WHITCHURCH ENGINEERING

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Initial Study and Proposed Mitigated Negative Declaration

## Planned Development on Redwood Way Fortuna, CA 95540

*California Environmental Quality Act (CEQA)*

Lead Agency:
City of Fortuna
621 11th St.
Fortuna CA, 95540

Lead Agency Contact:
Liz Shorey, Deputy Director/ Senior Planner
(707)725-7600
lshorey@ci.fortuna.ca.us

Prepared for:
**Dennis Fitze**
**1749 Alamar Way**
**Fortuna, CA 95540**

Prepared by:
**Whitchurch Engineering**
**610 9th St.**
**Fortuna, CA 95540**

*March 24, 2019*



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Eureka: (707) 444-1420

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*March 24, 2019*

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# Acronyms and Abbreviations

| | |
|---|---|
| APN | Assessor Parcel Number |
| ACOE | Army Corp of Engineers |
| CARB | California Air Resource Board |
| CCR | California Code of Regulations |
| CDFW | California Department of Fish and Wildlife |
| EPA | Environmental Protection Agency |
| ERD | Eel River Disposal and Resource Recovery Inc. |
| DFW | Department of Fishing and Wildlife |
| DTSC | Department of Toxic Substances Control |
| FCMP | Final Construction Management Plan |
| FFPD | Fortuna Fire Protection District |
| FMMP | Farmland Mapping and Monitoring Program |
| FPD | Fortuna Police Department |
| FVFD | Fortuna Volunteer Fire Department |
| GHG | Green House Gas |
| HCDEH | Humboldt County Division of Environmental Health |
| HMAP | Hazardous Materials Area Plan |
| HMRT | Regional Hazardous Materials Response Team |
| HOA | Homeowner's Association |
| HTA | Humboldt Transit Authority |

| | |
|---|---|
| LID | Low Impact Design |
| LOS | Level Of Service |
| MGD | Million Gallons per Day |
| MND | Mitigated Negative Declaration |
| NAAQS | National Ambient Air Quality Standards |
| NCAB | North Coast Air Basin |
| NCUAQMD | North Coast Unified Air Quality Management District |
| NSR | New Source Review |
| NPDES | National Pollutant Discharge Elimination System |
| ODCHC | Open Door Community Health Clinic |
| OSHA | Occupational Safety and Health Administration |
| PRC | Public Resource Codes |
| PD | Planned Unit Development |
| ROW | Right Of Way |
| RTS | Redwood Transit Service |
| SWMM | Storm Water Management Model |
| SWPPP | Stormwater Pollution Prevention Plan |
| TISR | Traffic Impact Study Report |
| TMDL | Total Maximum Daily Load |
| WWTP | Wastewater Treatment Plant |

# 1 Project Summary

| | |
|---|---|
| **Date:** | May 21, 2019 |
| **Project Title:** | Planned Development (PD) on Redwood Way Fortuna, CA 95540 |
| **Project Summary** | 59 cottage-style residences on individual lots for senior housing on two parcels with a total combined size of 14.73 acres. Amenities include a community center, common open space, pedestrian footpath, wetland preservation, and associated roads and utility services. |
| **Lead Agency:** | City of Fortuna |
| **Lead Agency Contact:** | Lead Agency Contact:<br>Liz Shorey, Deputy Director of Community Development<br>(707)725-1408<br>lshorey@ci.fortuna.ca.us |
| **Report Authors:** | Nicholas Notthoff, E.I.T., Project Engineer, Whitchurch Engineering<br><br>Jeff Laikam, P.E., Project Manager, Whitchurch Engineering |
| **Author Contact:** | Whitchurch Engineering<br>610 9th Street, Fortuna CA, 95540<br>(707)725-6926 |
| **Project Location:** | Redwood Way, Fortuna CA, 95540 |
| **Coastal Zone:** | Site is not located within the Coastal Zone |
| **Assessor Parcel Numbers:** | 202-082-005 and 202-121-002 |
| **General Plan Designation:** | Residential Low (R-L) |
| **Zoning:** | Residential Single Family (R-1-10) |
| **Anticipated Permits and Approvals** | 1) Planned Development/Tentative Map<br>2) Utility Improvement Plans<br>3) Building Permits for residential unit construction |

## 1.1 CEQA Requirement

The proposed Planned Development is subject to the requirements of the California Environmental Quality Act (CEQA). CEQA encourages lead agencies and applicants to modify their projects to avoid potentially significant adverse impacts (CEQA Section 20180 [C][2] and State CEQA Guidelines Section 15070[b][2]). The purpose of this Initial Study (IS) is to provide a basis for determining whether to prepare an Environmental Impact Report (EIR), Negative Declaration, or Mitigated Negative Declaration. This is intended to satisfy the requirements of CEQA (Public Resources Code, Div 13, Sec 21000-21177) and the State CEQA Guidelines (California Code of Regulations, Title 14, Sec 15000-15387).

Section 15063(d) of the State CEQA Guidelines states that an IS shall contain the following information in brief form:

1) A description of the project including the location of the project

2) An identification of the environmental setting

3) An identification of environmental effects by use of a checklist, matrix, or other method, provided that entries on a checklist or other form are briefly explained to provide evidence to support the entries

4) Discussion of means to mitigate identified significant effects, if any

5) An examination of whether the project would be consistent with existing zoning, plans, and other applicable land use controls

6) The name of the person or persons who prepared and/or participated in the Initial Study

The environmental checklist form contained in this document is based on Appendix G of the CEQA Guidelines (2018).

### 1.1.1 Lead Agency name and Address

Fortuna City Council
621 11th St
Fortuna, CA 95540

The Lead Agency for the proposed development is the City of Fortuna, per CEQA guidelines Section 21067.

### 1.1.2 Contact person(s) and phone number

Jeff Laikam, PE
Lead Engineer
Whitchurch Engineering
(707)725-6926
jtl@whitchurchengineering.com

Lead Agency Contact:
Liz Shorey
Deputy Director of Community Development
(707)725-1408
lshorey@ci.fortuna.ca.us

# 2 Project Description

The proposed project is a Planned Development (PD) on Redwood Way in Fortuna, California. It will consist of 59 cottage-style residences on the combined parcels for a total of 14.73 acres. This project will house senior residents in Fortuna, and ensure close proximity with both medical and shopping services. Strongs Creek is located on adjoining property to the north and northwest of the site, with a portion of the bank located on the site in the northwest area; Jameson Creek crosses the site in the southwest area. Riparian vegetation associated with these creeks will be preserved through a 50-foot bank setback, in accordance with Fortuna General Plan policies. The site also includes approximately 0.04 acres of wetlands to be preserved, and a 25-ft setback and fencing for wetland protection. Primary access is from Redwood Way. A 10-foot emergency road will be developed from Joseph Drive. Interior access will be provided with a new 20-foot private road with a 5-foot sidewalk. The private road entryway is located on a City-owned parcel (APN 202-082-004), for which an easement will be dedicated.

The project as designed is incorporating substantial green space and a creek side easement for a trail to achieve aesthetic integration with the local landscape. The historic horticultural elements (redwood tree, mature fruit trees, and wild roses) fall within the current design zone for green space and trails and shall be incorporated into the landscape design.

## 2.1 Project Location and Setting

The site is located on Redwood Way in Fortuna CA, 95540, east of the California state highway 101. The site is in the central area of Fortuna, generally between Rohnerville Road to the east, Redwood Way to the north, Kenmar road to the south, and Fortuna Boulevard to the west. The project parcels (APN: 202-082-005, 202-121-002) combined are approximately 14.73 acres in size. The majority of the site consists of pastureland, used for grazing cattle. There are no buildings, structures, or utility lines on the site. Jameson Creek crosses the site in southwestern area, and Strongs Creeks northwestern area. The parcel is located within the California Township and section S1 T2N R1W. The parcel is not located in a Coastal zone, but portions of the site are within the 100-year flood zone.

## 2.2 Applicant

Dennis Fitze
1749 Alamar Way
Fortuna, CA 95540

## 2.3 General Plan Designation

The General Plan land use designation is Residential Low (RL). This designation provides for single family detached homes, secondary residential units, public and quasi-public uses, limited neighborhood-serving commercial uses, and similar and compatible uses. The maximum allowable is 6.9 units per gross acre. The project proposes 59 units; the maximum number of units is 101 units.

## 2.4 Zoning

The zoning designation is Residential Single Family (R-1-10), allowing one single family residence per lot (FMC 17.03.011). The project proposes that each residence will be located on a separate lot.

Planned Development are allowed under Fortuna Municipal Code (FMC) Section 17.07.080, allowing waiver of minimum lot sizes (with no change in overall density) and other zoning standards, in exchange for amenities such as common open space. Each of the single family residences will be placed on a separate lot and built to the property lines, which will require waiver of the standard R-1-10 standards. The project proposes waiver of lot area, lot width, lot depth, ground coverage, and setbacks. In exchange, the development will include common open space for use by all of the residents, trails, and wetland and creek preservation. The opens spaces will be maintained by a homeowners' association (HOA).

## 2.5 Project Phasing

The PD is anticipated to be constructed in four phases, as shown on the tentative map.

## 2.6 Utilities

Installation of utilities includes water, sewer, and power lines to service each new residence. The sewer system will require the use of two pump stations to elevate the waste to the City's sewer system located on Redwood Way. The water system will be connected to the City's public water main in Redwood Way to the north, and looped to St. Joseph Drive to the west of the development. Sewer service will be privately maintained by the HOA and be connected to the City sewer lines under Redwood Way northeast of the site. Initial sizing and proposed layout of these systems are included and based on the City of Fortuna SWMM and EPANET models.

## 2.7 Roadway

The main access to the PD will be from Redwood Way. A new road will be installed to connect the PD to Redwood Way on the northern edge of the parcel. The road will be developed to a 20-foot width and 4-foot sidewalk. The interior development will include three cul-de-sacs and access across Jameson Creek to a looped road. An additional all-weather 10-foot road will be provided from St. Joseph Way for emergency access by the fire department and other emergency providers. Parking will be in designated areas adjacent to the road and in driveways and garages.

## 2.8 Drainage

Drainage for the project will adhere to requirements defined by the MS4 permit effective in the project area. Design of stormwater routing and detainment structures will be in conformance with Humboldt County LID Manual requirements. The use of self-detaining areas to retain and infiltrate drainage water will be utilized in the open space areas associated with the development.

## 2.9 Residential

The purpose of this proposed project is to construct 59 units that will house senior residents in Fortuna. The residences will be developed as 2-bedroom, 1.5 bathroom with a garage. Each unit will have access to roads per the connected driveway. The proposed development site plan sheets are included as attachments at the end of this document (Attachment A).

## 2.10 Surrounding Land Use

The parcel is bordered by the Redwood Memorial Hospital to the east, an assisted living facility to the north, single family residences to the west, and pastureland to the south and southwest. Strongs Creek borders the property to the north and Jameson Creek passes through the property in the southwestern portion of the parcel.

# 3 Public Agencies Requiring Approval

The City of Fortuna Planning Commission and City Council are the approving bodies for the planned development subdivision. The City of Fortuna Public Works Department will approve the public utility infrastructure plans. The City of Fortuna Building Division will permit the construction of the residential units.

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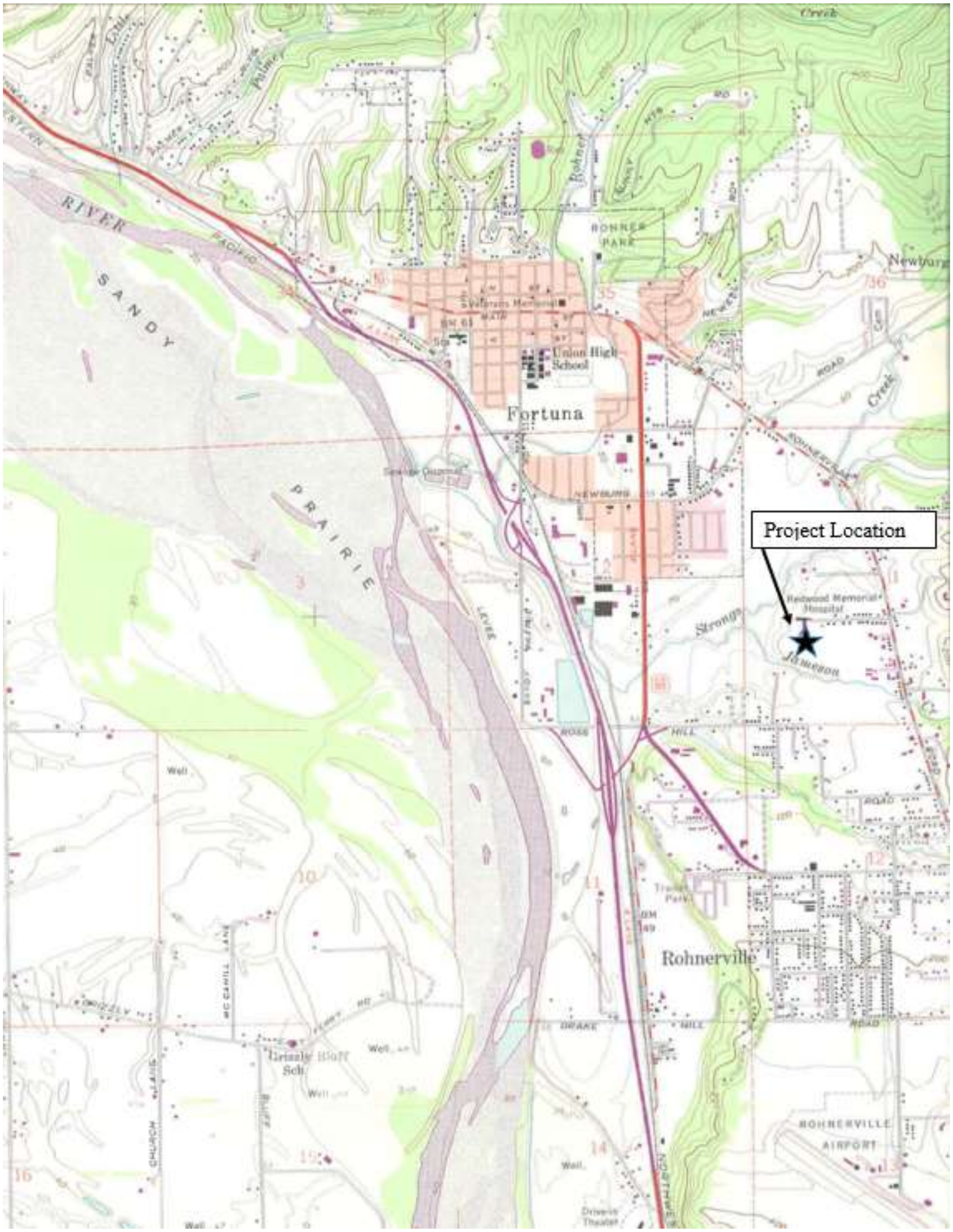


***Figure 1: Fitze Planned Development***


***Figure 2: Fitze Planned Development Aerial Photo***

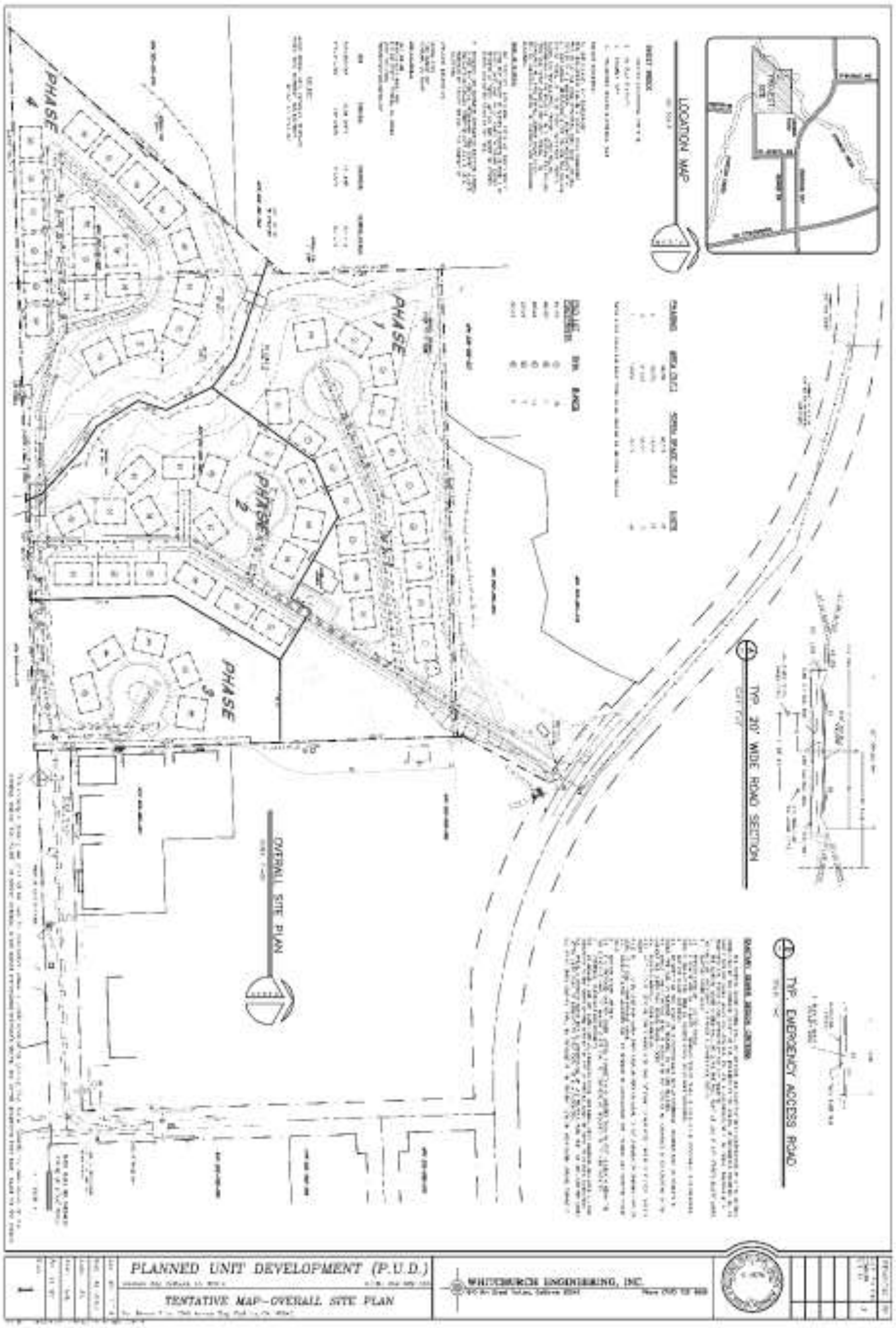


*Figure 3: Fitze Planned Development Tentative Map, Sheet 1*

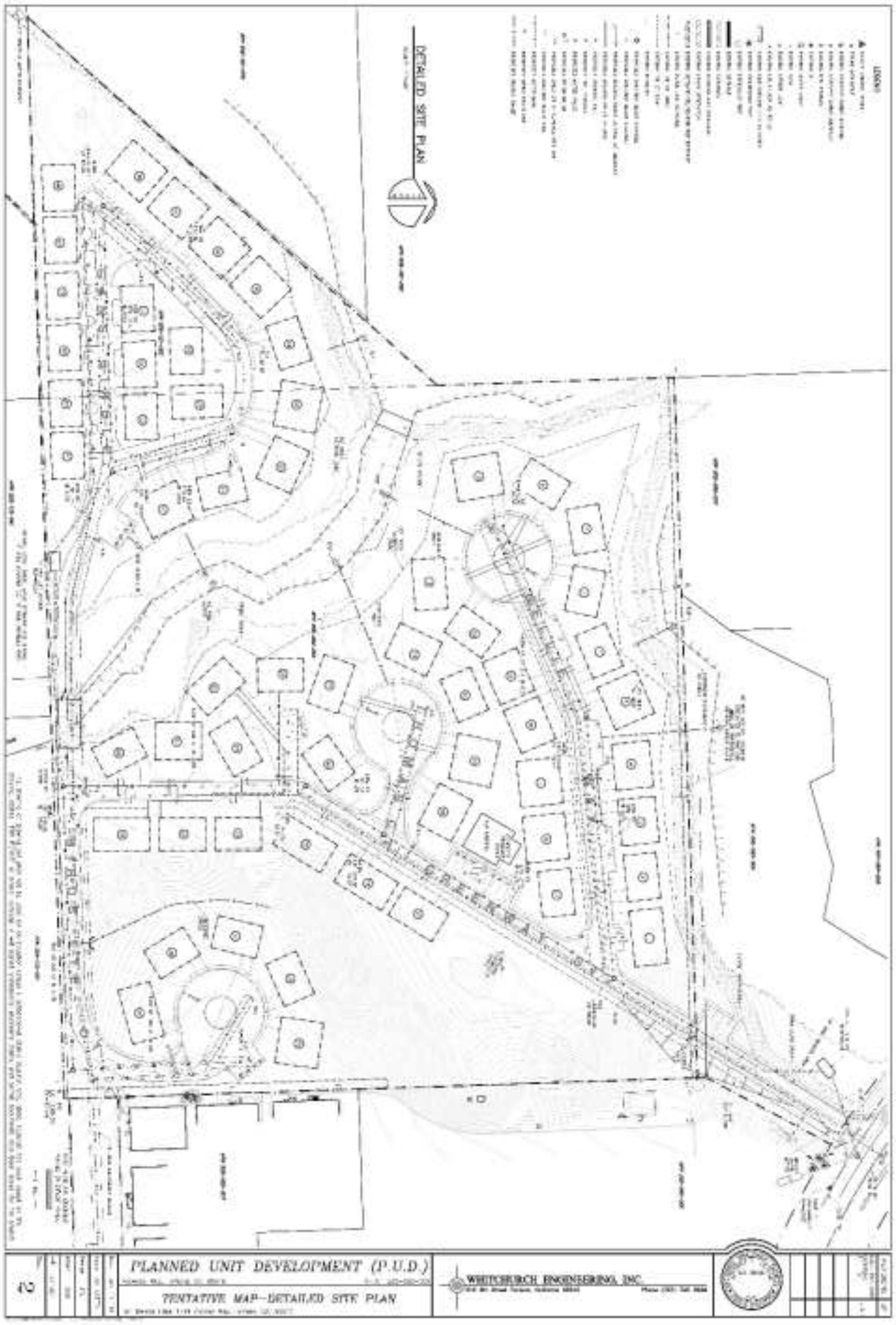


***Figure 4: Fitze Planned Development Tentative Map, Sheet 2***

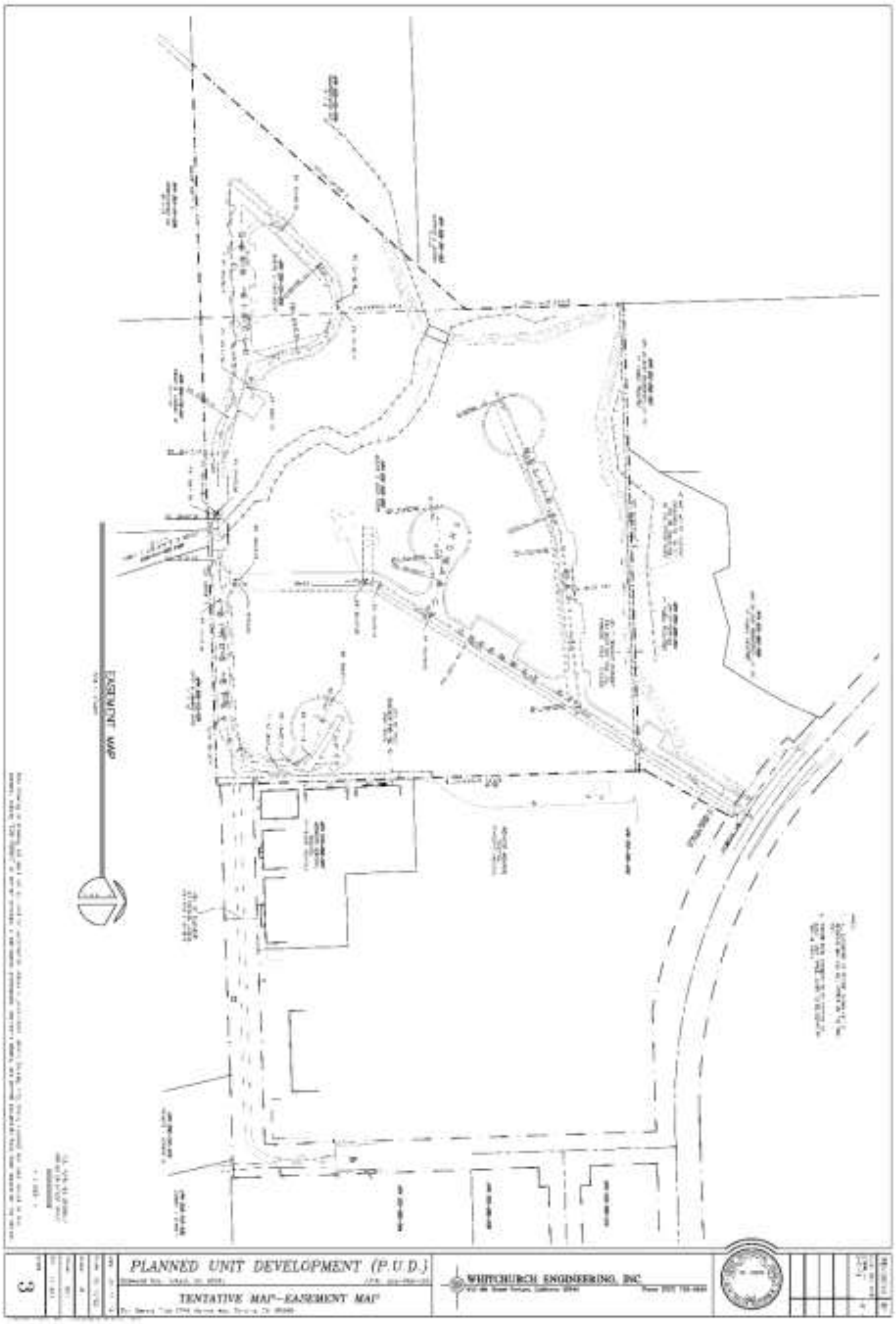


***Figure 5: Fitze Planned Development Tentative Map, Sheet 3***

BASIN 1
BASIN 2
BASIN 3
BASIN 4
BASIN 5
BASIN 6
GANS CIRCLE
NELLIE WAY
GREENWAY ST
PRELIMINARY GRADING & DRAINAGE PLAN
TYP. CREEK SIDE SELF-RETAINING AREA SECTION
PLANNED UNIT DEVELOPMENT (P.U.D.)
PRELIMINARY GRADING & DRAINAGE PLAN
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***Figure 6: Fitze Planned Development Tentative Map, Sheet 4***

# 4 Environmental Factors Potentially Affected

The environmental factors marked below have been determined to have a possible effect experienced due to the implementation of this project. Factors that involve at least one impact determined to be a "Potentially Significant Impact" include:

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Aesthetics | ☐ | Agriculture and Forestry Resources | ☐ | Air Quality |
| ☒ | Biological Resources | ☒ | Cultural Resources | ☒ | Geology/Soils |
| ☐ | Greenhouse Gas Emissions | ☐ | Hazards & Hazardous Materials | ☒ | Hydrology/Water Quality |
| ☐ | Land Use / Planning | ☐ | Mineral Resources | ☒ | Noise |
| ☐ | Population / Housing | ☐ | Public Services | ☐ | Recreation |
| ☒ | Transportation/Traffic | ☐ | Tribal Cultural Resources | ☐ | Utilities / Service Systems |
| ☐ | Mandatory Findings of Significance | | | | |

A detailed explanation of all responses follows in Section 4 of this report. All answers take into account 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. The explanation of each issue identifies: (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 a less than significant level.

## 4.1 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. |

Liz Shorey

May 22, 2019

Liz Shorey, Deputy Director
of Community Development

Date

## 4.2 Evaluation of Environmental Impacts

A detailed explanation of all responses follows in Section 10 of this report. All answers take into account 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. The explanation of each issue identifies: (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 a less than significant level.

In the checklist the following definitions are used:

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 offsite as well as onsite, 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 citied 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 analysis of each issue should identify:
    a) the significance criteria or threshold used to evaluate each question; and
    b) the mitigation measure identified, if any, to reduce the impact to less than significant

## 4.3 AESTHETICS

***Table 1: Aesthetic impact evaluation***

| I. **AESTHETICS**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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, which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☒ | ☐ |

### 4.3.1 THRESHOLDS OF SIGNIFICANCE

The project would have a significant effect on aesthetic resources if it would have a substantial adverse effect on a scenic vista; substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway; substantially degrade the existing visual character or quality of the site and its surroundings; create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

### 4.3.2 Discussion

Views within the project site include the senior living facility looking south, Redwood Memorial Hospital looking west, farm land facing north, and residential houses looking east (however dense vegetation will limit the residential houses from viewing the land). Thus, the viewshed is a combination of urban and rural areas.

#### a) Adverse Effect on a Scenic Vista – Less than Significant Impact

The project area is substantially surrounded by urban and suburban development including a senior living facility, hospital, single family residential neighborhood and rural residential uses. The project area may be temporarily altered by equipment, construction materials, and workers during active construction. The changes to these views will be minor, temporary, and will generally be visible only to the public in the immediate vicinity of the active portion of construction.

Post construction, the new residences will be substantially set back from Redwood Way. Upon completion of the project, there will not be any substantial discernible alterations to the visual nature of the area as native landscape plantings and trees are part of the project development and most adjacent properties are also developed to typical urban or suburban densities. The zoning of the site is Residential Single Family (R-1-10). The proposed development is suitable for this zoning, and single-family residences are not considered to be a visual nuisance.

b) Damage Scenic Resources within a State Scenic Highway – No Impact

Based on California Scenic Highway Mapping System information, no designated state scenic highways are found adjacent to or within view of the project site (California Department of Transportation, 2015). There are no officially designated State Scenic Highways within Humboldt County, although Highway 101 has been identified by the State Scenic Highway Mapping System as eligible for state listing for its entire length in Humboldt County. The project site is not visible from Highway 101.

c) Degrade Existing Visual Character – Less than Significant Impact

Construction activities associated with the project will result in minor temporary aesthetic impacts that will not substantially alter/degrade the existing visual character of the project area. Site work will include installation of a roadway, driveways, parking, sidewalks and development of usable space for recreation. The project will not substantially degrade the existing visual character, or the visual quality of the project site and its surroundings. The riparian areas surrounding both Jameson and Strongs Creek will be substantially unaltered. Therefore, the project will not substantially alter the existing visual character of the project site or its surroundings. The impact is less than significant.

d) New Source of Light or Glare – Less than Significant Impact with Mitigation Incorporation

Construction of the project will occur during daylight hours and will not produce a noticeable amount of light or glare. For public safety reasons, street lights will be installed in the parking areas. Street lighting will consist of low-pressure sodium lighting on light standards pursuant to City policy.

The City of Fortuna General Plan policy requires that all new development provide on-sight lighting to be shielded and downward facing to limit night sky illumination and to prevent direct views of lighting elements from neighboring streets and properties.

### 4.3.3 FINDINGS

The Proposed Project will not have a substantial adverse effect on scenic resources or visual character. For the reasons stated above, the project will have Less than Significant Effect.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

## 4.4 AGRICULTURE AND FORESTRY RESOURCES

***Table 2: Agriculture and Forestry Resources impact evaluation***

| II. **AGRICULTURE AND FORESTRY RESOURCES.** Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? | ☐ | ☐ | ☐ | ☒ |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forestland to non-forest use? | ☐ | ☐ | ☐ | ☒ |

### 4.4.1 Thresholds of Significance

Agriculture and Forestry Resources would be significantly affected by the proposed project if the project were to convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (hereafter “farmland”), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program (FMMP) of the California Resources Agency, to non-agricultural uses. Significant impacts to Agricultural and Forestry Resources would also occur if the project conflicted with existing zoning for agricultural use or a Williamson Act contract; conflicts with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)); Result in the loss of forest land or 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 Farmland, to non-agricultural use or conversion of forestland to non-forest use.

### 4.4.2 DISCUSSION

Maps prepared pursuant to California’s FMMP include Humboldt County as an “Area Not Mapped” and, therefore do not categorize the project area as having any type of Important Farmland (California Department of Conservation, 2012). According to the Fortuna General Plan



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Background Report (Mintier & Associates et al. 2009), most of the City of Fortuna is located on prime farmland. The City of Fortuna General Plan 2030 Draft Programmatic Environmental Impact Report (DPEIR) identifies the project site as prime farmland. The DPEIR indicates that approximately 923 acres of the City's planning area of 8,051 acres is prime farmland. The subject site is approximately 0% of the prime farmland identified in the City of Fortuna planning area. According to the Fortuna General Plan Background Report, there are no parcels under Williamson Act contract within or adjacent to the project site (Mintier & Associates et al. 2009).

According to the Humboldt County WebGIS Portal, the parcel is considered prime agricultural land and has a Storie Index rating of 65, or good for agriculture and a Grade 2 rating. The Storie Index expresses relative suitability soil for general intensive agriculture (Humboldt County, 2002). Grade 1 soils (those with a Storie Index rating from 80 to 100) are well-suited to general intensive agriculture. They are easily worked and very productive; irrigation is simple and efficient. The Lower Eel River Watershed contains the City of Fortuna and greater Planning Area and is the watershed with the greatest area of Grade 1 soils and prime farmland in Humboldt County (Humboldt County, 2002). Figure 1 shows a map of the city of Fortuna and all its prime farmland and forestry land.

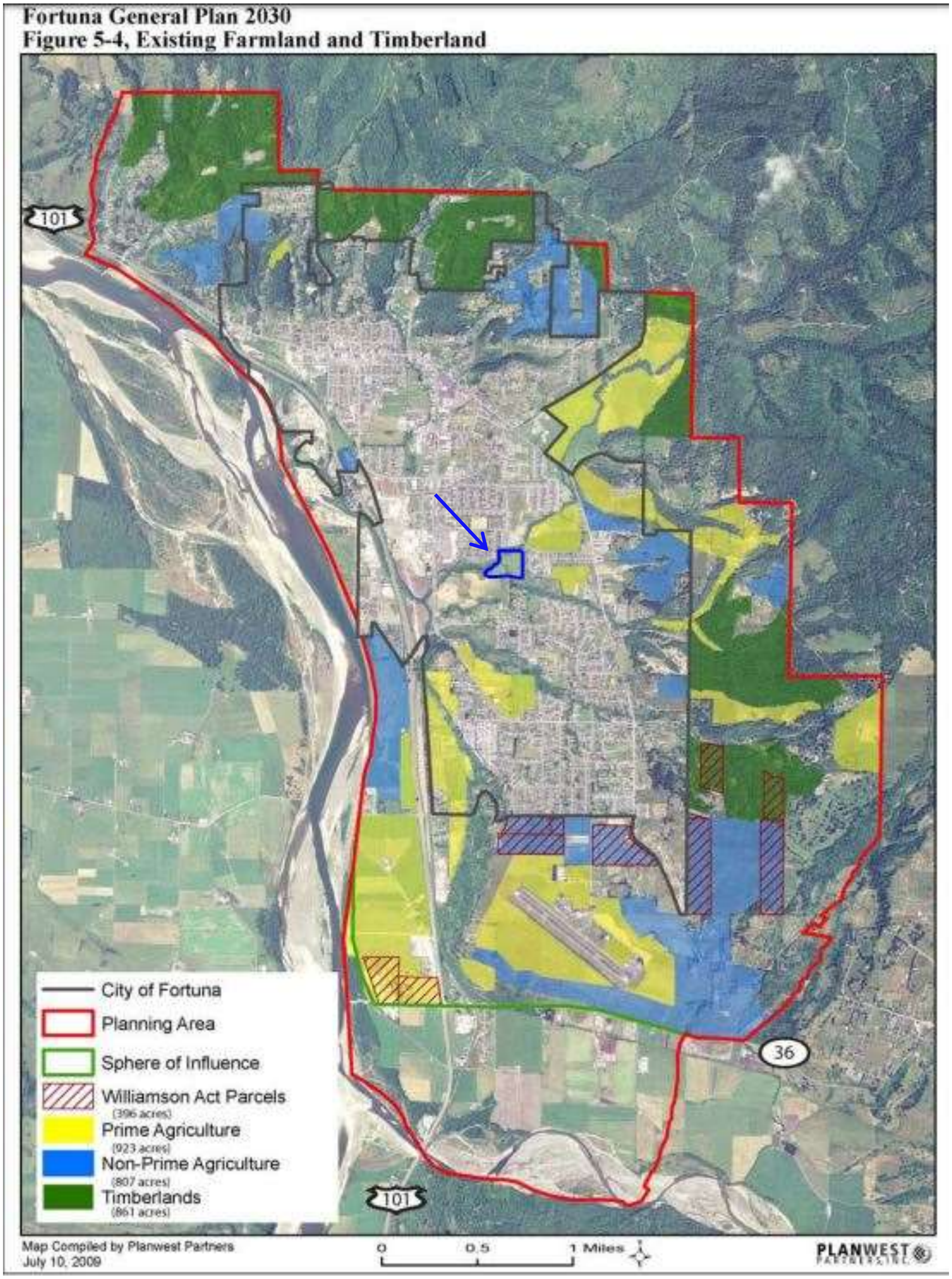


***Figure 7: Map of Agriculture and Timber land in Fortuna, California. Site is marked with blue outline.***

a) Convert Farmland – Less Than Significant

The project site does include local designated Prime Farmland but not Unique Farmland, or Farmland of Statewide Importance, as shown on any maps prepared pursuant to the FMMP. The project will not convert FMMP designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use. The project site has historically been used for growing hay and other silage and for the grazing of cattle, however, a 13.35-acre parcel does not typically provide sufficient area to sustain economically viable agricultural activity and the site has been designated for development in the Fortuna General Plan. According to the General Plan 2020, 289 acres of the 923 acres designated as Prime Farmland in the planning area is designated for urban use including the project site. Thus, the 13.35 acres of the project site represents approximately 0 percent of the prime farmland within the planning area; therefore, the project will have a less than significant effect.

b,c) Conflict with Existing Zoning for Agricultural Use or Forest Land or Result in the Loss of Forest Land – No Impact

The project site is zoned R-1-10. There are no parcels in the project site or in the vicinity under Williamson Act contract (California Department of Conservation 2012) or zoned for Timberland Production. The project will not conflict with agricultural or forest land zoning or Williamson Act contracts and will not result in the loss of forest land; therefore, no impact will occur.

d) Convert Forest Land or Farmland – No Impact

The subject site is substantially surrounded by properties developed with urban and suburban uses with no adjacent forest land, timber land or intensive agricultural uses. Therefore, development of the subject site does not have the potential to cause the conversion of other farmland to non-agricultural use or conversion of forest land to non-forest use. No impact has been identified.

#### 4.4.3 MITIGATION MEASURES
No mitigation required.

#### 4.4.4 FINDINGS
The Project will have a Less than Significant Impact on Agricultural and Forestry Resources.

## 4.5 AIR QUALITY

***Table 3: Air quality impact evaluation***

| **III. AIR QUALITY**. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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, which exceed quantitative thresholds for ozone precursors)? | ☐ | ☐ | ☒ | ☐ |
| d) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ☒ | ☐ |
| e) Create objectionable odors affecting a substantial number of people? | ☐ | ☐ | ☒ | ☐ |

### 4.5.1 Thresholds of Significance

The project would have a significant effect on Air Quality if it conflicts with or obstructs implementation of applicable air quality plans; violates any air quality standard or contribute substantially to an existing or projected air quality violation; results in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors); exposes sensitive receptors to substantial pollutant concentrations; or creates objectionable odors affecting a substantial number of people.

### 4.5.2 DISCUSSION

The climate in Fortuna is moderate, with the predominant weather being moist air masses moving in a westerly direction from the ocean. Average annual rainfall is approximately 40 inches with the majority falling between October and April. The Draft Environmental Impact Report for the City of Fortuna General Plan Update concludes that: "The City of Fortuna benefits from generally good airflow and quality. Its primary sources of air emissions include smoke from residential wood stoves, vehicular exhaust particulates, and dust from unpaved roads."

The Proposed Project is located within the North Coast Air Basin (NCAB) and is subject to North Coast Unified Air Quality Management District (NCUAQMD) requirements. The NCUAQMD is responsible for monitoring and enforcing local, state, and federal air quality standards in the County of Humboldt. Air quality standards are set for emissions that may include, but are not limited to, visible emission, particulate matter, and fugitive dust. The entire NCAB is currently designated as “non-attainment,” or in excess of allowable limits, for the State 24-hour $PM_{10}$ standard for breathable particulate matter of 10 microns or less ($PM_{10}$), and as “attainment,” or within allowable limits, with respect to the balance of the criteria pollutants (http://www.ncuaqmd.org/index.php?page=aqplanning.ceqa).

**a) Conflict with or Obstruct Applicable Air Quality Plan – Less than Significant Impact**

The Health and Safety Element of the Fortuna General Plan (October 2010) includes policies to maintain compliance with NAAQS for $PM_{10}$ (Policy HS-3.2 Particulate Matter); to reduce Greenhouse Gas emissions (Policy HS-3.6 Greenhouse Gas Emissions Reduction from Transportation); and require that new development incorporate air pollutant emission reduction measures during construction and operation (Policy HS-3.7 Air Pollutant Emission Reduction Construction and Operation Measures). The Health and Safety Element also includes programs to work with the NCUAQMD to develop and implement an Air Quality Management Plan for controlling $PM_{10}$ (Program HS-4); and to require proposed new subdivisions, PDs, and other large development projects to implement air emission reduction measures (Program HS-5).

The project will generate a minor amount of particulate emissions over the duration of construction in the form of dust, and vehicle and equipment emissions as a result of earthwork, trenching, clearing, grading, and other construction activities. The project will not cause any long-term increase in the emissions of particulate matter or other air pollutants as the primary purpose of the project is to consolidate existing health care services and to provide additional services to residents of Fortuna and the Eel River Valley, limiting the need to travel to more distant providers. To reduce potential impacts to air quality, the City of Fortuna General Plan includes construction emission reduction measures that are required for development projects. Those are incorporated into the project. While the NCAB is in non-attainment for $PM_{10}$, the temporary nature of construction activities combined with project implementation of standard dust and $CO_2$ emission reduction actions during construction will avoid significant impacts.

In the long term, the project will not substantially add to the level of $PM_{10}$ or other emissions such that it will cause a cumulatively considerable net increase of pollutant emissions in the area. With implementation of Best Management Practices (BMPs) and the City’s Construction Emission Reduction Measures, which are incorporated into the project, the project will not obstruct implementation of the NCUAQMD particulate matter attainment plan. The project will also be consistent with applicable General Plan policies related to air resources and a less than significant impact will occur.

**b) Violate Air Quality Standard or Contribute Substantially to Existing or Projected Air Quality Violation – No Impact**

Under the federal Clean Air Act of 1977, the US Environmental Protection Agency (EPA) is required to identify NAAQS to protect public health and welfare. The EPA has established NAAQS for six criteria air pollutants (Carbon Monoxide, Lead, Nitrogen Dioxide, Ozone, Particle Pollution and Sulfur Dioxide); however, the NCAB does not meet or exceed these federal pollutant thresholds. Under the California Clean Air Act, the California Air Resources Board (CARB) has adopted more stringent standards for the criteria air pollutants. Though it has adopted a particulate matter attainment plan, the NCUAQMD has not established specific thresholds of significance for criteria pollutants. As discussed above, the NCAB is currently designated as a state non-attainment area for $PM_{10}$, but does not violate any other federal, state, or local air quality standards (CARB 2013). In the NCAB, most particulate matter is caused by vehicle emissions, wind generated dust, construction dust, wildfire and human caused wood smoke, and sea salts. Health effects from particulate matter include reduced lung function, aggravation of respiratory and cardiovascular diseases, increases in mortality rate, and reduced lung function and growth in children.

It is anticipated that the following equipment will be used during construction, which is anticipated to last between twelve and fifteen months: excavator, bulldozer, roller, backhoe, concrete trucks and dump trucks for hauling materials.

During project construction, a small number of trips associated with the delivery of materials will occur throughout the construction period. The trips will create a minor temporary air quality impact within the neighborhood immediately surrounding the project area.

Disturbance of soil at the project site during excavation and earthmoving will contribute to project dust emissions. Project construction will require trucks to remove excess materials to a disposal site and to deliver construction and fill materials to the project site. In addition to haul truck trips, workers will travel to and from the project site each day, generating a minor amount of daily commute trips.

The project will be required to comply with all rules and standards of the NCUAQMD and with air pollution prevention BMPs incorporated into the project.

**c) Result in Cumulatively Considerable Net Increase of Any Criteria Pollutant for which the Region is in Non-Attainment – Less than Significant Impact**

As described above, the NCAB is in non-attainment for the criteria air pollutant $PM_{10}$; however, as discussed above, with incorporation of construction emission reduction measures that are required for development projects (Environmental Protection Action 1) in the City of Fortuna, project construction will cause only minor and short-term production of $PM_{10}$ and will not significantly increase the background levels. Project operation will result in negligible additional $PM_{10}$ emissions; therefore, the project will result in a less than significant cumulative impact to air quality from criteria air pollutant and precursor emissions.

**d) Expose Sensitive Receptors to Substantial Pollutant Concentrations – Less than Significant Impact**

Construction of the project will create temporary emissions of toxic air contaminants, primarily as a component of diesel emissions. Due to the variable nature of construction activity, the generation of toxic air contaminant emissions in most cases will be temporary, particularly considering the short amount of time such equipment is typically within an influential distance of sensitive receptors. Sensitive receptors in the project area include residences, churches, schools, a hospital, and areas adjacent to roadways where the general public will have access. Concentrations of mobile-source diesel PM emissions are typically reduced by 70 percent at a distance of approximately 500 feet. In addition, 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 variable nature of construction activities associated with this project.

Construction will commence in the summer of 2019 between the hours of 7:00 AM and 7:00 PM, Monday through Friday. Construction will be allowed on weekends and holidays subject to City approval. As discussed above, the project will result in only minor, short-term construction-related air emissions. Additionally, the implementation of the City's construction emission reduction measures that are required for development projects (Environmental Protection Action 1), will keep diesel $PM_{10}$ exhaust emissions at lower levels. As these emissions are temporary in nature, health risks from project construction are not anticipated. Construction impacts are less than significant.

Project operation will not expose sensitive receptors to substantial pollutant concentrations as the project does not include any significant stationary source emissions, as the project components are those typical for a residential PD. Source emissions will be constrained to resident vehicles, and intermittent gardening equipment. Therefore, operational impacts will be less than significant.

**e) Create Objectionable Odors – Less than Significant Impact**

During construction the various diesel-powered vehicles and equipment could create localized odors. Additionally, some materials used in construction or substrates encountered in sub-surface construction may create objectionable localized odors. These odors will be temporary and not likely to be noticeable for extended periods of time beyond the construction zone due to atmospheric dissipation. The impact will be less than significant.

The project will comply with City of Fortuna new Planned Development/Subdivision and other large development projects air emission reduction measures (City of Fortuna; General Plan - HS-5, 2010) through the application of the following control measures;

1) Use watering to control dust during tree clearing activities
2) Spray exposed soils and dirt roads as needed during clearing, grading, and trenching;
3) Sweep paved streets used by earth-moving equipment at least once a day;
4) Apply soil stabilizers to areas where development or landscaping will not occur within tree (3) days of grading;
5) Plant ground cover in disturbed areas immediately after grading;
6) Cover haul truck loads;
7) Use only low VOC and low formaldehyde coatings, paints and insulation in buildings;
8) Fit construction equipment with EPA and/or NCAQMD-approved exhaust systems, and keep these vehicles tuned and in good working order;
9) Limit diesel-powered construction equipment idling time to 10 minutes maximum; and
10) Stage diesel-powered construction equipment as far away from residences as possible.

#### 4.5.3 FINDINGS

The Project will have a Less than Significant Impact on Air Quality with the project standards.

## 4.6 BIOLOGICAL RESOURCES

***Table 4: Biological Resources impact evaluation***

| **IV. BIOLOGICAL RESOURCES**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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, and 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? | ☐ | ☐ | ☐ | ☒ |

### 4.6.1 Thresholds of Significance

The project would have a significant impact to Biological Resources if it were to 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 Wildlife or U.S. Fish and Wildlife Service; have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service; 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; 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; conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

### 4.6.2 DISCUSSION

Zoning of the site is Residential Single Family (R-1-10). The site is surrounded by residential uses to the northwest and southeast, an assisted living facility to the north, patureland to the southwest, and Strongs Creek to the north and northwest. The undeveloped site is largely composed of a pasture, which flanks Strongs Creek along portions of the northern and western property border. The field is vacant and has been typically used for cattle and horse grazing. The Strongs Creek stream channel is located on adjacent land to the north, but portions of the bank and riparian vegetation are on the project site. Jameson Creek crosses the site in the southwest project area. Several small wetlands are located on the site, totaling 0.04 acres in size. In general, the entire site to be developed is heavily grazed and in poor condition for biological resources habitat.

The pasture is vegetated by sweet vernal grass (*Anthoxanthum oderatum*), English daisy (*Bellis perennis*), velvet grass (*Holcus lanatus*), perennial ryegrass (*Lolium perenne*), penny royal (*Mentha pulgeium*) and white clover (*Trifolium repens*). Non-tree vegetation along the riparian edges is composed of Himalayan blackberry (*Rubus armeniacus*) as well as California blackberry (*Rubus ursinus*).

The Strongs Creek and Jameson Creek riparian forest is dominated by red alder (*Alnus rubra*) with scattered Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scoulerii*), California bay (*Umbellularia californica*), and bigleaf maple (*Acer macrophyllum),* with an understory of salmon berry (*Rubus spectabilis*), cascara (*Rhamnus purshiana*), thimbleberry (*Rubus parviflorus*), and ground cover including colt's foot (*Petasites frigidus var. palmatus*), lady fern (*Athyrium felix-femina*), and creeping buttercup (*Ranunculus repens*).

Currently, the pastures on the site provide limited wildlife habitat for mammals, reptiles, amphibians, and avian species due to the heavily grazed condition and limited forage, cover or nesting habitat. The most suitable habitat on site for wildlife cover and breeding bird use, is the Strongs Creek riparian. No development will occur within 50 feet of the Strongs Creek bank and riparian area, and it will continue to function as a wildlife corridor.

Development activities will not have a significant effect on sensitive wildlife because all development activities will take place within the existing pasture area. Grading will occur outside of the 50-foot creek setback from the high flow channel and the 25-foot wetland setback. This project will have a less than significant impact to special-status species, riparian habitat or sensitive natural community.

Although the project area does contain some native plants and associations the overall vegetation stand is largely composed of introduced species and the area has been graded and mowed repeatedly in the past and has otherwise been impacted through its use for livestock grazing. The on-site vegetation type is not considered to have a high conservation value or a high-quality occurrence of the given communities due to past management, and the presence of invasive and non-native plant species. Riparian areas surround both Jameson and Strongs Creek on site. A streamside management area has been defined and includes a setback of 50-ft from the top of bank of each stream as required by the City of Fortuna. This setback will ensure preservation of riparian vegetation.

A wetland survey was conducted for the subject property by J. Regan Consulting in October and November 2016 for APNs 202-082-005 and 202-121-002. Three small areas with a total area of 0.04 acres meet the Army Core of Engineers (ACOE) requirements to be defined as jurisdictional wetlands with the main site area (APN: 202-082-005). These wetlands have been reviewed and approved by the American ACOE, the approved Jurisdictional determination and wetland delineation report can be found in the attachments of this study (Attachment B).

**a) Impacts to Special-Status Species, Riparian or Sensitive Natural Community – Less than Significant Impact with Mitigation**

The project will be constructed in the vicinity of Strongs and Jameson Creeks, but development will not encroach on the 50-ft streamside management area. Wetlands are recommended in the Fortuna General Plan to have a 50-foot setback; however, the Fortuna General Plan Policy NCR-15 allows for a reduced setback up to 25 feet when a biological report indicates that such wetland buffer areas are not required. Site review by J. Regan consulting indicates that wetland setback could potentially be reduced to 25-ft as the jurisdictional wetlands on site do not function as high value animal habitat (Attachment C).

Vegetation at the sites has been altered and modified by past land use and development. These activities have altered the environmental conditions at the sites so that common, non-native plant species dominate the sites. The ongoing disturbed nature of the sites and regular impacts from human intrusion are factors that likely contribute to the absence of rare plants or their ability to colonize the site over time, with the exception of species that can tolerate a high disturbance regime. Through the ACOE wetland delineation process, database information concluded that there are no previously known rare plant populations within the project parcels.

Given the above information and that no special status plant species were observed during the Regan Consulting wetland delineation, the proposed project is not anticipated to directly or indirectly impact any listed or special status plant species; thus, anticipated impacts are less than significant.

**b) Effect on Wetlands – Less than Significant Impact with Mitigation**

The Regan Consulting report revealed several potential jurisdictional wetlands at the project site. The wetlands report concluded that the wetland was described as relatively low function due to past and current agricultural use, lack of hydrological connection to other waters, the small size (0.04 acres) and the disturbed nature of the Oregon ash grove.

In a letter dated November 28, 2018 from the US Army Corps of Engineers, a Jurisdictional Determination was approved determining there are no jurisdictional water of the United States and navigable waters of the United States within the boundary area of the site – per Section 404 of the Clean Water Act. The site, in terms of this report, includes the entry way to the proposed project, and does not include the total parcel areas included in the previous wetland delineation report (Attachment B). The Jurisdictional Determination and the wetland delineation report associated with it the project entry way can be found in the attached documentations (Attachment D).

Every unit will be at least 50 feet from the riparian zone as to not disrupt the surrounding environment. Jurisdictional wetlands are recommended to have a 50-foot setback for any development. Through communication with the City of Fortuna and review by J. Regan Consulting, it has been determined that the setback may be reduced to 25 feet around the wetland areas without impact to the wetlands. This reduction was determined to be appropriate based on the analysis that the wetlands located on site do not function as high value animal habitat.

**c) Interfere with Movement of Fish or Wildlife Species – No Impact**

Development activities will not have a significant effect on fish or wildlife because all development activities will take place within the existing disturbed pasture area. Grading will occur outside of the 50-foot creek setback from the high flow channel and the 25-foot wetland setback. This project will have a less than significant impact to special-status species, riparian habitat or sensitive natural community. Implementation of the project will not interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. No impact will occur.

**d) Interfere with Movement of Fish or Wildlife Species, Migratory Wildlife Corridors or Native Wildlife Nursery Sites –Less than Significant Impact with Mitigation Incorporated**

This project is not anticipated to impede the use of native wildlife nursery sites. However, suitable Strongs Creek and Jameson Creek riparian habitat exists on site for wildlife cover and breeding bird use. Development will not occur within the 50-foot riparian buffer and will not occur during the breeding season before a nesting survey is completed (BR-3 Mitigation). No work will be performed within Strongs or Jameson creeks, therefore potential migratory fish within the channel will not be effected.

The Fortuna General Plan includes Policy NCR-2.1 (Riparian Corridor Protection), to address fish and terrestrial wildlife habitat protection, enhancement, and movement along riparian corridors. The Strongs and Jameson creeks riparian will remain as a buffer. No other development will occur within 50 feet of the riparian corridor.

This project will have a less than significant effect on the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. With the incorporation of BR-3 Mitigation, this project will have a less than significant effect on native wildlife nursery sites.

**e) Habitat Conservation Plan – No Impact**

The City of Fortuna does not have an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan within which the project will conflict. Furthermore, according to the Fortuna General Plan Background Report (City of Fortuna 2007), the Fortuna General Plan Planning Area (which encompasses both incorporated territory and unincorporated areas that may directly or indirectly affect the City's future development) is not subject to an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impact will occur.

### 4.6.3 MITIGATION MEASURES

**BR-1: Compliance with Army Corps Nationwide Permit.**

Timing for Implementation/Compliance: City plan review of improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review and pre-construction site review.

Evidence of Compliance: Final development plans depict creek banks and wetland areas and setbacks. City Community Development Department to review Nationwide Permit during plan review to ensure protection measures are depicted. Building Inspectors to review during site development to ensure fencing and other measures are implemented.

**BR-2: Maintain the 50-ft setback from Strongs and Jameson creeks' top of bank. Maintain 25-ft setback from jurisdictional wetlands.**

Timing for Implementation/Compliance: City plan review of improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review and pre-construction site review.

Evidence of Compliance: Plans depict 50-foot setback from Strongs and Jameson Creeks, and 25-foot setbacks from wetlands.

BR-3: Migratory Bird Protection

There are potential direct impacts to migratory bird species if construction or vegetation removal occurs during the breeding season (March 1- August 15). Therefore, preconstruction nesting surveys will be performed if construction will occur during that time to mitigate these potential impacts.

If breeding birds are found in the vicinity, construction will be delayed until after the breeding season or proper setbacks should be established in cooperation with the California Department of Fish and Wildlife prior to proceeding with construction.

Timing for Implementation/Compliance: March - August
Person/Agency Responsible for Monitoring: Owner
Monitoring Frequency: Once, pre-construction
Evidence of Compliance: Visual or written verification that no breeding birds are present.

### 4.6.4 FINDINGS

The Project will have Less than Significant Effect on Biological Resources with Mitigation Incorporation.

## 4.7 CULTURAL RESOURCES

***Table 5: Cultural Resources impact evaluation***

| V. **CULTURAL RESOURCES**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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) Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074? | ☐ | ☐ | ☒ | ☐ |

### 4.7.1 Thresholds of Significance

The project would have a significant effect on Cultural Resources if it would cause a substantial adverse change in the significance of a historical resource as defined in '15064.5; cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5; directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or disturb any human remains, including those interred outside of formal cemeteries; or create change in the significance of a tribal cultural resource as defined in Public Resources Code 21074.

### 4.7.2 DISCUSSION:

A Cultural Resources Investigation (CRI) for this project was performed by William Rich M.A., RPA of William Rich and Associates (Appendix E). The purpose of this investigation was to determine whether historical resources are present within the proposed project area or adjacent areas.

The investigation methods included a review of the files at the Northwest Information Center (NWIC) located in Rohnert Park, California. Review of archaeological and historical literature and historic photographs pertinent to the project region was conducted at the Humboldt County Historical Society, Humboldt State University (HSU) Library-Humboldt Room, the HSU Cultural Resources Facility and the author's personal files. Correspondence with Native American Tribes was initiated by the City of Fortuna. William Rich and Associates obtained a sacred land search from the Tribal Preservation Historical Officer for the Bear River Band of the Rohnerville Rancheria and the Chairman of the Wiyot Tribe.

According to the NWIC records search, a portion of the project area has been subject to a previous cultural resources survey as part of a proposed sewage system for the community of Rohnerville (Gorrell, 1976). No known cultural resources are recorded in the area proposed for the subdivision; however, four Native American archaeological sites, an archaeologically sensitive area and an historic period barn and residence are located within ½ mile of the project area.

Ethnogeographic information for the project location is sparse. Research indicates that the Wiyot's ancestral area included what is today Fortuna and extended south to Alton. The closest Wiyot village was known to be situated at the mouth of Strongs Creek along the Eel River, well outside of the project area (Loud, 1918).

A pedestrian field survey was completed for the entire project area on April 30, 2019. Survey conditions were good with adequate light and numerous exposures of mineral soil throughout the survey area. Shovels and trowels were used to clear ground cover in some areas where ground visibility was obscured.

The report concluded that no significant archaeological or historic period resources, for the purposes of CEQA, exist in the limits of the proposed subdivision area. At this time, no further archaeological studies are recommended for the project by William Rich and Associates. Although the report finds that it would be unlikely to encounter significant buried archaeological materials during project implementation, the Cultural Resource Protection Protocol described below would ensure potential project impacts on inadvertently discovered cultural resources are eliminated or reduced to less than significant levels.

**a, b, d)** Cause a Substantial Adverse Change in the Significance of a Historical or Archaeological Resource; or Disturb any Human Remains, Including Those Interred Outside of Formal Cemeteries – No Impact

The Cultural Resources Investigation report concludes that no significant archaeological or historic period cultural resources, that for the purposes of CEQA (15064.5 (a)), would be considered an historical resource, exist in the limits of the proposed project area. Therefore, the Code of Federal Regulations (CFR) recommends a finding of no substantial adverse changes (PRC §5020.1(q) and 14 CCR §15064.5(b)(1)) to historical resources.

In the event that cultural resources are unearthed during project implementation, Cultural Resource Protection Protocol 1 and 2, stated in the following pages, will be implemented. These offer recommendations that would ensure potential project impacts on inadvertently discovered cultural resources are eliminated or reduced to less than significant levels. At this time, no further archaeological studies are recommended by Williams & Associates. This project will not cause any known disturbance to human remains, and will have no known significant impact on historical or archeological resources.

**c)Directly or indirectly destroy a unique paleontological resource or unique geologic feature – Less than significant with Mitigation**

According to the Fortuna General Plan, the bluffs overlooking the Eel River, which are miles from the project site, are a significant source of fossils. Therefore, unique paleontological resource or geologic features have the potential to exist within Fortuna's Planning Area. However, it is unlikely these resources exist on the project site because of the site's geologic conditions. The area is described in the *Geologic Map of California* as "Pleistocene-Holocene alluvium playa, and terrace deposits; unconsolidated and semi-consolidated. Mostly non-marine, but includes marine deposits near the coast."

During the pedestrian field survey, attention was given to the banks of Strongs Creek where subsurface soils could be observed. Despite conducting an intensive pedestrian field investigation with intuitively-spaced shovel scrapes to aid inspection of mineral soil, no artifacts, features, sites or other cultural resources were identified in the areas proposed for project implementation.

If any unique paleontological resource or unique geologic feature is discovered, Cultural Resource Protection Protocol 1 will be implemented. Since there is no current knowledge of a unique paleontological resource or unique geologic feature, this project is anticipated to have no significant impact.

**e)Cause a substantial adverse change in the significance of a tribal cultural resource –Less than significant**

Starting in 2018, Lead Agencies are to consult with Tribes and initiate consultation prior to the release of a negative declaration, mitigated negative declaration or environmental impact report under the California Environmental Quality Act (CEQA).

More specifically, AB 52 creates a new category of resources in CEQA called "tribal cultural resources" and seeks to engage the expertise of Native American tribes in the protection and preservation of those resources. To fulfill that purpose, the new law requires the lead agency to consult with a local Native American tribe as part of the environmental review process. The law also requires that the details of the tribal cultural resource be kept confidential and provides examples of mitigation measures that focus on preserving tribal cultural resources.

The City of Fortuna sent consultation letters regarding the proposed project to the Bear River Band of the Rohnerville Rancheria and the Wiyot Tribe on December 14, 2018 (Appendix E). On April 29, 2019, WRA sent a letter to the Native American Heritage Commission (NAHC) requesting a search of the Sacred Lands Inventory File. The NAHC responded on May 1, 2019. A follow-up letter was sent to Erika Cooper, THPO for the Bear River Band of the Rohnerville Rancheria and Chairman Ted Hernandez of the Wiyot Tribe on May 6, 2019. The letter described the isolated artifact that was found during the field survey. Ms. Cooper acknowledged receipt of the letter and no further responses were received (Appendix E).

Impacts

This project will have no impact on known tribal cultural resources. If tribal cultural resources are discovered, the Cultural Resource Protection Protocol outlined below will ensure Cultural Resources Protection Protocol are to be followed. Mitigation Measure C-1 requires that the protocol is printed on the project construction plans; this will ensure that the construction contractors are aware of and responsible for the protocol.

### 4.7.3 MITIGATION MEASURES

**C-1:** If tribal cultural resources are discovered, the Cultural Resource Protection Protocol outlined below will be followed. The protocol shall be printed on all construction plan sets.

#### Cultural Resource Protection Protocol 1: Cultural Resources

If cultural resources, such as lithic materials or ground stone, historic debris, building foundations, or bone are inadvertently discovered during ground-disturbance activities, work shall be stopped within 20 meters (66 feet) of the discovery, per the requirements of CEQA (January 1999 Revised Guidelines, Title 14 CCR 15064.5 (f)). If the proposed project receives Federal funding, it may be considered a Federal undertaking triggering compliance with Section 106 National Historic Preservation Act. Inadvertent discoveries shall be treated as outlined in 43 CFR 10.4 and 36 CFR 800.13.

Work near the archaeological find shall not resume until a professional archaeologist, who meets the *Secretary of the Interior's Standards and Guidelines*, has evaluated the materials and offered recommendations for further action.

Prehistoric materials which could be encountered include: obsidian and chert debitage or formal tools, grinding implements, (e.g., pestles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic materials which could be encountered include: ceramics/pottery, glass, metal, can and bottle dumps, cut bone, barbed wire fences, building pads, structures, trails/roads, etc.

Cultural Resource Protection Protocol 2: Human Remains

If human remains are inadvertently discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie adjacent to human remains (Public Resources Code, Section 7050.5). The Humboldt County coroner will be contacted to determine if the cause of death must be investigated. If the coroner determines that the remains are of Native American origin, it is necessary to comply with State laws relating to the disposition of Native American burials, which fall within the jurisdiction of the Native American Heritage Commission (NAHC) (Public Resources Code, Section 5097). The coroner will contact the NAHC. The descendants or most likely descendants of the deceased will be contacted, and work will not resume until they have made a recommendation to the landowner or the person responsible for the excavation work for means of treatment and disposition, with appropriate dignity, of the human remains and any associated grave goods, as provided in Public Resources Code, Section 5097.98. Work may resume if NAHC is unable to identify a descendant or the descendant failed to make a recommendation.

> Timing for Implementation/Compliance: Submittal of utility Improvement plans and building permit plans.
> Person/Agency Responsible for Monitoring: City Community Development Dept.
> Monitoring Frequency: Plan review.
> Evidence of Compliance: Protocol printed on plans.

### 4.7.4 FINDINGS

The Project will have a Less than Significant Impact on Cultural Resources with Mitigation Incorporation.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

## 4.8 GEOLOGY AND SOILS

***Table 6: Geology and Soils impact evaluation***

| **VI. GEOLOGY AND SOILS**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 wastewater disposal systems where sewers are not available for the disposal of wastewater? | ☐ | ☐ | ☐ | ☒ |

### 4.8.1 Thresholds of Significance

The project would have a significant effect on geology and soils if it would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: 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, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides; result in substantial soil erosion or the loss of topsoil; 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; 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; or 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.

### 4.8.2 DISCUSSION

The City of Fortuna is located within a complex geological environment characterized by high rates of tectonic activity. The area is known for a high amount of seismicity, with more than 60 earthquakes producing discernible damage since the mid-1800s. The project area lies north of the Mendocino Triple Junction, where the North American, Pacific and Gorda plates meet. The local geologic setting of Fortuna is characterized by the Little Salmon fault and the Eel River. The City lies east of the Eel River and is built on alluvium derived from the Eel and Van Duzen rivers and from streams draining the hills east of town.

The Humboldt County GIS website and the EIR for the Fortuna General Plan do not identify any earthquake faults, or earthquake fault hazard zones within the project area. According to the Humboldt County GIS, the project site is relatively stable, is not within a liquefaction zone, and is not within an Alquist Priolo Fault Zone. Soil types have not been mapped by the Natural Resources Conservation Service. However, geologic maps of the region indicate the material underlying the project area and surrounding slopes is associated with the Middle to Late Pleistocene aged Hookton Formation (Kilbourne, 1985). The Hookton Formation is composed principally of non-marine gravel, sand, silt, and clay; however, some of the sediments along the western limits of this formation appear to have been deposited in shallow marine or marginal environments (Ogle, 1953). The Wildcat series of the Hookton formation are the predominate soils in the area.

#### a.i) Fault Rupture – Less than Significant Impact

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. This act prohibits the location of structures designed for human occupancy across active faults and regulates construction within fault zones. The project site is not within or adjacent to an Alquist–Priolo Earthquake Fault Zone (CGS 1991). The nearest fault classified as an Alquist–Priolo Earthquake Fault Zone is the Little Salmon Fault located approximately 2.1 miles northeast of the project. Based on published mapping, the possibility of ground ruptures and/or fault creep at the project site is low. The impact is less than significant.

#### a.ii) Ground Shaking – Less than Significant Impact

All of coastal Northern California is subject to potentially strong seismic ground shaking and multiple earthquake sources capable of generating moderate to strong earthquakes are in close proximity to the project site. Strong seismic shaking is a regional hazard that could cause major damage to the project area. The extent of ground-shaking during an earthquake is controlled by the earthquake magnitude and intensity, distance to the epicenter, and the geologic conditions in the area. The impact is less than significant.

### a.iii) Liquefaction – Less than Significant Impact

Liquefaction is the transformation of saturated, loose, fine-grained sediment to a fluid-like state because of earthquake shaking or other rapid loading. Liquefaction is known to occur in loose or moderately saturated granular soils with poor drainage.

An engineering soils report was completed for the project site by Whitchurch Engineering. The report found that "according to the State of California Department of Conservation Division of Mines and Geology Special Publication 115 (1995) … this parcel is located in an area of moderate to low liquefaction potential." Further, the report concluded "…soils at this site are capable of providing adequate support for the construction of a planned unit development." The impact is less than significant.

### a.iv) Landslides – Less than Significant Impact

Landslides are gravity-driven downslope movements of earth materials, typically triggered by earthquakes, or elevated pore pressures, resulting from peak rainfall events. Factors that influence the susceptibility of an area to landslides, or mudflows, include slope gradient, the nature of earth materials, vegetative cover, and groundwater levels (City of Fortuna 2010a). The project site is not within a landslide zone and is on relatively flat ground. The project will not expose people or structures to substantial risk of landslides for the reasons stated above. The impact is less than significant.

### f) Loss of Topsoil – Less than Significant Impact with Mitigation

Construction activities, including trenching, excavation, trimming/removal of vegetation, shrubs and trees, and operation of heavy equipment will disturb soil and, therefore, have the potential to cause erosion. Subject to regulatory approval, erosion control actions and a Storm water Pollution Protection Plan (SWPPP) will be prepared for the project prior to the start of construction and soil disturbance. The erosion control actions will include BMPs designed to reduce erosion of exposed soil and minimize the sediment entrained in runoff from the site during construction. BMPs may include: plastic tarps, geo-fabric, woven coconut fronds, silt fences, coir rolls/straw wattles, erosion control matting, site watering for controlling dust, or other suitable materials. With the implementation of these mitigation measures, potential impacts to soil erosion or the loss of topsoil will be less than significant.

### g) Unstable Soil – Less than Significant Impact

According to the City of Fortuna General Plan Program EIR (City of Fortuna 2010a), the Planning Area is underlain by sedimentary materials and the potential for unstable soils (e.g., soils subject to liquefaction, lateral spreading, subsidence, or expansion). However, because the project will be subject to state building code requirements and is on relatively flat ground, the impact will be less than significant.

h) Expansive Soils – Less than Significant Impact

Expansive soils are generally high in certain clay types and are prone to large volume changes upon wetting and drying. According to the Fortuna General Plan Program EIR (City of Fortuna 2010a), the Eel River Valley is underlain by the Hookton Formation that includes coastal plain and fluvial deposits. The western two-thirds of the Fortuna Planning Area overlays this formation. Given the unconsolidated nature of this formation and its proximity to the Eel and Van Duzen rivers this portion of the Fortuna Planning Area is subject to varying levels of expansive soils. The soils report conducted by Whitchurch Engineering indicate low amounts of clayey soils, meaning there are little to no expansive soils in the project site. This soils report can be found in the attached documentation (Attachment F). The project impact from expansive soils will have no impact.

i) Septic Tanks – No Impact

Because the project does not include septic tanks or alternative wastewater disposal systems, and because construction of the berms and treated effluent pump station will not be impacted or be located on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems, no impact will occur.

### 4.8.3 MITIGATION MEASURES

GS-1: Implement standard construction BMPs in accordance with a standard Caltrans SWPPP. The erosion control actions will include BMPs designed to reduce erosion of exposed soil and minimize the sediment entrained in runoff from the site during construction. BMPs may include: plastic tarps, geo-fabric, woven coconut fronds, silt fences, coir rolls/straw wattles, erosion control matting, site watering for controlling dust, or other suitable materials. With the implementation of these mitigation measures, potential impacts to soil erosion or the loss of topsoil will be less than significant.

Timing for Implementation/Compliance: During construction of project.

Person/Agency Responsible for Monitoring: Licensed QSD or designated Construction Observer.

Monitoring Frequency: Before, during, and after rain events resulting in 0.1 inches of rainfall depth within a 24-hour period.

Evidence of Compliance: Visual site inspection by QSD or designated Construction Observer.

### 4.8.4 FINDINGS

The Project will have Less Than Significant impact on Geology and Soils within limited mitigation.

## 4.9 GREENHOUSE GAS EMISSIONS

***Table 7: Greenhouse gas emissions impact evaluation***

| **VII. GREENHOUSE GAS EMISSIONS.** Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Generate greenhouse gas emissions (GHG), 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? | ☐ | ☐ | ☒ | ☐ |

### 4.9.1 Thresholds of Significance

The project would have a significant impact on Greenhouse Gas Emissions if it would generate greenhouse gas emissions (GHG), either directly or indirectly, that may have a significant impact on the environment; or conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

### 4.9.2 DISCUSSION

The proposed project is a 59-unit residential subdivision limited to senior residents. The site is currently vacant. Vegetation consists of significant riparian vegetation associated with the Streamside Management Areas of Strongs Creek and Jameson Creek. In addition, 0.04 acres of wetlands have been delineated, and will be preserved on the site.

The California Global Warming Solutions Act of 2006 (Assembly Bill 32) definitively established the state's climate change policy and sets GHG reduction targets (Health & Safety Code §38500 et seq.). The state set its target at reducing greenhouse gases to 1990 levels by 2020.

CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects.  The model quantifies direct emissions from construction and operations (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use.

The model is an accurate and comprehensive tool for quantifying air quality impacts from land use projects throughout California. The model can be used for a variety of situations where an air quality analysis is necessary or desirable such as California Environmental Quality Act (CEQA) documents, National Environmental Policy Act (NEPA) documents, pre-project planning, compliance with local air quality rules and regulations, etc.

In an attempt to quantify this impact, project staff evaluated GHG impacts projected from the project using the CalEEMod model.

Project-related air quality impacts fall into two categories: short-term construction-related impacts and long-term operations-related impacts. Emissions for the project were calculated using the CalEEMod model Construction equipment types and numbers specified in the CalEEMod modeling effort are based on the applicant's guidance and the consultant's experience. Construction emissions estimated for the proposed project were modeled over a period of one year. This modeling of project-level emissions is considered conservative because it condensed the same level of emissions into a shorter time period, thus inflating the project's average annual emissions estimates. Long-term operational emissions for the proposed project are based on the land uses and trip generation rates

a) Generation of Greenhouse Gas Emissions – Less than Significant Impact

According to the CalEEMod Model, the mitigated construction emissions are as follows:

***Table 8: Modelled construction emissions totals generated through the CalEEMod application.***

| | ROG | $NO_X$ | CO | $SO_2$ | Fugitive $PM_{10}$ | Exhaust $PM_{10}$ | $PM_{10}$ Total | Fugitive $PM_{2.5}$ | Exhaust $PM_{2.5}$ | $PM_{2.5}$ Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **lbs/day** | | | | | | | | | |
| 2019 | 12.2 | 11.1 | 10.7 | 0.17 | 13.7 | 0.62 | 14.0 | 1.48 | 0.57 | 1.82 |

The construction of the proposed project will contribute a temporary, short term increase in air pollution from vehicles and equipment during construction. The proposed project will result in emissions of GHGs, which contribute to global climate change. Given the scope of global climate change, however, it is not anticipated that the project will have an individually discernible effect on global climate change (i.e., increase global temperature as a result of emissions from the project).

Operational GHG's were calculated once the planned development has undergone all construction phases, and including full residency on site utilizing the CalEEMod model.

*Table 9: Full buildout greenhouse gas emissions modelled using the CalEEMod model.*

| | ROG | $NO_X$ | CO | $SO_2$ | Fugitive $PM_{10}$ | Exhaust $PM_{10}$ | $PM_{10}$ Total | Fugitive $PM_{2.5}$ | Exhaust $PM_{2.5}$ | $PM_{2.5}$ Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **lbs/day** | | | | | | | | | |
| Area | 0.20 | 0.06 | 4.88 | $2.60e^{-4}$ | | 0.03 | 0.03 | | 0.03 | 0.29 |
| Energy | 0.01 | 0.11 | 0.05 | $6.80e^{-4}$ | | $8.64e^{-3}$ | $8.64e^{-3}$ | | $8.64e^{-3}$ | $8.64e^{-3}$ |
| Mobile | 0.45 | 2.73 | 5.82 | 0.01 | 0.95 | 0.02 | 0.90 | 0.23 | 0.01 | 0.27 |
| Total | 0.68 | 2.90 | 10.75 | 0.01 | 0.95 | 0.32 | 1.18 | 0.23 | 0.05 | 0.31 |

Given the scope of global climate change, it is not anticipated that the project will have an individually discernable effect on global climate change and the impacts are less than significant.

**Project-related Reduction in Greenhouse Gas Emissions**

The project includes a number of design features that will result in a reduction in greenhouse gas emissions.

1) Senior Occupancy. The project is a residential development that will limit its occupancy to senior residents. For a number of reasons, senior household sizes are smaller, a greater number are retired and not employed, car ownership is lower, and the vehicle trips made by seniors is significantly less than the number of trips made by the general population, by a degree of approximately 40 % (U.S. Dept. of Transportation Federal Highway Administration Summary of Travel Trends 2009). Therefore, the project buildout emissions modeling in Table 9 above, may effectively be considered to be reduced by 40%.
2) Transit Proximity. The project is located in close proximity to a bus stop operated by the Humboldt Transit Authority. The bus stop is located on Redwood Way approximately 400 feet to the east of the project entrance. In addition, the City of Fortuna operates a low-cost senior bus for those age 50 and above.
3) Proximity to Services. The project is an in-fill development, and is located in the vicinity of medical, shopping, and other services. Redwood Memorial Hospital, Open Door Health Clinic, and other medical offices are located to the east directly adjacent to the project site. Redwood Shopping Center is located on Fortuna Boulevard approximately 1/3 mile to the west, reached by car, bus, bike, or foot on Redwood Way. Other services are also available on Fortuna Boulevard.

4) Vegetation. The project includes approximately 40% open space, including common open space surrounding each residential unit, riparian vegetation along Strongs and Jameson Creeks, and preserved wetlands. The common open space will be landscaped with lawn, shrubs, and trees, which will be an addition to the amount of vegetation that currently exists on the site. Walking paths will be incorporated into the project design, and will connect to the City's future John Campbell Greenway Trail along the south side of Strongs Creek.

All of these listed design reduction measures will result in an approximately 40% reduction in greenhouse gas emissions when levels are compared to the standard residential development measurements calculated in the CalEEModel prepared for the project, and compared to the modeling that was done for the Fortuna General Plan EIR that considered standard residential development in the R-1-10 land use designation. Therefore, the project will result in a reduction in greenhouse gases when compared to a standard residential development allowed under the Fortuna General Plan.

b) Conflict with an Applicable Plan, Policy, or Regulation - Less than Significant Impact

The NCUAQMD does not have rules, regulations, or thresholds of significance for non-stationary or construction-related GHG emissions. In 2011, the NCUAQMD adopted Rule 111 - Federal Permitting Requirements for Sources of Greenhouse Gases to establish a threshold above which New Source Review (NSR) and federal Title V permitting applies and to establish federally enforceable limits on potential to emit greenhouse gases for stationary sources. These are considered requirements for stationary sources and should not be used as a threshold of significance for non-stationary source projects.

The Fortuna General Plan includes two policies specific to GHGs. Policy HS-3.5 (Restoration for Greenhouse Gases Absorption) states, "foster and restore forests and other terrestrial ecosystems that offer significant carbon mitigation potential." Policy HS-3.6 (Greenhouse Gas Emissions Reduction from Transportation) states, "Increase clean-fuel use, promote transit-oriented development and alternative modes of transportation, and reduce travel demand." The City of Fortuna does not have an adopted Climate Action Plan or similar policies and standards to address GHG emissions other than the two polices noted above. Also, the City has not adopted local implementing procedures and guidelines for CEQA to address how emissions should be analyzed in environmental documents.

### 4.9.3 MITIGATION MEASURES

No Mitigation Required

### 4.9.4 FINDINGS

The Project will have a Less than Significant on Global Greenhouse Gases.

## 4.10 HAZARDS AND HAZARDOUS MATERIALS

***Table 10: Hazard and hazardous materials impact evaluation***

| **VIII. HAZARDS AND HAZARDOUS MATERIALS.** Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 complied 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 area or where residences are intermixed with wildlands? | ☐ | ☐ | ☒ | ☐ |

### 4.10.1 Thresholds of Significance

The project would have a significant impact on hazards and hazardous materials if it were to 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; emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school; or be located on a site which is included on a list of hazardous materials sites complied pursuant to

Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment. In addition, for projects 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; if the project is within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area. Finally, the project would have a significant impact to hazards and hazardous materials if it would impair the implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan; or expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized area or where residences are intermixed with wildlands.

### 4.10.2 DISCUSSION

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency, or if it has characteristics defined as hazardous. Factors that influence the health effects of exposure to hazardous material include the dose to which the person is exposed, the frequency of exposure, the exposure pathway, and individual susceptibility.

The California Code of Regulations (CCR) defines a hazardous material as a substance that, because of physical or chemical properties, quantity, concentration, or other characteristics, may either (1) cause an increase in mortality or an increase in serious, irreversible, or incapacitating, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of, or otherwise managed (CCR, Title 22, Division 4.5, Chapter 10, Article 2, Section 66260.10).

Hazardous wastes are defined in the same manner. Hazardous wastes are hazardous materials that no longer have practical use, such as substances that have been discarded, discharged, spilled, contaminated, or are being stored prior to proper disposal. Hazardous materials and hazardous wastes are classified according to four properties: toxicity, ignitability, corrosivity, and reactivity (CCR, Title 22, Chapter 11, Article 3).

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

Project construction will require the use of hazardous materials such as fuels, lubricants, paints, and solvents. Construction activities for the project will be short-term and one-time in nature, and will involve the limited transport, storage, use, or disposal of hazardous materials. Some examples of hazardous materials handling include fueling and servicing construction equipment on-site, and the transport of fuels, lubricating fluids, and solvents. These types of materials; however, are not acutely hazardous, and all storage, handling, and disposal of these materials are regulated by the Department of Toxic Substances Control (DTSC), the U.S. EPA, the Occupational Safety & Health Administration (OSHA), and the Fortuna Fire Protection District.

Because the City, contractors, and other construction service providers will be required to comply with existing hazardous materials laws and regulations for the transport, use, and disposal of hazardous materials, the impacts associated with the project having the potential to create a significant hazard to the public or the environment will be less than significant.

b) Upset or Accidents Involving Hazardous Materials – Less than Significant Impact

During construction, routine transport of hazardous materials to and from the project site could indirectly result in an incremental increase in the potential for accidents. Caltrans, the Federal Department of Transportation, and the California Highway Patrol (CHP) regulate the transportation of hazardous materials and wastes, including container types and packaging requirements, as well as licensing and training for truck operators, chemical handlers, and hazardous waste haulers. Because the City, contractors, and other construction service providers will be required to comply with existing hazardous materials laws and regulations for the transport and use of hazardous materials, the impacts associated with the potential to create a significant hazard to the public or the environment will be less than significant.

c) Emit Hazardous Materials within 0.25 Mile of a School – Less than Significant Impact

There is a potential impact related for the project to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school, as the project is west of the Norman G. Ambrosini Elementary School. However, as stated above in Sections a) and b) above, the impacts associated with the project having the potential to create a significant hazard will be less than significant.

d) Included on a List of Hazardous Materials Sites – Less than Significant Impact

There is one hazardous material site compiled pursuant to Government Code Section 65962.5 (Hazardous Waste and Substances Site List or "Cortese" list) within the project area. The Redwood Memorial Hospital is an institutional user of hazardous materials. Hospitals abide to the California Code of Regulations, Title 8, Section 5193, when discerning the proper disposal of hazardous waste and thus provide a less than significant impact on the site.

e,f) Safety Hazard for People Residing or Working Within Two Miles of an Airport – No Impact

The nearest public airport, the Rohnerville Airport, is located approximately 2 miles south of the project site. The project will not result in airport-related safety hazards for people residing or working in the project area. No impact will occur.

g) Impair or Interfere with an Adopted Emergency Response/Evacuation Plan – No Impact

The Humboldt County Department of Health & Human Services Division of Environmental Health (HCDEH) has a Hazardous Materials Area Plan (HMAP) that covers the County, including the City of Fortuna and its surroundings. The HMAP establishes the following:

- Policies, responsibilities, and procedures required for protecting the health and safety of Humboldt County's population, the environment, and the public and private property from the effects of hazardous materials incidents;

- Emergency response organization for hazardous materials incidents occurring within Humboldt County;

- Operational concepts and procedures associated with the Eureka Fire Departments Regional Hazardous Materials Response Team (EFD HMRT).

The City of Fortuna also has hazardous material response plans associated with the regulatory requirements for their wastewater treatment, water treatment plant facilities and operations, and an emergency response plan that establishes chain-of-command and response procedures between the police, fire, public works, City staff and board, and other essential departments and outside organizations. Response plans are also included in hazardous materials business plans, for those businesses that are required by the HCDEH to prepare and maintain them.

The project will not impair or interfere with any emergency response and evacuation plans, and does not include development that will significantly increase the number of people exposed to potential emergencies. Furthermore, no roads will be closed as a result of project activities. No impact will occur.

h) Exposure to Wildland Fires – Less than Significant Impact

The project will not expose people or structures to a risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Construction involving heavy equipment, vehicles, power tools, and personnel smoking in and around the project site could cause the ignition of a wildfire; however, the project site is within the urbanized area of Fortuna so the possibility of a wildfire is remote. The impact is less than significant.

### 4.10.3 MITIGATION MEASURES

No mitigation required.

### 4.10.4 FINDINGS

The Project will have No Impact on Hazards and Hazardous Materials.

## 4.11 HYDROLOGY AND WATER QUALITY

***Table 11: Hydrology and water quality impact evaluation***

| **IX.HYDROLOGY AND WATER QUALITY**. Would the project: | | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 stormwater 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 of 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 or loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | ☐ | ☐ | ☐ | ☒ |
| j) | Result in inundation by seiche, tsunami, or mudflow? | ☐ | ☐ | ☐ | ☒ |

### 4.11.1 Thresholds of Significance

The project would have a significant effect on hydrology and water quality if it would violate any water quality standards or waste discharge requirements; 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); 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; 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; 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, or otherwise substantially degrade water quality. Significant impacts would also occur if the project would place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary of Flood Insurance Rate Map or other flood hazard delineation map; place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary of Flood Insurance Rate Map or other flood hazard delineation map; place within a 100-year flood hazard area structures, which would impede or redirect flood flows; expose people or structures to a significant risk or loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or result in inundation by seiche, tsunami, or mudflow.

#### 4.11.2 DISCUSSION

According to EPA, the proposed project is located within the Eel River watershed, which drains approximately 3,680 square miles and extends from the headwaters in the mountains to the east to the river's mouth at the Pacific Ocean. More specifically, the project site is located within the Strongs Creek watershed, which encompasses approximately 10,700 acres and drains a mix of developed and undeveloped areas. Rainfall in the project area ranges from 41 to 55 inches per year. Flooding is a direct result of storm flows. The subject property is in Zone X according to the Firm Flood Insurance Panel Map.

The Strongs Creek Drainage Area is located in the central area of the City of Fortuna, bordered by the Rohner Creek and Hillside Creek Drainage Areas to the north and the Jameson Creek Drainage Area to the south. The Strongs Creek watershed is the largest watershed in the general Fortuna area, encompassing approximately 5,200 acres not including tributaries, and approximately 10,700 acres when tributaries are included. Tributaries to Strongs Creek include Rohner Creek, Jameson Creek, and Mill Creek.

Jameson Creek runs through the middle of the project site. Jameson Creek is at approximately 115 feet in elevation. EPA temperature analysis of the Strongs Creek drainage has been designated as marginal for the purposes of Total Maximum Daily Loads (TMDL) and sediment is not a concern.

The outlying rural stormwater systems including the project site are composed largely of roadside ditches and culverts with some developed stormwater systems along Rohnerville Road. Stormwater runoff from these systems flows by gravity to Rohner Creek, Hillside Creek, Strongs Creek, Jameson Creek, and Mill Creek before flowing to the main stem of Strongs Creek and discharging to the Eel River. Each of the aforementioned creeks are primarily in their natural, unchanneled state, except for the lower reaches of Strongs Creek which is partially channelized. The mean annual flow volume for Strongs Creek is 20.1 cfs and the catchment area is 13,670,166 square feet (1.27 $km^2$) according to the USEPA.

a,f) Violate Water Quality Standards or Degrade Water Quality–Less than Significant with mitigation

Construction activities can introduce pollutants to Stormwater runoff, including sediment, paint, solvent, pavement, construction debris and trash, as well as hydrocarbons and other fluids from construction vehicles. The most likely pollutant from the proposed project will be sediments created by soil disturbance during or immediately after construction from rainfall events. These potential pollutants are regulated under the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities. This construction general permit offers NPDES coverage for Stormwater discharges with construction activities of more than 1.0 acre and will apply if the project disturbs over one acre of ground. Ground disturbance will be more than one acre; therefore, the project will trigger the requirement for a Stormwater Pollution Prevention Plan (SWPPP).

A SWPPP must contain site plans that show the construction area, roadways, Stormwater collection/discharge points, general existing and proposed topography, and drainage patterns across the project. As described in section A of the construction general permit, a SWPPP must include: Best Management Practices (BMPs) the discharger will use to protect Stormwater runoff; a visual monitoring program; a chemical monitoring program for non-visible pollutants to be implemented in the event of a BMP failure; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303 (d) list for sediment.

Jameson Creek and Strongs Creek, both located by or in the subject site, are tributaries of the Eel River, which is on the 303 (d) list. Project activities will not take place along the Eel River or immediately adjacent to its tributaries; however, since the Eel River is downstream from the project site, the Eel River could be potentially affected by project activities in the absence of adequate controls. The project is within an MS4 permit area. An MS4 requires the incorporation of an Erosion Control Plan and implementation of a SWPPP to protect nearby waterbodies from uncontrolled erosion and stormwater runoff. The project will not violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality with the implementation of these plans.

Construction of the project will also require the use of gasoline and diesel-powered equipment, such as trucks, excavators, graders, bulldozers, backhoes, compactors, and generators. Chemicals such as diesel, gasoline, lubricants, hydraulic fluid, transmission fluid, paints, solvents, glues, and other substances will be utilized during construction. An accidental release of any of these substances could degrade surface or groundwater and cause a significant impact. Therefore, the following mitigation is included in section 11.9.3.

With implementation of these mitigation measures, project impacts to water quality will be less than significant after mitigation.

#### b) Substantially Deplete Groundwater Supplies or Interfere with Groundwater Recharge–No Impact

Dewatering of the construction work area could be required if groundwater accumulates in an excavation area. Dewatering typically involves pumping water out of the excavation area to lower groundwater levels to the extent needed for construction. Based on the Whitchurch Engineering soil exploration logs, no ground water was found on site down to the deepest hole of 94”. Water table draw-down during project construction will most likely not occur based on these soil explorations. Soil exploration logs can be found in the attached documentation (Attachment G). No other aspect of the project will substantially deplete groundwater supplies or interfere with groundwater recharge; therefore, no impact has been identified.

#### c) Alter Drainage Patterns–Less than Significant Impact

The project will not substantially alter the existing drainage patterns of the project site or in the area and will not alter any waterway. The impact is less than significant.

#### d, e) Increase Runoff Resulting in Flooding or Exceed Capacity of Storm Drain System–Less than Significant Impact

The proposed project will not materially alter the hydrology and hydraulics of the watershed. The impact is less than significant.

#### g, h) Place Housing and/or Structures Within a 100-Year Flood Zone–Less than Significant Impact with Mitigation

The project site has Jameson Creek pass through the middle of the parcel. On the map shown on the next page, the 100-year flood zone can be seen to surround the Jameson Creek. During the construction of the project, certain areas will be graded to ensure the flow of the water to the creeks as well as building the residences in areas of higher elevation. This will help to keep flooding of the residences to a minimal and therefore it less than significant impact with mitigation.

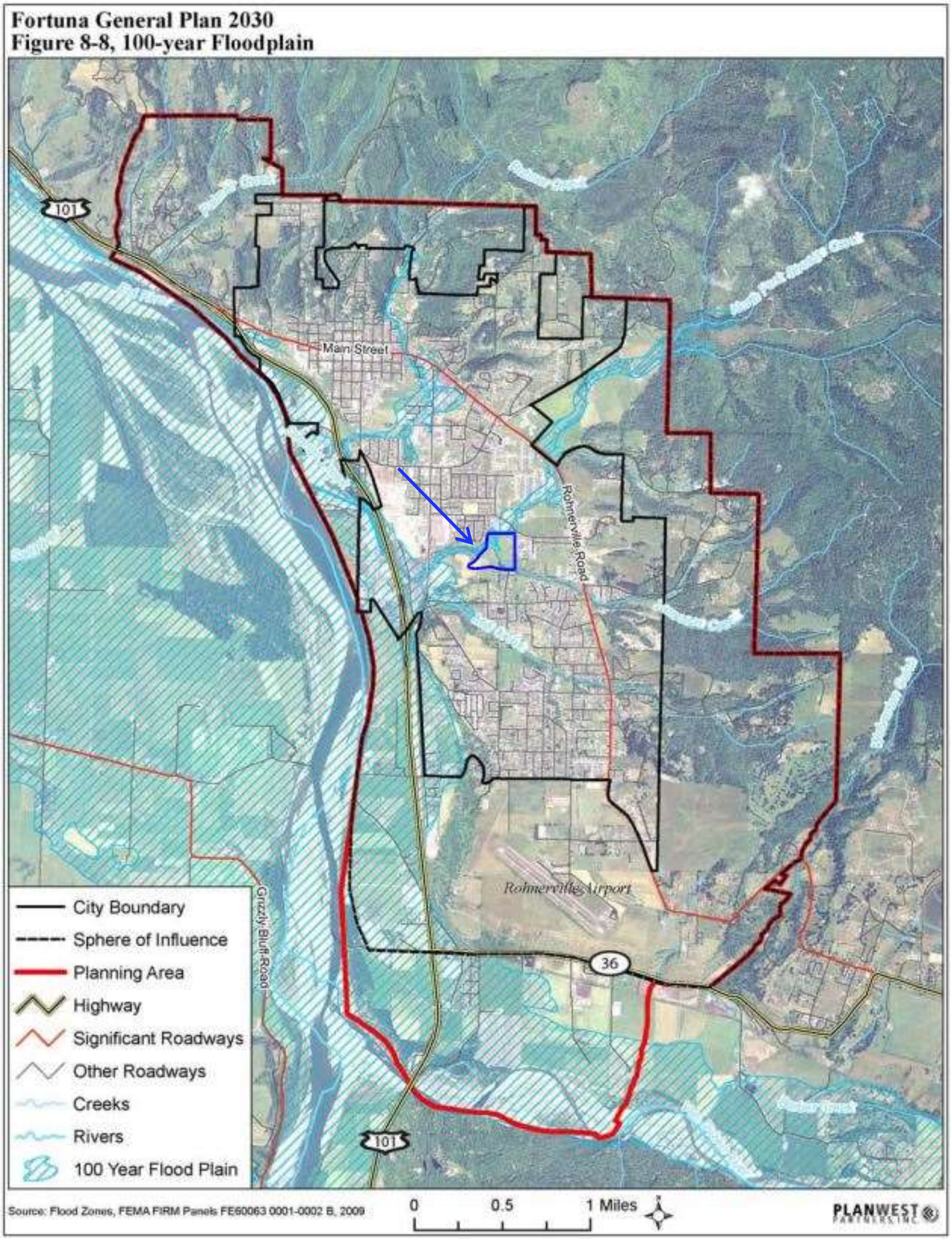
Fortuna General Plan 2030
Figure 8-8, 100-year Floodplain
Main Street
Rohnerville Road
Rohnerville Airport
Grizzly Bluff Road
101
36
City Boundary
Sphere of Influence
Planning Area
Highway
Significant Roadways
Other Roadways
Creeks
Rivers
100 Year Flood Plain
Source: Flood Zones, FEMA FIRM Panels FE60063 0001-0002 B, 2009
0
0.5
1 Miles
PLANWEST PARTNERS INC

*Figure 8: Flood zone map of the proposed project area*

i) Flooding from a Levee or Dam Failure –No Impact

According to the Humboldt Operational Area–Hazard Mitigation Plan (HMP) (Figure11-2 Dam Inundation Areas), the project site is not located within a dam failure inundation area. Fortuna also does not have any critical facilities located in a dam inundation area (Humboldt County 2008). The HMP includes information on risk assessment and mitigation strategies for hazards from dam failure and other hazards such as flooding, tsunami, earthquakes, etc. The proposed project does not include any activities or components which will expose people or structures to a significant risk of loss from flooding from a levee or dam failure. No impact will occur.

j) Inundation by Seiche, Tsunami, or Mudflow–No Impact

Based on area characteristics, the project site is not down-gradient of a debris-flow source and will not be subject to mudflows. The project site is also not near any enclosed water body capable of producing a seiche event. According to the State of California Humboldt County Tsunami Inundation Map for Emergency Planning, the tsunami inundation zone for the Fortuna quadrangle generally ends approximately ½ mile east of the historic Fernbridge on the Eel River. No impact will occur.

### 4.11.3 MITIGATION MEASURES

**HWQ-1: Prepare and Implement SWPPP and BMPs**

The City shall ensure that a SWPPP is prepared and implemented for the project and includes BMPs. The SWPPP shall be prepared prior to any construction on any portion of the project and implemented prior to and during construction. At a minimum the contractor shall implement the following, or the equivalent as described in the approved SWPPP:

#### *4.11.3.1 Materials Management*

- The Contractor shall provide protected (covered) storage areas for any potentially toxic materials (concrete, herbicides, pesticides, fertilizer, grease, oils, fuel, paints, stains, solvents, wood preservatives, etc.). Ensure that these materials are protected from vandalism, and that all lids and covers are securely fastened. Clearly mark all hazardous material containers.

- Bags of mortar, concrete, or other supplies shall be placed on pallets and covered with tarps so that if precipitation does occur these materials will not be exposed to Stormwater and become a Stormwater pollutant.

• Minimize the production or generation of hazardous materials and wastes at the site. Do not allow them to accumulate on the ground. Schedule regular pickup of used materials by licensed waste haulers and ensure proper disposal.

• All hazardous material containers shall be placed in secondary containment. Ensure that adequate secondary containment volume is provided for hazardous materials and that they are located in areas on the site away from stormwater drains or water courses. Segregate potentially hazardous waste from non-hazardous construction debris. Provide berms, if necessary, to prevent Stormwater run-on from contacting the storage area. Also, use containment berms in fueling and maintenance areas and where the potential for spills is high.

*4.11.3.2 Waste Disposal*

• The Contractor shall provide waste receptacles for common solid wastes at convenient locations on the job site and provide regular collection of wastes, including building materials. Provide cover for receptacles or piles of waste prior to rain events. Do not allow crew to discard miscellaneous trash on the project site.

*4.11.3.3 Spill Prevention and Response*

• The Contractor shall make adequate preparations, including training personnel and providing equipment, to contain and/or cleanup spills of oil and other hazardous materials. Ensure that adequate materials such as absorbents, berms, dry sweep shovels, brooms, and absorbent pads are on hand to clean up any accidental spill that may occur. Spills of hazardous materials can originate from fueling, equipment breaking down (such as hydraulic lines), material transfer operations, and other sources. Cleanup such spills immediately and properly dispose of all wastes and used spill control materials.

*4.11.3.4 Available Erosion Control Supplies*

• The Contractor shall ensure that sufficient erosion control supplies shall be available on site at all times to deal with areas susceptible to erosion during rain events. Materials should include plastic tarps, geo-fabric, woven coconut fronds, coir rolls/straw wattles, jute netting, erosion control matting, silt fencing, straw mulch or other suitable materials.

*4.11.3.5 Non-Stormwater Discharges*

• Activities such as vehicle washing, bucket rinsing, paint brush cleaning, etc. shall be carried out at an approved facility (i.e. carwash or interior sink), wherein the water is discharged into a sanitary sewer. Non-stormwater discharges should be eliminated or reduced to the extent feasible. The Contractor shall designate a qualified person with the responsibility for ensuring that no materials other than stormwater are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems.

*4.11.3.6 Sanitary Waste Management*

- The Contractor shall provide sanitary facilities of sufficient number and size to accommodate construction crews. Locate the sanitary facilities in a convenient location, but away from storm drain inlets and drainage facilities. Anchor the facilities sufficiently to prevent them from being blown over or tipped by vandals. Ensure that the facilities are maintained in good working order and emptied at regular intervals by a licensed sanitary waste hauler.

*4.11.3.7 Vehicle and Equipment Fueling*

- On-site vehicle and equipment fueling should only be used where it's impractical to send vehicles and equipment offsite for fueling. The Contractor shall designate an area for equipment fueling and maintenance away from storm drain inlets or drainage channels. The fueling area shall be located on a paved surface (if practical) and shall be protected with berms to prevent run-on and run-off and contain spills. Secondary containment techniques such as drip pans or drop cloths shall be used when fueling to catch drips or leaks.

*4.11.3.8 Vehicle and Equipment Cleaning*

- Off-site commercial washing businesses are equipped to handle and dispose of wash water properly and are to be used for vehicle and equipment cleaning as much as possible. If vehicle and equipment washing and cleaning must occur on site and cannot be performed in a building equipped with sanitary sewer facilities, the outside cleaning area shall be located away from storm drain inlets and drainage facilities. The wash area shall be stabilized with aggregate base, and bermed to prevent run-off and run-on. The drainage area shall be outfitted with a sump to allow for the collection and disposal of wash water. Wash water is not to be disposed of into storm drains or water courses.

- The wash area shall be used as little as possible, while using the minimum amount of wash water and soaps necessary. Power washers tend to use less water and should be considered. Steam cleaning is not to be performed at any time. Cleaning solvents shall never to be used on-site.

*4.11.3.9 Vehicle and Equipment Maintenance*

- Perform vehicle maintenance off site whenever practical. The Contractor shall coordinate with the City and designate the on-site vehicle and equipment maintenance areas away from storm drain inlets and water courses. Locate the maintenance areas on paved surfaces if practical and protect the maintenance area from stormwater run-on and run-off.

• Properly dispose of used oils, fuels, and lubricants. Do not dump fuels or lubricants on the ground, place in dumpsters, or pour into storm drains or water courses. Properly dispose of or recycle batteries and other waste products.

• Repair leaks of fluids and oil immediately. Place drip pans under vehicles with leaks while they are waiting repair and promptly empty drip pans into proper waste containers.

• Regularly inspect vehicles and equipment for leaks or potential leaks. Perform regularly scheduled preventative maintenance, preferably offsite. Inspect the maintenance area regularly and cleanup any spills or leaks immediately. Maintain an adequate supply of spill cleanup materials in the maintenance area at all times.

*4.11.3.10 Erosion Control BMPs*

• Scheduling Work

-Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of the construction project especially during the rainy season. This project is scheduled to be constructed in the summer season with all grading and major excavations completed prior to the onset of the rainy season, which begins on October 15th. When rainfall is forecast, the construction schedule is to be adjusted to allow the implementation of erosion and sediment controls on all disturbed areas prior to the onset of rains.

• Minimize Earth moving and Vegetation Removal

-Vegetation removal, grading, and other construction activities shall be restricted to the minimum area necessary to complete the project.

• Site Stabilization and Seeding

-All soil disturbances shall be stabilized by native seeding. All soil disturbances shall be stabilized with a pasture seed mix or similar seed mix. The contractor should hand broadcast seed and rice straw in access areas where bare ground exists after construction. Seeding should be done at an adequate time to develop a uniform vegetative cover (70% or greater) before the seasonal rains begin. If this is not possible at the site due to the construction schedule of the project, the Contractor shall implement temporary soil stabilization measures until the vegetative cover develops. The Contractor shall consider measures such as: covering with mulch, temporary seeding/vegetation, soil stabilizers, binders, fiber rolls, blankets, or permanent seeding.

• Seeding and mulching should be done as soon as grading operations are completed. Proper and timely attention shall be taken to avoid erosion. Erosion control and seed establishment can be enhanced with the use of surface roughening followed by seeding and mulching.

- Exposed Area Limitations

-The occurrence of windy days may also require water to be sprayed onto exposed surface areas for dust control. These areas could include dirt roads, soil disposal areas, or other graded surfaces. Care should be taken not to create run-off from the application of excessive quantities of water, or to increase vehicle track-out of sediment from this activity.

- Stockpiled Soils

–The Contractor shall work with the Owner to designate an area to be used for stockpiled soils. Trench spoils generated during utility installation and other activities must be securely stockpiled at the site. In the event of rain, care shall be taken to prevent erosion and sediment transport from stockpiled areas. Stockpiles should be securely covered and placed away from drainage channels, preferably in areas with some natural vegetation in place. Silt fences shall be installed around the soil stockpile areas in the event of extended heavy rainfall. Silt fence construction and maintenance is further discussed in the Sediment Control section of this SWPPP. Uncovered soil stockpiles are to be wetted as needed during windy days to prevent wind erosion.

Timing for Implementation/Compliance: During construction of project.

Person/Agency Responsible for Monitoring: Building Department site inspector or designated Construction Observer.

Monitoring Frequency: Daily, for duration of project.

Evidence of Compliance: Visual site inspection by Building Department Staff.

#### 4.11.4 FINDINGS

The Project will have Less than Significant Impact with Mitigation Incorporation on Hydrology and Water Quality with Mitigation Incorporation.

## 4.12 LAND USE AND PLANNING

***Table 12: Land use and planning impact evaluation***

| X. **LAND USE AND PLANNING**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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? | ☐ | ☐ | ☐ | ☒ |

### 4.12.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (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; or (c) conflict with any applicable habitat conservation plan or natural community conservation plan.

### 4.12.2 Discussion

The City of Fortuna's General Plan was adopted in October, 2010. The Fortuna General Plan formalizes the long-term vision for the City's physical evolution. It outlines policies, standards, and programs to guide day-to-day decisions concerning future development.

The subject property is zoned Residential – single family (R-1-10) by the City of Fortuna. Parcels which fall under this zoning definition are meant to encourage the growth of single-family dwelling developments. Each proposed residence will be within its own parcel, this new development being implemented as a PD affects the setback requirements between each parcel, and the size of the lots. Lot sizes are reduced in area to provide community shared open space. This development falls under the principal permitted use of R-1 of one, single-family home per lot.

a) Physically Divide an Established Community–No Impact

No aspect of the project will physically divide an existing residential community; therefore, no impact will occur.

b) Conflict with Applicable Land Use Plans, Policies or Regulations–No Impact

The project site is within the City limits of Fortuna and includes the General Plan Land Use designation of Residential single-family zoning (R-1-10). The proposed project is consistent with General Plan Land Use and Zoning and will not require a General Plan Land Use designation or zoning change, is not within the California Coastal Commission's jurisdiction, and will not conflict with any other applicable plan, policy or regulation with jurisdiction over the project area. Therefore, no impact has been identified.

c) Conflict with any Applicable Habitat Conservation Plan–No Impact

The City of Fortuna does not have an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan within which the project will conflict. Furthermore, according to the Fortuna General Plan Background Report (City of Fortuna 2007), the Fortuna General Plan Planning Area is not subject to an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impact will occur.

### 4.12.3 MITIGATION MEASURES

No mitigations measures are required for this Land use and Planning.

### 4.12.4 FINDINGS

The Project will have No Impact on Land Use and Planning.

## 4.13 MINERAL RESOURCES

***Table 13 : Mineral Resources impact evaluation***

| **XI. MINERAL RESOURCES**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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? | ☐ | ☐ | ☒ | ☐ |

### 4.13.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (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, or (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.

### 4.13.2 DISCUSSION

According to the Fortuna General Plan Background Report (Natural & Cultural Resources, Section 6.5 Mineral/Soils and Energy Resources) (City of Fortuna 2007), there are seven gravel extraction operations in the Eel River adjacent to the City's Planning Area.

**a, b) Result in the Loss of Availability of a Known Mineral Resource of Value to the Region or Delineated by a General Plan, Specific Plan or other Land Use Plan – Less than Significant Impact**

Gravel mining operations are located to the north and south of the project area. The project, will require use of mined rock material but will not require the use of a substantial amount of any mineral resource, and will not result in the loss of availability of known mineral resources of value to the state, region or locally; therefore, the impact will be less than significant.

### 4.13.3 MITIGATION MEASURES

None required.

### 4.13.4 FINDINGS:

The Project will have Less Than Significant Impact on Mineral Resources.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

## 4.14 NOISE

***Table 14: Noise impact evaluation***

| **XII. NOISE**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☒ | ☐ | ☐ |
| b) Expose persons to or generate excessive ground borne vibration or ground borne noise levels? | ☐ | ☐ | ☒ | ☐ |
| c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☒ | ☐ |
| d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☒ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |

### 4.14.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (a) expose persons to, or generate, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; (b) expose persons to, or generate, excessive ground borne vibration or ground borne noise levels; (c) result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the Proposed Project; (d) result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the Proposed Project; (e) expose people residing or working in the project area to excessive noise levels (only applicable if the Proposed Project is 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); or (f) expose people residing or working in the project area to excessive noise levels (only applicable if the Proposed Project is located within the vicinity of a private airstrip.)

#### 4.14.2 DISCUSSION

Noise levels are measured in decibels (dB), but community noise levels are measured in terms of A-weighted sound level (dBA). The A-weighted scale of frequency sensitivity accounts for the sensitivity of the human ear and is sited in most noise criteria.

The City of Fortuna General Plan 2030 Chapter 8 Health and Safety, Subsection HS-4 Noise provides noise guidelines. The General Plan allows for different levels of noise during the construction phase of the project and during the operational phase of the project. During the construction phase, there are two standards; daytime exterior noise and nighttime exterior noise. During the operational phase of the project (post-construction), the General Plan allows for levels of noise using interior and exterior compatibility standards for residential land uses, with standards of 45 dBA interior and 60 dBA exterior.

The City's General Plan standards for exterior construction noise level impacts to residential land uses are not to exceed 65-dBA during the daytime, and not to exceed 60-dBA during nighttime. Construction noise standards per the General Plan are that construction activities are to be limited to the hours between 7:00 a.m. to 8:00 p.m., Monday through Saturday, except for emergencies and other special permitted circumstances.

Noise from construction activities on this project will be a function of the noise generated by individual construction equipment items ("Construction Equipment" section of the standards of the Construction Management Plan), the equipment location (much of this construction will be insulated by the landform, the depth of the excavation, the lowered topography in relation to the surrounding area, and the timing and duration of noise-generated activities. It is important to note that generally all equipment is not operated continuously or used simultaneously. The number, type, distribution, and usage of construction equipment will differ from phase to phase. The noise generated is both temporary in nature and limited in duration by the phase of construction and permitted hours of operation.

Based on this analysis, the project sites will experience noise levels above the 65 dB, "Acceptable" level. This increase will be short-term and temporary and will cease upon completion of construction. To mitigate temporary increases in noise, the following mitigation measure is recommended:

a, c, d) Exposure to Noise in Excess of Established Standards or Substantially Increase Existing Levels – Less than Significant Impact

The primary noise sources in the project area continue to be transportation-related. Traffic on Redwood Way and Rohnerville Road will continue to have minimal noise impacts on the project area; however, noise impacts from the project itself will be minimal due to the nature of the project.

Noise from construction activities on this project will be a function of the noise generated by individual construction equipment items, the equipment location (much of this construction will be insulated by the landform, the depth of the excavation, the lowered topography in relation to the surrounding area, and the timing and duration of noise-generated activities. It is important to note that generally all equipment is not operated continuously or used simultaneously. The number, type, distribution, and usage of construction equipment will differ from phase to phase. The noise generated is both temporary in nature and limited in duration by the phase of construction and permitted hours of operation.

There are several sensitive receptors including neighboring homes to the north, Redwood Memorial Hospital to the east and Norman G. Ambrosini Elementary School to the southeast. The construction site borders Redwood Memorial Hospital; 1400 feet from Norman G. Ambrosini Elementary School; and 85 feet from the closest residence.

To prevent noise disturbance to the community, construction will be limited to 7 a.m. to 7 p.m. on weekdays and 9 a.m. to 6 p.m. on weekends and holidays with the permission of the City.

Sound from a point source is known to attenuate at a rate of approximately -6 dB for each doubling of distance under typical urban/suburban conditions (HUD Noise Guidelines). For example, a noise level of 84 dB Leq as measured at 50 feet from the noise source will attenuate to 78 dB Leq at 100 feet from the source and to 72 dB Leq at 200 feet from the source to the receptor. Based on the reference noise levels in Table 3.12-1, the noise levels generated by construction equipment at the project site may reach a maximum of approximately 85 dB Leq at 50 feet during site excavation, vegetation trimming/removal and construction.

Based on these assumptions, the residential areas will experience noise levels above the 65 dB, "Acceptable" level. This increase will be short-term and temporary and will cease upon completion of construction.

b) Exposure to Ground Borne Vibration or Noise–Less than Significant Impact

Construction will cause temporary vibration in the immediate vicinity of the active portion of the construction site. Vibration will predominantly be caused by trenching equipment, excavation equipment, and compaction equipment. Vibration from on-site construction activities will typically be intermittent and for short durations.

Based upon the types of anticipated construction equipment, and because no pile driving or blasting is needed, ground borne vibration levels produced during project construction are not expected to have a significant impact at neighboring sensitive receptor locations. The restriction of working hours under the mitigation requirements will eliminate the impact of equipment-generated vibration during night-time, early morning, and evening hours when people are generally more sensitive to noise and vibration. Therefore, a less than significant impact will occur related to ground borne vibration or ground borne noise levels.

e, f) Exposure of People Residing or Working Near a Private or Public Airport to Excessive Noise Levels – No Impact

The nearest public airport, the Rohnerville Airport, is located approximately two miles south of the project site (City of Fortuna, 2007). The project will not result in any changes to the noise levels related to an airport or private airstrip. No impact will occur.

### 4.14.3 MITIGATION MEASURES

**NOI-1: Construction Noise Mitigation Procedures**

The Contractor will prepare a Final Construction Management Plan (FCMP) to minimize temporary noise impacts on the surrounding residences. Pile drivers will not be used on the project site. The FCMP will include, at a minimum, the following measures:

Hours of Construction - The hours of construction will be limited to 7 a.m. to 7 p.m. on weekdays and 9 a.m. to 6p.m. on weekends and holidays with the permission of the City.

Complaint Response - The City shall designate a Construction Observer who shall also serve as a “noise disturbance coordinator,” and be responsible for responding to any local complaints about construction noise or other impacts associated with construction activities. A telephone number for the disturbance coordinator will be conspicuously posted at the construction site and on the City website. The Construction Observer will determine the cause of the noise complaints (e.g., beginning work too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. Reasonable measures to be considered may include (but are not limited to) the following:

- Construction of temporary sound walls or other physical noise barriers between the construction site and adjacent residences;

- Shielding of stationary combustion equipment such as pumps or generators with noise protection barriers;

- Installation of noise reduction features (mufflers & shrouds, etc.) on construction equipment.

- Implementation of noise reduction features will be determined by the Construction Observer based on the type of complaint received from neighbors, the degree of noise levels based on actual measurements if necessary (assuming an acceptable interior noise level of 45 dB per State Building Standards Commission), and the feasibility of implementation of the specific measure.

Timing for Implementation/Compliance: During construction of project.

Person/Agency Responsible for Monitoring: Community Development Department staff or designated Construction Observer.

Monitoring Frequency: Daily, for duration of project.

Evidence of Compliance: Visual site inspection by City Planner and/or Building Department Staff.

### 4.14.4 FINDINGS

The Project will have Less than Significant with Mitigation Incorporation Impact on Noise.

## 4.15 POPULATION AND HOUSING

*Table 15: Population and Housing impact evaluation*

| **XIII.POPULATION AND HOUSING**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes and/or businesses) or indirectly (e.g., through extension of roads or other infrastructure)? | ☐ | ☐ | ☒ | ☐ |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |

### 4.15.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (a) induce substantial population growth in an area, either directly (e.g., by proposing new homes and/or businesses) or indirectly (e.g., through extension of roads or other infrastructure); (b) displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere, or (c) displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

### 4.15.2 DISCUSSION

The project includes 59 new residences, a community center, new roads including a fire lane, and the implementation of new utility services. Each residence is designed to house at least two tenants, and provide a space for a potential vehicle.

a) Induce Substantial Population Growth – Less than Significant Impact

The primary objective of the project is to provide 59 residential units to the city of Fortuna. With two bedrooms in each unit, there could be as many as, if not more than 120 people living in this area. This represents an approximate 0.9% increase in reference to the total population of Fortuna, CA. This does not represent a large increase in the population, thus, less than significant impact is expected. The Fortuna General Plan and Program EIR analyzed the population growth of the City, including the density of the project site at the density in which it is proposed to be developed. The project will not increase the density to a level greater than that analyzed in the General Plan and Program EIR.

b, c) Displace Housing or People – No Impact

The project will not result in the displacement of any housing or people. No impact will occur.

### 4.15.3 MITIGATION MEASURES

No mitigation measures are necessary to regards to population and housing.

### 4.15.4 FINDINGS

The Project will have less than significant impact. Population increase will be minor in reference to the current population in Fortuna, CA. The project purpose is to provide new housing for the elderly, meaning that displacement of people or housing will not occur.

## 4.16 PUBLIC SERVICES

***Table 16: Public service impact evaluation***

| **XIV. PUBLIC SERVICES**. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Fire protection? | ☐ | ☐ | ☒ | ☐ |
| b) Police protection? | ☐ | ☐ | ☒ | ☐ |
| c) Schools? | ☐ | ☐ | ☒ | ☐ |
| d) Parks? | ☐ | ☐ | ☒ | ☐ |
| e) Other public facilities? | ☐ | ☐ | ☒ | ☐ |

### 4.16.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or result in the 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 (a) fire protection, (b) police protection, (c) schools, (d) parks, or (e) other public facilities.

### 4.16.2 DISCUSSION

For fire protection services, the project area is protected by the Fortuna Fire Protection District (FFPD). The FFPD provides structural fire protection and emergency services to the City of Fortuna as well as most of the Planning Area. The FFPD is staffed by the Fortuna Volunteer Fire Department (FVFD), which is comprised of all-volunteer firefighters. The FVFD operates out of three fire stations. The largest station is centrally located on South Fortuna Boulevard, with the two smaller stations located in Hydesville and Campton Heights. The CAL FIRE provides wildland fire protection to the forest area within the Planning Area north and east of the City limits that is designated as a SRA. Several mutual aid agreements exist between the FFPD and other local emergency response agencies in Carlotta, Ferndale, Loleta, Rio Dell, and Scotia (City of Fortuna 2007).

Police protection services and traffic patrol for the project area and Fortuna City limits are provided by the Fortuna Police Department (FPD). The FPD had one officer per 755 residents (2009). The FPD responded to approximately 14,721 calls in 2008, with an average response time of less than three minutes. The Humboldt County Sheriff Department provides police protection within the Planning Area and along Highway 101 in the City limits.

The school districts serving the project area include the Fortuna Union High School District and Fortuna Union Elementary School District. Fortuna Union High is located on 12th Street. Fortuna Middle School is located on L Street. Norman G. Ambrosini Elementary School is located near the site.

Parks and recreation facilities in the project area include landscaped areas and recreational facilities and equipment at Fortuna Union High School. The Parks and Recreation Department has a shared agreement with Fortuna high school to use gym and school field facilities for community soccer, basketball, and football programs. This partnership allows the community to maximize use of available parks and facilities. Other parks in the vicinity include Chamber Park, Rohner Park, and Newburg Park.

The City of Fortuna library provides information, reading, audio, and visual materials. The present library has reached capacity at 18,000 books and has a monthly circulation around 9,000 books per month. The city has signed a memorandum of understanding between the City of Fortuna and the Humboldt County Library. The MOU transfers all library equipment owned by the City of Fortuna to the county. The Humboldt County Library is responsible for maintenance, supplies, and property insurance of the equipment, whereas the city owns the building and pay for repairs and maintenance.

The City of Fortuna provides public transit to all Fortuna residents through sponsorship of the Humboldt Transit Authority. The City's Parks and Recreation Department operates the "Dial-a-Ride" service for seniors over the age of fifty and disabled persons regardless of age. Two buses are in operation Monday through Friday from 8:30 a.m. to 4:30 p.m. One bus operates on Saturday from 9:00 a.m. to 3:30 p.m.

a, b, c, d, e) Substantial Adverse Physical Impacts Associated with New or Altered Fire or Police Protection, Schools, Parks, or other public facilities – No Impact

As discussed in Section XIII, the project will directly induce population growth and create new demand for services. Therefore, the project will have an impact on the service ratios, response times, or other performance objectives of schools, parks, and other public facilities and services that are based on population growth. The project will not require new or physically altered government facilities to serve the project site.

### 4.16.3 MITIGATION MEASURES

No mitigation required.

### 4.16.4 FINDINGS

The Project will have No Impact on Public Services.

## 4.17 RECREATION

***Table 17: Recreation impact evaluation***

| **XV. RECREATION**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☒ | ☐ |
| b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | ☒ |

### 4.17.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (a) increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated, or (b) include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

### 4.17.2 DISCUSSION

The City of Fortuna owns and maintains public parks, open spaces, and recreation facilities under the Parks and Recreation Department. The responsibilities of the Parks and Recreation Department include managing and maintaining City parks and recreational facilities, coordinating recreation programs and service club activities that take place at City parks and facilities, and planning for park and recreational facilities demand. The City of Fortuna has 75 acres of community parkland in Rohner, Newburg and 2 mini/pocket parks.

a) Increase in the Use of Existing Facilities Resulting in Substantial Physical Deterioration – Less Than Significant Impact

This project will indirectly influence recreation use as this project is constructing 59 permanent units for people to live in. As many as if not more than, 120 people could live in the proposed unit development. As these homes are specifically for senior citizens, usage of parks will most likely not include significant wear and tear on facilities (barring visiting family usage).

b) Development of Recreation Facilities that Could Result in Adverse Physical Effects on the Environment – No Impact

The PD includes a 15’ wide trail easement which connects to the City along Strongs Creek. When the trail is constructed, it will provide recreational access to the rear residential development and enrich the nature area. Thus, no adverse physical effects are anticipated, resulting in no impact.

MITIGATION MEASURES

No mitigation required.

### 4.17.3 FINDINGS

The Project will have Less Than Significant Impact on Recreation.

## 4.18 TRANSPORTATION/TRAFFIC

***Table 18: Transportation/Traffic impact evaluation***

| **XVI.TRANSPORTATION / TRAFFIC**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 congestions 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 result in substantial safety risks? | ☐ | ☐ | ☐ | ☒ |
| d) Substantially increase hazards due to design features (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 regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities? | ☐ | ☐ | ☐ | ☒ |

### 4.18.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (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 design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); (e) result in inadequate emergency access; or (f) conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

### 4.18.2 DISCUSSION:

As proposed, the project site access will be via a bi-direction road way connected to Redwood Way which is classified as a collector road (road that link local streets to the arterials system) by the City of Fortuna. Redwood Way is also identified as providing primary access throughout the community. The City also conducted surveys of critical intersections and the Rohnerville Road/Redwood Way (a two-way stop controlled) intersection is one the 26 critical intersections analyzed by the City.

Level of Service (LOS) is a quantitative measure that characterizes operation of transportation facilities. Using data relative to volumes, right-of-way (ROW) controls, and lane configurations, the relative experience of drivers using the transportations system can be evaluated. It “grades” the operation of the facility similar to a report card; a LOS of "A" is representative of generally free-flowing conditions while a LOS of “F” is representative of long delays. The City’s standard is LOS “C” for all City streets, except Main Street where LOS “D” is the minimum.

According to the City of Fortuna, Rohnerville Road/Redwood Way (a two-way stop controlled) intersection has a level of service (LOS) of B.  A LOS of B for a two-way stop-controlled intersection has a delay of 15 to 25 seconds without any queues. This intersection is located approximately 1400 feet from the entrance to the proposed center. The road width at the proposed entry for Redwood Way is 32 feet including the two travel lanes and a pedestrian/bike lane located on the south. There are no sidewalks along most of Redwood Way and the posted speed limit is 35 mph.

A Traffic Impact Study Report (TISR) was prepared for the project by GHD and finalized in December, 2018. The TISR can be found in the attached documentation (Attachment H). The TISR provides an evaluation of operating conditions during the typical weekday morning and evening peak periods under Baseline, Baseline plus Project, Cumulative, and Cumulative plus Project Conditions. Baseline conditions model existing conditions, which include the development of the Open-Door Community Health Center (ODCHC) and the McLean Community Center Projects. Anticipated operations and intersection LOS were assessed for potential impacts using the measure of effectiveness and thresholds of significant established by the City of Fortuna. The purpose of the TISR is to provide City staff and policy makers such as Planning Commissioners and Council members with data that they can use to make an informed decision regarding the potential traffic impacts of the proposed project, and any associated improvements that will be required in order to mitigate these impacts to a level of insignificance as defined by the Fortuna General Plan 2030, or other applicable policies.

The results of the various conditions scenarios reported with this study indicate that the study area roadway network generally will operate adequately over the long-term horizon, with or without the addition of project trips. The TISR concluded that,

"...the proposed project improvements at the project development site it will have minimal effect on the study roadway network because of the additional trips generated…this study confirms that the levels of service encountered with the addition of the project generated trips will be the same as those encountered without the addition of project-generated trips"

The Humboldt Transit Authority (HTA) have two transit services operating within the City of Fortuna. The primary transit services within the study area is the Redwood Transit Service (RTS) mainline, with the RTS Southern Humboldt Intercity transit line operating in the southbound direction from the study area. The RTS main lines provides fixed route services between Scotia, Fortuna, Loleta, Fields Landing, Eureka, Arcata, McKinleyville, Westhaven, and Trinidad seven days per week. Services travel along South Fortuna Boulevard, Redwood Way, Rohnerville Road, and Kenmar Road. Transit stops are currently placed adjacent to Redwood Village Shopping Center along both South Fortuna Boulevard and Redwood Way, and adjacent to the St. Joseph's Drive and Redwood Memorial Hospital.

Pedestrian facilities (sidewalks on public streets) are provided in varying coverage throughout Fortuna but are not available along Redwood Way near the project site.

a) Conflict with an Applicable Plan, Ordinance, Policy, or Program Establishing Measures of Effectiveness for the Performance of the Circulation System – Less than Significant with Mitigation

Increases in traffic will occur during project construction. The proposed project will generate short-term traffic during construction from transport of heavy construction equipment to and from the project site, truck traffic associated with hauling construction components and materials to the site and removal of debris, and construction workers commuting to and from the site. The temporary increase in traffic will be localized and temporary.

During project construction, truck trips associated with delivery of materials and hauling away of soil and other construction debris will occur. The trips will create a minor impact within the neighborhood immediately surrounding the project site. However, the impact will be short-term, and once construction is completed, all short-term impacts associated with the proposed project will cease.

Based on the TISR conducted by GHD, the project itself will not generate a significant impact on the LOS of the surrounding road network. Conditions leading to the improvement of the surrounding road network will have occurred with, or without the development of the project site.

b) Conflict with an Applicable Congestion Management Program – No Impact

The project area is not subject to a Congestion Management Program and does not have a traffic congestion problem during weekday work hours, with all project area streets and roads below capacity; therefore, there will be no impact.

c) Result in a Change in Air Traffic Patterns – No Impact

The nearest public airport, the Rohnerville Airport, is located approximately 2 miles south of the project site. No aspect of the project will affect air traffic patterns; therefore, there will be no impact.

d) Substantially Increase Hazards due to a Design Feature or Incompatible Use – Less than Significant with Mitigation

The planned intersection of the proposed ODCHC entrance and Redwood Way will require minimal roadway modifications, assuming that the two-way left turn lane associated with the City's current Redwood Way project will be implemented prior to the construction of the planned entrance. In order to address rear-end collision concerns in the southbound direction, a southbound right turn pocket could be considered, but it does not produce a significant benefit in terms of delay.

As discussed above, the presence of construction vehicles and equipment on nearby roadways could increase the normal traffic hazard in the project area. The project will only require traffic safety control procedures onsite to accommodate traffic during construction. Work hours will be confined to 7:00 a.m. to 7:00 p.m. on weekdays, and 9:00 a.m. to 6:00 p.m. on weekends and holidays (if work on weekends and/or holidays is permitted by the City).

e) Result in Inadequate Emergency Access – Less than Significant with Mitigation

The project site borders the Redwood Memorial Hospital which is the main hospital for Fortuna residents and other nearby cities. The site is located on one of three main access ways to the hospital; Renner Drive, west Redwood Way and east Redwood Way. During the beginning stages of construction, it is likely that there will be large equipment being operated near west Redwood Way. This could inhibit the use of both lanes resulting in inadequate emergency access. Once the new road for the units is constructed, then there will be fewer issues with large equipment blocking one of the lanes of Redwood Way. Mitigation through traffic planning management is proposed. This includes signage to guide vehicles through and or around the construction zone at all times.

f) Conflict with Adopted Policies, Plans, or Programs Regarding Public Transit, Bicycle, or Pedestrian Facilities, or Otherwise Decrease the Performance or Safety of Such Facilities – No Impact

The Fortuna General Plan Policy Document is the guiding document addressing bicycle, pedestrian and transit facilities in the project area and Planning Area of Fortuna. The project will not conflict with any of the policies or programs in the policy document, nor adversely affect facilities for public transit, bicycles, or pedestrians. There will be no impact.

### 4.18.3 MITIGATION MEASURES

**TRT-1: Traffic Planning**

The City of Fortuna will be responsible for implementing the following measures to minimize the potential short-term impacts to transportation in the project area during construction:

1. No public traffic routes shall be fully blocked at any time.

2. Workers shall park their privately-owned vehicles at designated locations at the project site to reduce traffic impacts.

3. Temporary parking advisory signs shall be posted at least 24 hours, but no more than 48 hours, in advance of construction.

4. Haul routes shall be utilized by construction trucks to minimize truck traffic on local roadways to the extent possible. When necessary, flaggers and/or signage to guide vehicles through and/or around the construction zone shall be utilized.

5. Truck trips shall be scheduled outside of peak morning and afternoon commute periods to the extent possible.

6. The City of Fortuna shall be responsible for ensuring that any affected residents are notified well in advance of any disruption to the transportation infrastructure.

Timing for Implementation/Compliance: During construction.

Person/Agency Responsible for Monitoring: Building Official.

Monitoring Frequency: During construction activities.

Evidence of Compliance: Visual observance by Building Official.

With implementation of the above mitigation measures, potential impacts on traffic, bicycle and pedestrian circulation attributable to the project will be reduced to a less than significant level.

### 4.18.4 FINDINGS

The Project will have No Impact on Transportation and Traffic with mitigation.

## 4.19 UTILITIES AND SERVICE SYSTEMS

***Table 19: Utilities and Service systems impact evaluation***

| **XVII.UTILITIES AND SERVICE SYSTEMS.** Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 water or wastewater facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☐ | ☒ |
| c) Require or result in the construction of new Stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| 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? | ☐ | ☐ | ☐ | ☒ |

### 1.1.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (a) exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board; (b) require or result in the construction of new water or wastewater facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; (c) require or result in the construction of new Stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; (d) have sufficient water supplies available to serve the project from existing entitlements and resources, or need new or expanded entitlements; (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; (f) be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; or (g) comply with federal, state, and local statutes and regulations related to solid waste.

### 1.1.2 DISCUSSION

The City has prepared master plans for the infrastructure in the project area, including water and sewer and roadways through the General Plan, zoning ordinance, Capital Improvement Plan, and Storm Drainage Master Plan. In addition, Whitchurch Engineering has made use of the SWMM Model provided by the City of Fortuna to determine the effects of the PD on the water and wastewater facilities of the City.

The storage of existing water sources, connection of pressure zones and improvement of existing fire suppression services will not conflict with applicable plans, policies or regulations. City of Fortuna service providers have been contacted regarding the project and have indicated the ability to provide services. Additionally, Whitchurch Engineering has found through the City of Fortuna SWMM and EPANET models that the existing wastewater and potable water systems are adequately sized to service the proposed project. Therefore, the existing water system also has adequate capacity to meet the domestic and irrigation demands of the proposed development.

The General Plan encourages in-filling where existing facilities and services are already available. This project supports "infill" development as it is located in the central area of the City and is substantially surrounded by development on three sides with the exception of a remnant pasture located to the southwest.

The City Wastewater Treatment Plant (WWTP) currently treats 1.0 Million Gallons per Day (MGD) during the dry weather season (June through September), and an average of 1.9 MGD annually (wet and dry weather flows). The recently upgraded WWTP has an average dry weather capacity of 1.5 MGD, and a wet weather capacity of up to 7 MGD. The WWTP can accommodate services for approximately 15,000 people. Additionally, Whitchurch Engineering SWMM modeling indicated that the City's existing wastewater conveyance system has adequate capacity to meet the demands of the proposed development. Based upon this analysis, the projected wastewater inflow resulting from this project will not result in overtopping of junction the downstream invert J-531. Results can be found in the attached documentation (Attachment I).

The overall current storage capacity of the city's water system is approximately 7.5 MG. The city's water supply is limited by water rights. According to the Humboldt County Capital Facilities Technical Report, the city is extracting approximately 75 percent of its groundwater allocation under current rights. The city has approximately 1,489 connections available before it will need to apply for additional water rights. The EPANET analysis conducted by Whitchurch Engineering concluded that an emergency usage of 2,037 GPM could occur in the case of fire response scenario. The system connects to the PD through J-193 and J-224 to provide redundancy, and an excess of water supply. Raw results are included in the attached documentation (Attachment J).

The waste stream generated in the City of Fortuna totals approximately 7,000 tons per year, and includes household, commercial, construction, and garden refuse material, as well as recycling.

The City of Fortuna contracts with Eel River Disposal and Resource Recovery Inc. (ERD) for municipal solid waste collection services. ERD has been in operation for more than 20 years and offers Fortuna residents weekly garbage pickup and bi-weekly curbside recycling of paper, cardboard, plastic, glass, and metal. Solid waste from the ERD transfer station is transported out of Humboldt County to the Dry Creek Landfill in Medford, Oregon or Anderson Landfill in Anderson, California.

a, e) Exceed Applicable Wastewater Treatment Requirements or Wastewater Treatment Capacity – No Impact

The project consists of development pursuant to the General Plan and Zoning Designation at a density and intensity of use which was considered in the City of Fortuna utility Master Plans. The Master Plan identifies long term capacity improvements which may be needed to accommodate anticipated development. Based on analysis of the current City of Fortuna infrastructure through the analysis of the provided SWMM model, no short-term limitations to the provision of service have been identified. No impact will occur.

b) Require Construction or Expansion of New Water or Wastewater Facilities – No Impact

Based on analysis of the current City of Fortuna infrastructure through the analysis of the provided SWMM and EPANET models, the project will not require construction or expansion of new water or wastewater facilities, which will cause significant environmental effects. No impact will occur.

c) Require Construction or Expansion of New Stormwater Facilities – Less than Significant Impact

The project site is in a developed area of Fortuna, which is served by an existing stormwater collection and conveyance system. Implementation of the project is not anticipated to increase the volume or velocity of stormwater runoff off-site such that significant environmental effects are caused. Implementation of LID control will reduce the impact of new stormwater flow.

d) Have Sufficient Water Supplies to Serve the Project – No impact

The project will not require an increase in the capacity or result in overloading of the City's water system. No additional water supply is necessary to serve the proposed project. No impact will occur.

f, g) Have Sufficient Landfill Capacity and Comply with Statutes Related to Solid Waste – Less than Significant Impact

The project will generate a small volume of construction waste that will be hauled by the construction contractor to an approved disposal site. Waste will include construction materials remnants, replaced materials, and worker-generated trash and debris. This will be a less than significant impact on landfill capacity with the implementation of federal, state, and local statutes and regulations related to solid waste.

### 4.19.1 MITIGATION MEASURES

No mitigation required.

### 4.19.2 FINDINGS

The Project will have Less Than Significant Impact on Utilities and Service Systems. Current infrastructure is adequately sized to service the proposed project.

## 4.20 MANDATORY FINDINGS OF SIGNIFICANCE

***Table 20: Mandatory Findings of Significance impact evaluation***

| XVIII. MANDATORY FINDINGS OF SIGNIFICANCE. | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 would cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☒ | ☐ | ☐ |

### 4.20.1 DISCUSSION

**a, c) Degrade Environmental Quality or Adversely Affect Human Beings – Less than Significant with Mitigation**

With implementation of the Mitigation Measures presented herein, the project as a whole does not have the potential to significantly degrade the quality of the environment, including air quality, fish or wildlife species or their habitat, plant or animal communities, important examples of the major periods of California history or prehistory, geologic resources, hazards, water resources, land use compatibility, noise, traffic movement, or other adverse effects, directly or indirectly, on human beings.

**b) Cumulatively-Considerable Impacts – Less than Significant**

The project's individual impacts will not add appreciably to any existing or foreseeable future significant cumulative impact, such as visual quality, historic resources, traffic impacts, or air quality degradation. Incremental impacts, if any, will be negligible and undetectable. As reported throughout this document, cumulative impacts to which this project will contribute will be mitigated to a less than significant level.

Determination

This Initial Study has determined that in the absence of mitigation the proposed Project could have the potential to result in significant impacts associated with the factors checked below. Mitigation measures are identified in this Initial Study that will reduce all potentially significant impacts to less-than-significant levels.

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Aesthetics | ☐ | Agriculture and Forestry Resources | ☐ | Air Quality |
| ☒ | Biological Resources | ☒ | Cultural Resources | ☒ | Geology/Soils |
| ☐ | Greenhouse Gas Emissions | ☐ | Hazards & Hazardous Materials | ☒ | Hydrology/Water Quality |
| ☐ | Land Use / Planning | ☐ | Mineral Resources | ☒ | Noise |
| ☐ | Population / Housing | ☐ | Public Services | ☐ | Recreation |
| ☒ | Transportation/Traffic | ☐ | Tribal Cultural Resources | ☐ | Utilities / Service Systems |
| ☐ | Mandatory Findings of Significance | | | | |

On the basis of this Initial evaluation: There are no significant impacts which could not be mitigated to results in less-than-significant levels.  The proposed PD does not fall under the requirements to result in an Environmental Impact Report.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# 5 Mitigation Summary

**BIOLOGICAL RESOURCES**

**BR-1: Compliance with Army Corps Nationwide Permit to ensure protection of existing 0.04-acre wetlands.**

Timing for Implementation/Compliance: City plan review of improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review and pre-construction site review.
Evidence of Compliance: Final development plans depict creek banks and wetland areas and setbacks. City Community Development Department to review Nationwide Permit during plan review to ensure protection measures are depicted. Building Inspectors to review during site development to ensure fencing and other measures are implemented. ,

**BR-2: Maintain the 50-ft setback from Strongs and Jameson creeks' top of bank. Maintain 25-ft setback from jurisdictional wetlands.**

Timing for Implementation/Compliance: City plan review of improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review and pre-construction site review.
Evidence of Compliance: Plans depict 50-foot setback from Strongs and Jameson Creeks, and 25-foot setbacks from wetlands.

**BR-3: Migratory Bird Protection**
There are potential direct impacts to migratory bird species if construction or vegetation removal occurs during the breeding season (March 1- August 15). Therefore, preconstruction nesting surveys will be performed if construction will occur during that time to mitigate these potential impacts. If breeding birds are found in the vicinity, construction will be delayed until after the breeding season or proper setbacks should be established in cooperation with the California Department of Fish and Wildlife prior to proceeding with construction.

Timing for Implementation/Compliance: March - August
Person/Agency Responsible for Monitoring: City Construction Inspector
Monitoring Frequency: Once, pre-construction
Evidence of Compliance: Visual and written verification that no breeding birds are present.

## CULTURAL RESOURCES

**C-1: If tribal cultural resources are discovered, the Cultural Resource Protection Protocol outlined below will be followed. The protocol shall be printed on all construction plan sets.**

**Cultural Resource Protection Protocol 1: Cultural Resources**

If cultural resources, such as lithic materials or ground stone, historic debris, building foundations, or bone are inadvertently discovered during ground-disturbance activities, work shall be stopped within 20 meters (66 feet) of the discovery, per the requirements of CEQA (January 1999 Revised Guidelines, Title 14 CCR 15064.5 (f)). If the proposed project receives Federal funding, it may be considered a Federal undertaking triggering compliance with Section 106 National Historic Preservation Act. Inadvertent discoveries shall be treated as outlined in 43 CFR 10.4 and 36 CFR 800.13.

Work near the archaeological find shall not resume until a professional archaeologist, who meets the *Secretary of the Interior's Standards and Guidelines*, has evaluated the materials and offered recommendations for further action.

Prehistoric materials which could be encountered include: obsidian and chert debitage or formal tools, grinding implements, (e.g., pestles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic materials which could be encountered include: ceramics/pottery, glass, metal, can and bottle dumps, cut bone, barbed wire fences, building pads, structures, trails/roads, etc.

**Cultural Resource Protection Protocol 2: Human Remains**

If human remains are inadvertently discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie adjacent to human remains (Public Resources Code, Section 7050.5). The Humboldt County coroner will be contacted to determine if the cause of death must be investigated. If the coroner determines that the remains are of Native American origin, it is necessary to comply with State laws relating to the disposition of Native American burials, which fall within the jurisdiction of the Native American Heritage Commission (NAHC) (Public Resources Code, Section 5097). The coroner will contact the NAHC. The descendants or most likely descendants of the deceased will be contacted, and work will not resume until they have made a recommendation to the landowner or the person responsible for the excavation work for means of treatment and disposition, with appropriate dignity, of the human remains and any associated grave goods, as provided in Public Resources Code, Section 5097.98. Work may resume if NAHC is unable to identify a descendant or the descendant failed to make a recommendation.

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Timing for Implementation/Compliance: Submittal of utility Improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review.
Evidence of Compliance: Protocol printed on plans.

**GEOLOGY AND SOILS/EROSION CONTROL**

GS-1: Implement standard construction BMPs in accordance with a standard Caltrans SWPPP. The erosion control actions will include BMPs designed to reduce erosion of exposed soil and minimize the sediment entrained in runoff from the site during construction. BMPs may include: plastic tarps, geo-fabric, woven coconut fronds, silt fences, coir rolls/straw wattles, erosion control matting, site watering for controlling dust, or other suitable materials. With the implementation of these mitigation measures, potential impacts to soil erosion or the loss of topsoil will be less than significant.

Timing for Implementation/Compliance: During construction of project.
Person/Agency Responsible for Monitoring: Licensed QSD or designated Construction Observer.
Monitoring Frequency: Before, during, and after rain events resulting in 0.1 inches of rainfall depth within a 24-hour period.
Evidence of Compliance: Visual site inspection by QSD or designated Construction Observer.

**HYDROLOGY AND WATER QUALITY**

**HWQ-1: Prepare and Implement SWPPP and BMPs**

The City shall ensure that a SWPPP is prepared and implemented for the project and includes BMPs. The SWPPP shall be prepared prior to any construction on any portion of the project and implemented prior to and during construction. At a minimum, the contractor shall implement the measures listed in the Initial Study, or an equivalent as described in the approved SWPPP:

Timing for Implementation/Compliance: During construction of project.
Person/Agency Responsible for Monitoring: Building Department site inspector or designated Construction Observer.
Monitoring Frequency: Daily, for duration of project.
Evidence of Compliance: Visual site inspection by Building Department Staff.

## NOISE

### NOI-1: Construction Noise Mitigation Procedures

The Contractor will prepare a Final Construction Management Plan (FCMP) to minimize temporary noise impacts on the surrounding residences. Pile drivers will not be used on the project site. The FCMP will include, at a minimum, the following measures:

Hours of Construction - The hours of construction will be limited to 7 a.m. to 7 p.m. on weekdays and 9 a.m. to 6p.m. on weekends and holidays with the permission of the City.

Complaint Response - The City shall designate a Construction Observer who shall also serve as a "noise disturbance coordinator," and be responsible for responding to any local complaints about construction noise or other impacts associated with construction activities. A telephone number for the disturbance coordinator will be conspicuously posted at the construction site and on the City website. The Construction Observer will determine the cause of the noise complaints (e.g., beginning work too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. Reasonable measures to be considered may include (but are not limited to) the following:

- Construction of temporary sound walls or other physical noise barriers between the construction site and adjacent residences;
- Shielding of stationary combustion equipment such as pumps or generators with noise protection barriers;
- Installation of noise reduction features (mufflers & shrouds, etc.) on construction equipment.
- Implementation of noise reduction features will be determined by the Construction Observer based on the type of complaint received from neighbors, the degree of noise levels based on actual measurements if necessary (assuming an acceptable interior noise level of 45 dB per State Building Standards Commission), and the feasibility of implementation of the specific measure.

> Timing for Implementation/Compliance: During construction of project.
> Person/Agency Responsible for Monitoring: Community Development Department staff or designated Construction Observer.
> Monitoring Frequency: Daily, for duration of project.
> Evidence of Compliance: Visual site inspection by City Planner and/or Building Department Staff.

**TRAFFIC AND CIRCULATION**

**TRT-1: Traffic Planning**

The City of Fortuna will be responsible for implementing the following measures to minimize the potential short-term impacts to transportation in the project area during construction:

1. No public traffic routes shall be fully blocked at any time.

2. Workers shall park their privately-owned vehicles at designated locations at the project site to reduce traffic impacts.

3. Temporary parking advisory signs shall be posted at least 24 hours, but no more than 48 hours, in advance of construction.

4. Haul routes shall be utilized by construction trucks to minimize truck traffic on local roadways to the extent possible. When necessary, flaggers and/or signage to guide vehicles through and/or around the construction zone shall be utilized.

5. Truck trips shall be scheduled outside of peak morning and afternoon commute periods to the extent possible.

6. The City of Fortuna shall be responsible for ensuring that any affected residents are notified well in advance of any disruption to the transportation infrastructure.

Timing for Implementation/Compliance: During construction.
Person/Agency Responsible for Monitoring: Building Official.
Monitoring Frequency: During construction activities.
Evidence of Compliance: Visual observance by Building Official.

# References

1. City of Fortuna (December 2010). “City of Fortuna General Plan”.
2. Environmental Protection Agency (1977). “Clean Air Act”.
3. California Department of Transportation (2015). “California Scenic Highway Mapping System”
4. California Department of Conservation (2012). “Farmland Mapping and Monitoring Program (FMMP)”.
5. California Department of Conservation (2012). “Williamson Act contract”
6. Humboldt County. “Humboldt County WebGIS portal”.

7. International Conference of Building Officials (1994) “Table 18-1-B”.
8. Mintier & Associates et al. (2009). “Fortuna General Plan Background Report”
9. Perry, Merritt (August 2015). Personal correspondence email.
10. State of California. “California Global Warming Solutions Act of 2006”.
11. State of California. “California Code of Regulations”
12. State of California (1970). “California Environmental Quality Act” (CEQA).
13. State of California. “Public Resources Code section 12220(g); section 4526”.
14. State of California (1976). “Government Code section 51104(g))”.
15. California Air Resources Board (2013). “California Clean Air Act”

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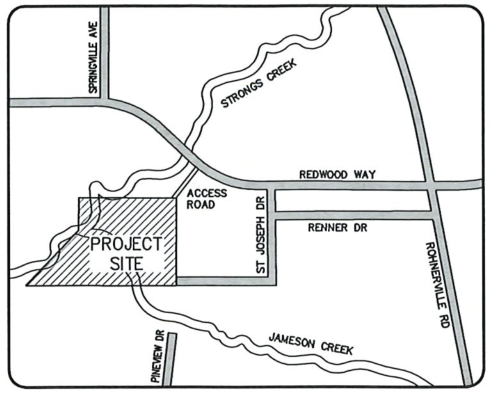
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment A: Proposed Site Plan Sheets




## LOCATION MAP

NO SCALE

NORTH

### SHEET INDEX

1. LOCATION MAP/OVERALL SITE PLAN
2. DETAILED SITE PLAN
3. EASEMENT MAP
4. PRELIMINARY GRADING & DRAINAGE PLAN

PROJECT DESCRIPTION

59 UNIT PLANNED UNIT DEVELOPMENT.
THIS DEVELOPMENT WILL BE A SENIOR GATED COMMUNITY WITH 59 COTTAGE STYLE STRUCTURE UNITS. EACH UNIT WILL CONSIST OF A 2 BEDROOM, 1.5 BEDROOM RESIDENCE WITH A 1 CAR GARAGE. IMPROVEMENTS FOR THE SITE WILL INCLUDE ACCESS ROADS, UTILITIES TO SERVE EACH PARCEL (WATER, SEWER, GAS AND ELECTRIC). PROPERTY LINES WILL BE ESTABLISHED AT THE WALLS OF THE STRUCTURE AND INCLUDE PATIO AND PORCH AREAS WITHIN EACH PARCEL. THE COMMUNITY WILL HAVE SHARED COMMON AREAS WHICH WILL BE CONNECTED ALONG THE ROADWAYS WITH ACCESSIBLE SIDEWALKS.

BASIS OF BEARING:

1. THE PROPERTY LINES SHOWN HEREIN ARE BASED SOLELY UPON THAT RECORD OF SURVEY RECORDED IN BOOK 6 OF PARCEL MAPS, PAGE 44 OF HUMBOLDT COUNTY SURVEY RECORDS AS PARCEL MAP NO. 698 BASED ON RECORD SURVEY MONUMENTS FOUND IN THE FIELD.
2. BOUNDARY AND EASEMENT INFORMATION INDICATED HEREON IS PER THAT CERTAIN PRELIMINARY TITLE REPORT NUMBER FFHO-0031600145-KP, EFFECTIVE DATE JULY 8, 2016. PREPARED BY FIDELITY NATIONAL TITLE COMPANY OF CALIFORNIA

APPLICANT INFORMATION:

DENNIS FITZE
1749 ALAMAR WAY
FORTUNA, CA. 95540

MAP PREPARER:

JEFF LAIKAM
WHITCHURCH ENGINEERING
610 9th STREET, FORTUNA, CA. 95540
(707) 725-6926
jtl@whitchurchengineering.com

| APN | EXISTING | PROPOSED | EXISTING ZONING |
|---|---|---|---|
| 202-082-005 | 10.98 ACRES | 47 UNITS | R-1-10 |
| 202-121-002 | 1.87 ACRES | 12 UNITS | R-1-10 |

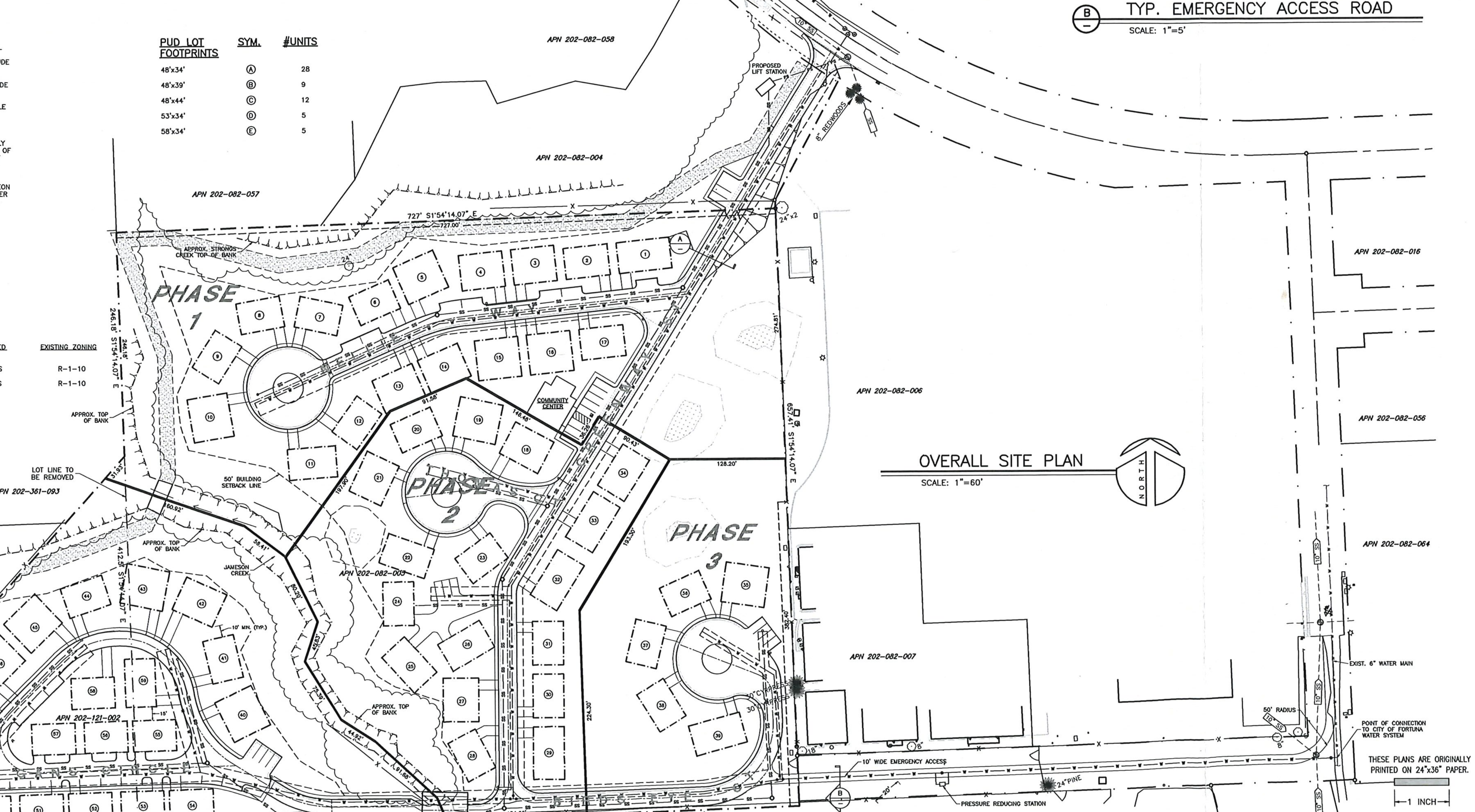
LOT SIZE

MINUS RIPARIAN AREA, SIDEWALKS, DRIVEWAYS, PATIOS, BLDG. FOOTPRINT, AND ROADWAYS
491,531 S.F. (11.3 AC)

| PHASING | AREA (S.F.) | *OPEN SPACE (S.F.) | UNITS |
|---|---|---|---|
| 1 | 189,781 | 98,513 | 17 |
| 2 | 129,672 | 49,919 | 17 |
| 3 | 81,223 | 51,454 | 5 |
| 4 | 159,151 | 71,475 | 20 |

*OPEN SPACE AREAS FOR EACH PHASE TO BE CREATED AS SEPARATE PARCELS

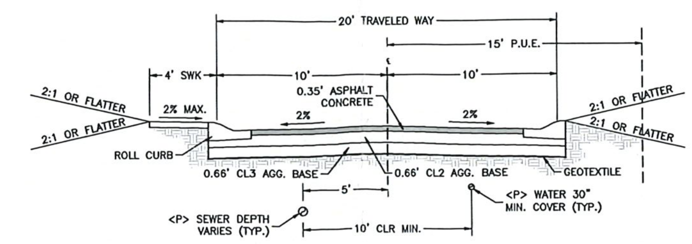
| PUD LOT FOOTPRINTS | SYM. | #UNITS |
|---|---|---|
| 48'x34' | A | 28 |
| 48'x39' | B | 9 |
| 48'x44' | C | 12 |
| 53'x34' | D | 5 |
| 58'x34' | E | 5 |




## OVERALL SITE PLAN

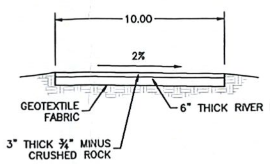
SCALE: 1"=60'

NORTH




## A TYP. 20' WIDE ROAD SECTION

SCALE: 1"=5'




## B TYP. EMERGENCY ACCESS ROAD

SCALE: 1"=5'

THESE PLANS ARE ORIGINALLY PRINTED ON 24"x36" PAPER.

1 INCH

This drawing or drawing set shall not be used for construction unless a jurisdictional stamp (County, City, State, Federal) has been issued on the drawing, stating "FOR PERMIT" or similar verbiage, a wet signed professional engineer's stamp, and permit documents have been issued for the project.

| REVISIONS | BY |
|---|---|
| C.O.F. PLN CHK COMMENT 3-1-19 | JTL |

REGISTERED PROFESSIONAL ENGINEER JEFFREY T. LAIKAM NO. 68586 CIVIL STATE OF CALIFORNIA

**WHITCHURCH ENGINEERING, INC.**
610 9th Street Fortuna, California 95540 Phone (707) 725-6926

# PLANNED UNIT DEVELOPMENT (P.U.D.)

Redwood Way, Fortuna, CA. 95540 A.P.N.: 202-082-005

## TENTATIVE MAP-OVERALL SITE PLAN

For: Dennis Fitze 1749 Alamar Way, Fortuna, CA. 95540

| | |
|---|---|
| Date | JAN 11 '19 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | GKK |
| Job | FIT1801 |
| Sheet | 1 |

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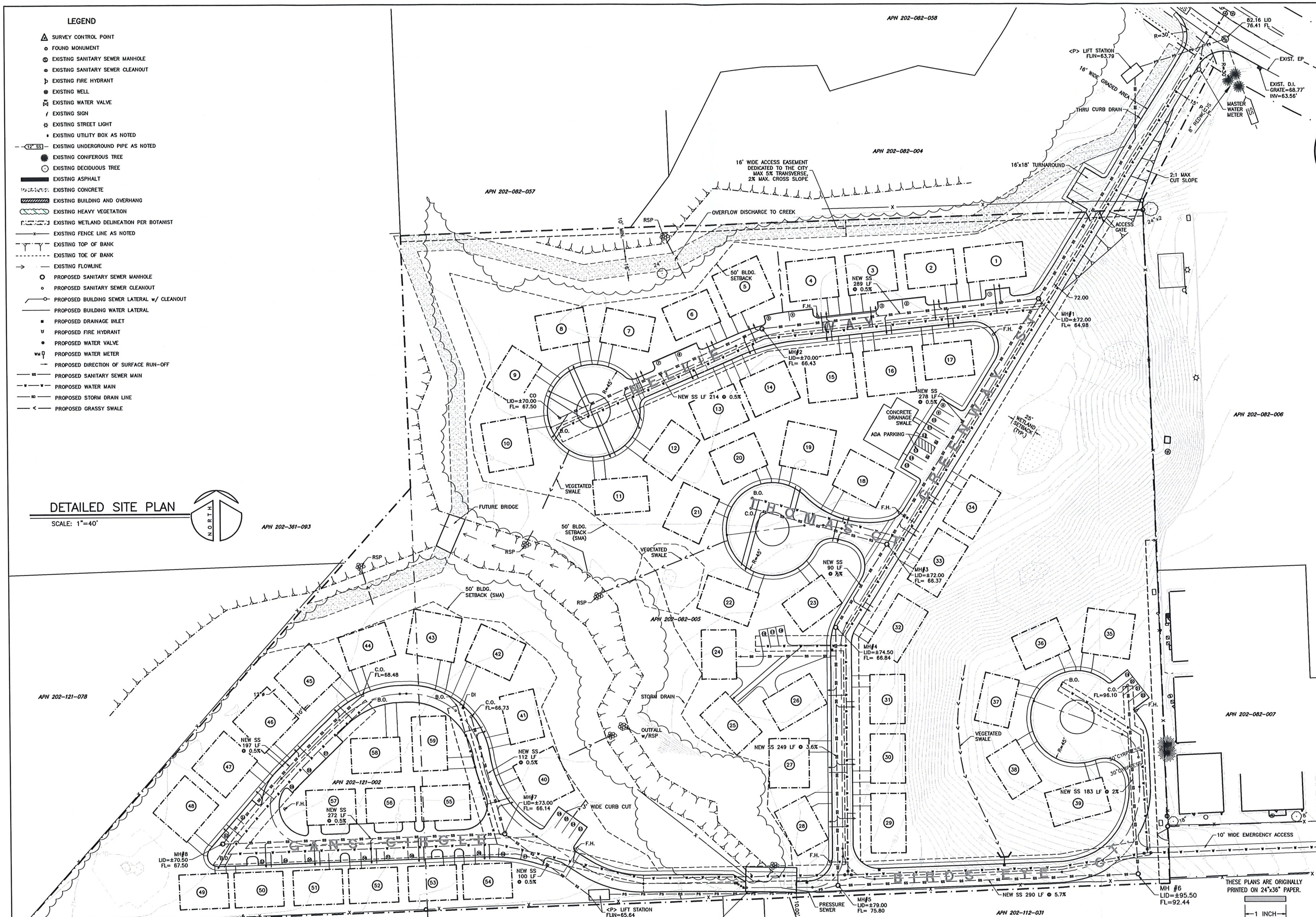


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**WHITCHURCH ENGINEERING, INC.**
610 9th Street Fortuna, California 95540 Phone (707) 725-6926

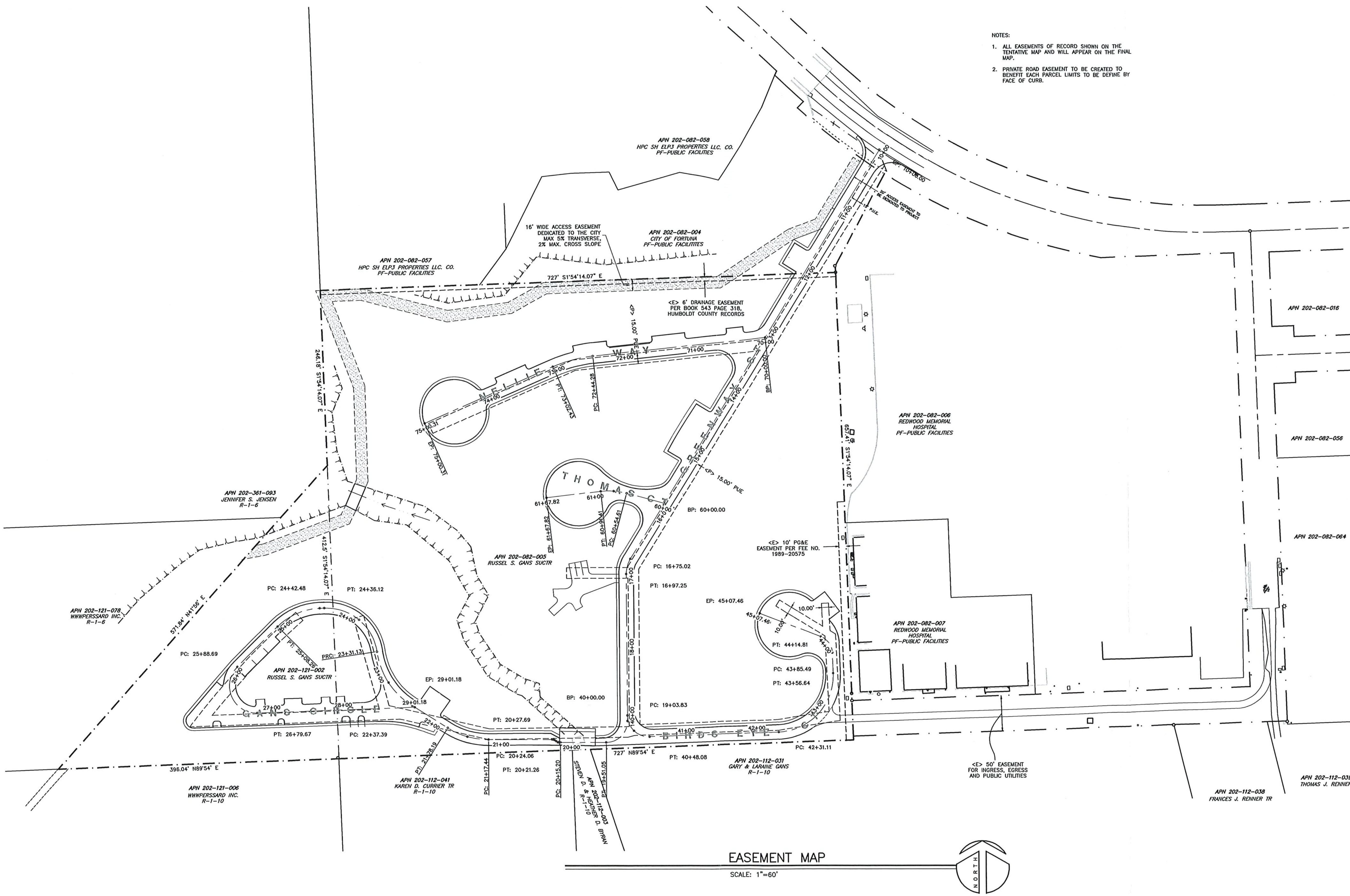
**PLANNED UNIT DEVELOPMENT (P.U.D.)**
A.P.N.: 202-082-005
Redwood Way, Fortuna, CA. 95540

**TENTATIVE MAP-DETAILED SITE PLAN**
For: Dennis Fitze 1749 Alamar Way, Fortuna, CA. 95540

| | |
|---|---|
| Date | JAN 11 '19 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | GKK |
| Job | FIT1801 |
| Sheet | 2 |

NOTES:

1. ALL EASEMENTS OF RECORD SHOWN ON THE TENTATIVE MAP AND WILL APPEAR ON THE FINAL MAP.
2. PRIVATE ROAD EASEMENT TO BE CREATED TO BENEFIT EACH PARCEL LIMITS TO BE DEFINE BY FACE OF CURB.




EASEMENT MAP

SCALE: 1"=60'

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WHITCHURCH ENGINEERING, INC.
610 9th Street Fortuna, California 95540
Phone (707) 725-6926

PLANNED UNIT DEVELOPMENT (P.U.D.)
Redwood Way, Fortuna, CA. 95540
A.P.N.: 202-082-005

TENTATIVE MAP-EASEMENT MAP
For: Dennis Fitze 1749 Alamar Way, Fortuna, CA. 95540

| | |
|---|---|
| Date | JAN 11 '19 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | GKK |
| Job | FIT1801 |
| Sheet | 3 |

## GRADING NOTES:

1. PROVIDE 5% SLOPE AWAY FROM ALL FOUNDATIONS.
2. ALL ROOF DRAINS TO BE ROUTED TO DRAINAGE FEATURES OR TIGHTLINED TO STREET.
3. UNITS 29, 30, 31, & 32 WILL HAVE RETAINING WALLS ASSOCIATED WITH THEIR FOUNDATIONS OR TO THE EAST OF THE LOTS.
4. TOPSOIL LAYER AT THE SITE RANGES FROM 16" TO 20" PHASE 1 & 2, 18" PHASE 3, AND 7 TO 13" PHASE 4.
5. PROJECT WILL BE DESIGNED TO MEET HUMBOLDT COUNTY LID REQUIREMENTS. PRELIMINARY DESIGN INDICATES THE FOLLOWING REQUIREMENTS FOR THE PHASES MUST BE MET:

   PHASE 1 (2 DMA'S)
   16,087 $ft^2$ OF SELF RETAINING AREA
   7,687 $ft^2$ OF SOIL QUALITY IMPROVEMENT

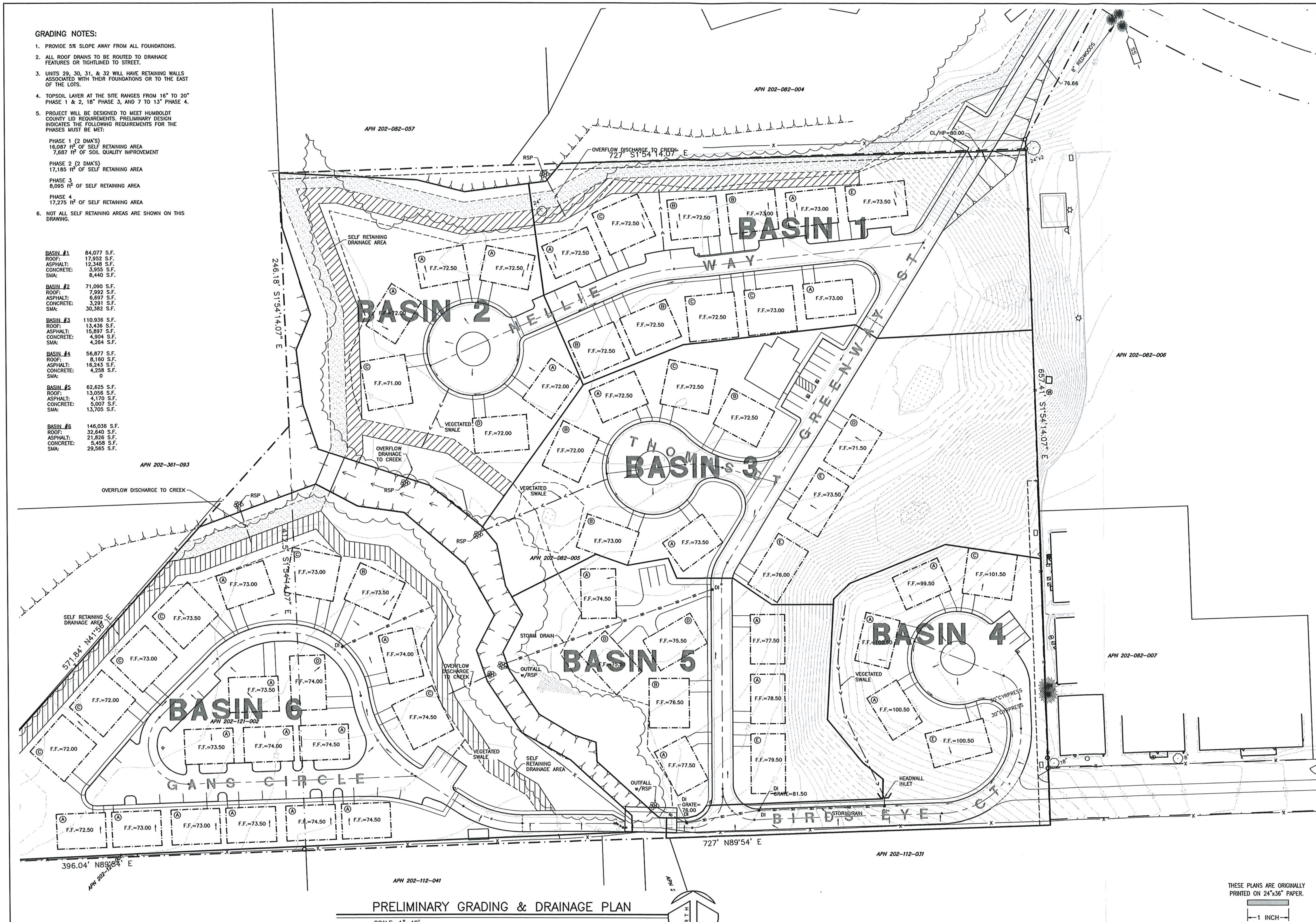
   PHASE 2 (2 DMA'S)
   17,185 $ft^2$ OF SELF RETAINING AREA

   PHASE 3
   8,095 $ft^2$ OF SELF RETAINING AREA

   PHASE 4
   17,275 $ft^2$ OF SELF RETAINING AREA

6. NOT ALL SELF RETAINING AREAS ARE SHOWN ON THIS DRAWING.

| | |
|---|---|
| BASIN #1 | 84,077 S.F. |
| ROOF: | 17,952 S.F. |
| ASPHALT: | 12,348 S.F. |
| CONCRETE: | 3,955 S.F. |
| SMA: | 8,440 S.F. |
| BASIN #2 | 71,090 S.F. |
| ROOF: | 7,992 S.F. |
| ASPHALT: | 6,697 S.F. |
| CONCRETE: | 3,291 S.F. |
| SMA: | 30,382 S.F. |
| BASIN #3 | 110.936 S.F. |
| ROOF: | 13,436 S.F. |
| ASPHALT: | 15,897 S.F. |
| CONCRETE: | 4,904 S.F. |
| SMA: | 4,264 S.F. |
| BASIN #4 | 56,877 S.F. |
| ROOF: | 8,160 S.F. |
| ASPHALT: | 16,243 S.F. |
| CONCRETE: | 4,258 S.F. |
| SMA: | 0 |
| BASIN #5 | 62,625 S.F. |
| ROOF: | 13,056 S.F. |
| ASPHALT: | 4,170 S.F. |
| CONCRETE: | 5,007 S.F. |
| SMA: | 13,705 S.F. |
| BASIN #6 | 146,036 S.F. |
| ROOF: | 32,640 S.F. |
| ASPHALT: | 21,826 S.F. |
| CONCRETE: | 5,458 S.F. |
| SMA: | 29,565 S.F. |




PRELIMINARY GRADING & DRAINAGE PLAN

SCALE: 1"=40'

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| REVISIONS | BY |
|---|---|
| C.O.F. PLN CHK COMMENT 3-1-19 | JTL |

REGISTERED PROFESSIONAL ENGINEER JEFFREY T. LAIKAM NO. 68586 CIVIL STATE OF CALIFORNIA

**WHITCHURCH ENGINEERING, INC.**
610 9th Street Fortuna, California 95540 Phone (707) 725-6926

# PLANNED UNIT DEVELOPMENT (P.U.D.)

Redwood Way, Fortuna, CA. 95540 A.P.N.: 202-082-005

## PRELIMINARY GRADING & DRAINAGE PLAN

For: Dennis Fitze 1749 Alamar Way, Fortuna, CA. 95540

| | |
|---|---|
| Date | JAN 11 '19 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | GKK |
| Job | FIT1801 |
| Sheet | 4 |

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# Attachment B: November 2016 - Wetland Delineation Report and ACOE Jurisdictional Determination

# Wetland Delineation Report
# For
# APN 202-082-005
# APN 202-121-002
# Fortuna, CA.
**November 4, 2016**


**Prepared by:**

**James Regan**
**Botanist/Wetland Delineator**
**707-845-2827**


**For:**

## Mad River Properties, Inc.
**McKinleyville, CA**

## Table of Contents



## Appendices

# 1.0 INTRODUCTION AND PURPOSE

On 1, 10, and 12 October and 2 November 2016 Mr. James Regan (botanist/ wetland delineator) conducted site review for potential wet areas within the city of Fortuna, Humboldt County, California (APN #202-082-005 and APN# 202-121-002). The property is located in the Fortuna USGS quadrangle in Sections 1 and 2, Township 2N, Range 1W; HB&M. The subject property is located in an open, undeveloped lot historically used for animal grazing and grass hay production. No structures exist on the subject parcels at this time. This investigation is meant to delineate the extent of any wetlands on the subject parcels. The property is bounded by Strongs Creek to the North and Redwood Memorial Hospital to the East. The Southern and Western extant of the subject parcel is bounded by undeveloped agricultural land. Jameson Creek divides the two parcels. Elevation on site is 50-100 feet above mean sea level. Topography on site is terraced. The majority of the parcel is flat land adjacent to Strongs and Jameson Creeks but the Eastern side of the property consists of a rather steep slope up to a second elevated terrace and small flat topped hill in the Southeastern corner.

This assessment serves to provide a wetland determination/delineation conducted to investigate the environmental setting of the subject property for future development needs. This report is the result of surveys conducted on the dates above, reviews of relevant scientific literature, and professional knowledge. Mr. Regan holds a Bachelor's degree in botany and has worked as a professional botanist in Northern California (Humboldt, Trinity, and Mendocino Counties) for the past 13 years and as a wetland delineator for the past 9 years.

# 2.0 METHODS

## 2.1 PROJECT AREA AND PROXIMITY TO KNOWN RESOURCES

An assessment of potential impacts to adjacent watercourses or wetlands within 500 feet of the subject property was conducted by interpretation of aerial photography and resource maps courtesy of Google Earth, the United States Geologic Survey (USGS) 7.5' Fortuna quadrangle map, Humboldt County Web GIS, and United States Fish and Wildlife Service (USFW) National Wetland Inventory. Two perennial watercourses are located within the project area: Jameson Creek and Strongs Creek (both potentially fish bearing watercourses). The two creeks join together on the Northwest edge of the site. The National Wetland Inventory does not show any known wetlands on the subject parcels.

In addition to adjacent aquatic resources the California Natural Diversity Database (CNDDB) and the California Native Plant Society (CNPS) websites were queried for the presence of federally rare, threatened, or endangered plants and animals occurring within the project area. Records show that Strongs Creek has known populations of cutthroat trout (*Oncorhynchus clarkii clarkia*) which is not a state or federally listed species but is a CDFW Species of Special Concern. These watercourses may be considered habitat for other fish or aquatic species including federally listed anadromous salmon species. The project site does contain or represent suitable habitat for any of the other federally listed terrestrial or avian species included in those databases for this area. Listed animals generally require forested settings or appropriate structures for nesting and breeding behaviors (northern spotted owl, marbled murrelet, Townsend's big eared bat). Results of CNDDB database searches indicate that there are no known rare or endangered plant species (federal or state listed rare, threatened, or endangered as well as California Rare Plant Rank 1 or 2) within the subject parcel at this time.

### 2.2 GENERAL INFORMATION

Plots for the wetland delineation were surveyed on 1, 10, and 12 October and 2 November 2016 by Mr. James Regan. The subject area was assessed using guidelines outlined in the U.S. Army Corps of Engineers (ACOE) Wetland Delineation Manual Technical Report Y-87-1 (referred to as the 1987 manual) and the Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region. The 1987 manual provides technical guidelines for identifying wetlands, distinguishing them from non-wetlands, and provides methods for applying the technical guidelines. Three key provisions of the ACOE wetland definition include:

i. Inundated or saturated soil conditions resulting from permanent or periodic inundation by ground or surface water.

ii. A prevalence of vegetation typically adapted for life in saturated soil conditions (hydrophytic vegetation)

iii. The presence of "normal circumstances"

Explicit in the ACOE definition is the consideration of three environmental parameters: Hydrology, Vegetation, and Soils. Positive wetland indicators of all three parameters are normally present in wetlands. The ACOE methodology requires one positive indicator from each parameter in order to make a positive wetland determination.

Plots were chosen using intuitive measures based on identification of obvious wetland features (i.e. vegetation, hydrology). A total of 18 sampling plots were established within the subject property(Site Map, Appendix A). Plant communities were fairly uniform throughout the area and were composed of species common grassland and pasture habitats. ACOE Routine Wetland Determination Data Forms were used in the field to record site-specific soil, vegetation, and hydrologic information. A data form was completed for each sample observation point. Copies of these data forms and a plot map are included as Appendix B.

### 2.3 VEGETATION

The entire parcel was walked/assessed first to determine the location of distinct plant community types. During the site visit two separate vegetation communities were noted;

open pasture/managed grassland and riparian shrub/woodland. Sample plots were chosen to provide representation of the vegetation communities onsite and sample plot locations are included in Appendix A.

Dominant plant species were recorded on ACOE data forms at each plot surveyed during this investigation. Where the plant community consisted of herbaceous species, a $1m^2$ plot was used. At this site woody overstory vegetation in the riparian corridor was not included in plot calculations for plots adjacent to the riparian fringe. This vegetation community is mature and deep rooted, often in the channel for the watercourse, which is up to 15 feet below the elevation of the terrace proposed for development. The watercourse corridor should be considered a separate landform and habitat type and is not indicative of the grassland community existing on the terrace above the streams.

Dominant species were determined by estimating those having the greatest percentage of cover using the "50/20" rule. The "50/20" rule entails that for each sample point and associated plant community, dominant species are the most abundant species, when ranked in descending order of abundance and cumulatively totaled, that immediately exceed 50% of the total dominance measure for the stratum, plus any additional species comprising 20% or more of the total dominance measure for each stratum. Absolute cover contribution was estimated for each sample plot, due to layering of species and strata percent cover values may exceed 100%. The ACOE Manual (1987) directs that presence of a single individual of hydrophytic species does not mean that hydrophytic vegetation is present. However, hydrophytic vegetation is considered to be present if 50% of the dominant species have indicator status of OBL, FACW or FAC.

The 2008 *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* includes the addition of a prevalence index for determination if hydrophytic vegetation is present. The prevalence index is a weighted-average wetland indicator status of all plant species in the sampling plot or other sampling unit, where each indicator status category is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and weighting is by abundance (absolute percent cover). It is a more comprehensive analysis of the hydrophytic status of the community than one based on just a few dominant species. It is particularly useful (1) in communities with only one or two dominants, (2) in highly diverse communities where many species may be present at roughly equal coverage, and (3) when strata differ greatly in total plant cover (e.g., total herb cover is 80 percent but sapling/shrub cover is only 10 percent). The prevalence index is used in this supplement to determine whether hydrophytic vegetation is present on sites where indicators of hydric soil and wetland hydrology are present but the vegetation initially fails the dominance test.

The following procedure is used to calculate a plot-based prevalence index. The method was described by Wentworth et al. (1988) and modified by Wakeley and Lichvar (1997). It uses the same field data (i.e., percent cover estimates for each plant species) that were used to select dominant species by the 50/20 rule, with the added constraint that at least 80 percent of the total vegetation cover on the plot must be of species that have been correctly identified and have an assigned indicator status (including UPL). For any species that occurs in more than one stratum, cover estimates are summed across strata. Steps for determining the prevalence index are as follows:

1. Identify and estimate the absolute percent cover of each species in each stratum of the community. Sum the cover estimates for any species that is present in more than one stratum.
2. Organize all species (across all strata) into groups according to their wetland indicator status (i.e., OBL, FACW, FAC, FACU, or UPL) and sum their cover values within groups. Do not include species that were not identified.
3. Calculate the prevalence index using the following formula:

$$PI = \frac{A_{OBL} + 2A_{FACW} + 3A_{FAC} + 4A_{FACU} + 5A_{UPL}}{A_{OBL} + A_{FACW} + A_{FAC} + A_{FACU} + A_{UPL}}$$

where:

$PI$ = Prevalence index
$A_{OBL}$ = Summed percent cover values of obligate (OBL) plant species;
$A_{FACW}$ = Summed percent cover values of facultative wetland (FACW) plant species;
$A_{FAC}$ = Summed percent cover values of facultative (FAC) plant species;
$A_{FACU}$ = Summed percent cover values of facultative upland (FACU) plant species;
$A_{UPL}$ = Summed percent cover values of upland (UPL) plant species.

Indicator status for each species was obtained from the WESTERN MOUNTAINS, VALLEYS, AND COAST 2016 Regional Wetland Plant List developed with the ACOE.

### 2.4 SOILS

No recent soil survey information for the subject property was available from the USDA Natural Resource Conservation Service (NRCS). The Humboldt County area is currently being surveyed but no information was available at this time.

The 1965 reference "Soils of Western Humboldt County" indicates that the parcels contain two soil types including the Ferndale soils (Fe2) and Loleta soils (Lo6) both of which are unconsolidated sedimentary soils. Ferndale soils are derived from Franciscan formations while the Loleta soils are developed from alluvium of the Wildcat formation. Both soil types are finely textured and excellent for agriculture but the Loleta soils are especially prone to compaction from both grazing and mowing activities.

A total of 17 soil pits were dug during this examination. Pits were dug to a depth of at least 16 inches. Soil profiles were examined and profile descriptions were recorded on ACOE data sheets for soil characteristics throughout the soil profile (Appendix B). The Munsell color chart (Macbeth, 2000) was used to determine soil color, value, and chroma. Soil profile textures were determined using a standard soil texture by feel technique and ribbon test. All soil profiles were examined for secondary hydrology indicators including oxidized root channels and redoxomorphic concentrations.

### 2.5 HYDROLOGY

Each observation point was examined for indicators of wetland hydrology, and observations were recorded on ACOE data forms (Appendix B).

Indicators of wetland hydrology include drainage patterns, drift lines, sediment deposits, watermarks, and visual observations of saturated soils and/or inundation. Visual observations of soil saturation were made in each pit to determine the level at which water (if any) stands in each pit after several minutes had elapsed. Drainage patterns were determined by observing any signs of surface flow into or through the subject parcel. Historic aerial imagery was used courtesy of Google Earth 2016.

## 3.0 RESULTS

### 3.1 VEGETATION

Vegetation within the subject parcel is generally non-native and common to grazed and disturbed areas with little canopy cover. The species composition is mixed with often three or four species sharing dominance. Most plant encountered were rated as FAC with only one OBL species found on the property (*Mentha pulegium*, pennyroyal) outside of the riparian corridor. Plots in which the dominant plants were FAC and that failed the FAC neutral test and the prevailance test were considered non-wetland as the plants may be found in either wetland or upland settings and all were non-native and some considered invasive. Plots 2, 3, 15, and 17 showed the strongest hydric plant communities. Plot 2 is located on a steep slope (>15%) and may indicate where ground water reaches the surface after the upper terrace is saturated during rain events. Plot 3 is located in a small depression at the foot of the slope, a natural place for seasonal ponding or pooling to occur. Plot 15 is a small man-made depression on the Western edge of the property and is likely the location of a cattle water trough historically. This site likely holds water during and after rain events and is not connected to a ground water source. Plot 17 has true wetland vegetation and is the site of a year round spring.

### 3.2 SOILS

Results of samples taken from the test pits were recorded on the data sheets attached to the end of this report. Soils from sample pits were generally clay loam and have historically been grazed, mown, and likely graded.

Many of the plots sampled for this determination showed some signs of periodic inundation near the surface but did not meet the standards to be considered indicators of wetland soils (soil colors did not indicate reduced matrix). Oxidized root pores in the first four to six inches were found in several pits indicating that the soils have been periodically inundated and likely hold seasonal rainwater due to compaction from grazing and mowing. The lack of more developed hydric soil indicators seems to show that these periods of inundation are short in duration. The majority of the project site sits directly adjacent to perennial watercourses and a portion of the property falls in the 100 year flood plain for Strongs Creek. It is likely (evidence of relict redoxomorphic features) that the area has received flood waters in the past and due to topography those waters would likely stay in low lying depressions for short periods after flooding has ceased. Plots 2, 3,13, and 15 showed positive indicators of wetland soils in the form of slightly reduced matrices with distinct to prominent redoxomorphic features in the form of soft concentrations or pore linings. Soil pits were not dug at plot 17.1 and 17.2, this area is a perennial spring with surface water at the time of survey, soils were dark and mucky and obviously in year round wetland condition under normal circumstances.

### 3.3 HYDROLOGY

The delineations were performed in October and November of 2016, in a year with average rainfall. Any primary indicators or secondary indicators that were present at any of the test pits or on the surface of any part of the subject area were recorded on the delineation forms. Field observations of hydrology include surface water, saturated soils, or shallow water table at the time of the samples. The only plots that showed surface water, shallow water table, or saturation were plots 3, 17.1, and 17.2. All other plots contained only oxidized root pores as a primary indicator of wetland hydrology, no other indicators were present in any plot. Plot 3 was sampled twice, once on the 1st of October before any significant rain events had occurred and once on the 2nd of November after more than 10 inches of precipitation. Plot 17.1 and 17.2 had surface water prior to any significant rainfall while Plot 3 only showed a shallow water table (at 16") only after the rain events.

A developed spring connected to a water tank exists on or adjacent to the subject parcel (labeled Springbox on the site map). This site should be considered during any project planning for future development of the parcel. No plots were taken at this location and it may be located off property.

## 4.0 CONCLUSIONS

Positive wetland indicators of all three parameters are normally present in jurisdictional wetlands. The ACOE methodology requires one positive indicator from each parameter (vegetation, soils, and hydrology). Plots 2, 3, 15, 17.1, and 17.2 meet the criteria for the three parameter test established under the ACOE. The areas represented by these plots are included as polygons on the site map in Appendix A and total approximately .036 acres of Palustrine Emergent Wetland. The plot map also contains polygons with areas where representative plots show indicators of periodic inundation and marginally hydric vegetation. These areas (1.26 acres) should be considered upland but likely have a history of periodic inundation during either long lasting rain events or severe flooding (100 year events).

CNPS (California Native Plants Society). 2015. *Inventory of Rare and Endangered Plants.* (on-line edition, v8-01a). California Native Plant Society. Sacramento, CA.

Hickman, J.C. (ed.) 1993. *The Jepson Manual: Higher Plants of California.* University of California Press. Berkeley and Los Angeles, CA.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016.
*The National Wetland Plant List*: 2016 wetland ratings.
Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X

Macbeth G. 2000 (revised). *Munsell Soil Color Chart.* Gretag Macbeth, 617 Little Britain Road, New Windsor, New York.12553.

McLaughlin J. and Harradine F. 1965. *Soils of Western Humboldt County, California.* Department of Soils and Plant Nutrition, UC Davis in cooperation with Humboldt County.

Sawyer, J.O. ,T.Keeler-Wolf, and, J.M. Evens. 2009. *A Manual of California Vegetation, 2nd edition.* California Native Plant Society, Sacramento,CA.

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US Army Corps of Engineers (ACOE). 1987. Corps of Engineers Wetland Delineation Manual. Wetlands Research Program Technical Report Y-87-1.

US Army Corps of Engineers (ACOE). Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region. Revised. 4-9-2007.

U. S. Fish and Wildlife Service. July 2016. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

This report and accompanying maps and data should be transmitted to the reviewing agents for review and included in any application for permits necessary for completion of any proposed development projects on the subject property.

Significance of wetlands and the necessity for compensatory mitigation during development is, however, decided by regional agents of the appropriate federal, state, and local agencies if and when the site is reviewed for permitting purposes.

## 5.0 TERMS AND CONDITIONS

This report is based on conditions observed and recorded October 2016. This report has not been reviewed nor has concurrence with the conclusion been obtained. Although a wetland has been identified, verification by agencies may be necessary in the future. Land use practices and regulations can change thereby affecting current conditions and delineation results described herein.

This report was prepared for exclusive use; consultants are not liable for any actions arising out of the reliance of any third party on the information contained in this report.

Please call with any questions or comments.

James Regan
Botanist/Wetland Delineator

707-845-2827
jreganii@aol.com

## 6.0 REFERENCES

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. The Jepson Manual: Vascular Plants of California, second edition. University of California Press, Berkeley.

California Department of Fish and Wildlife, Natural Diversity Database. April 2014. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. 73 pp.

[CDFG] California Department of Fish and Game. 2009. "Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities" State of California.

CNPS (California Native Plants Society). 2015. *Inventory of Rare and Endangered Plants*. (on-line edition, v8-01a). California Native Plant Society. Sacramento, CA.

Hickman, J.C. (ed.) 1993. *The Jepson Manual: Higher Plants of California.* University of California Press. Berkeley and Los Angeles, CA.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016.
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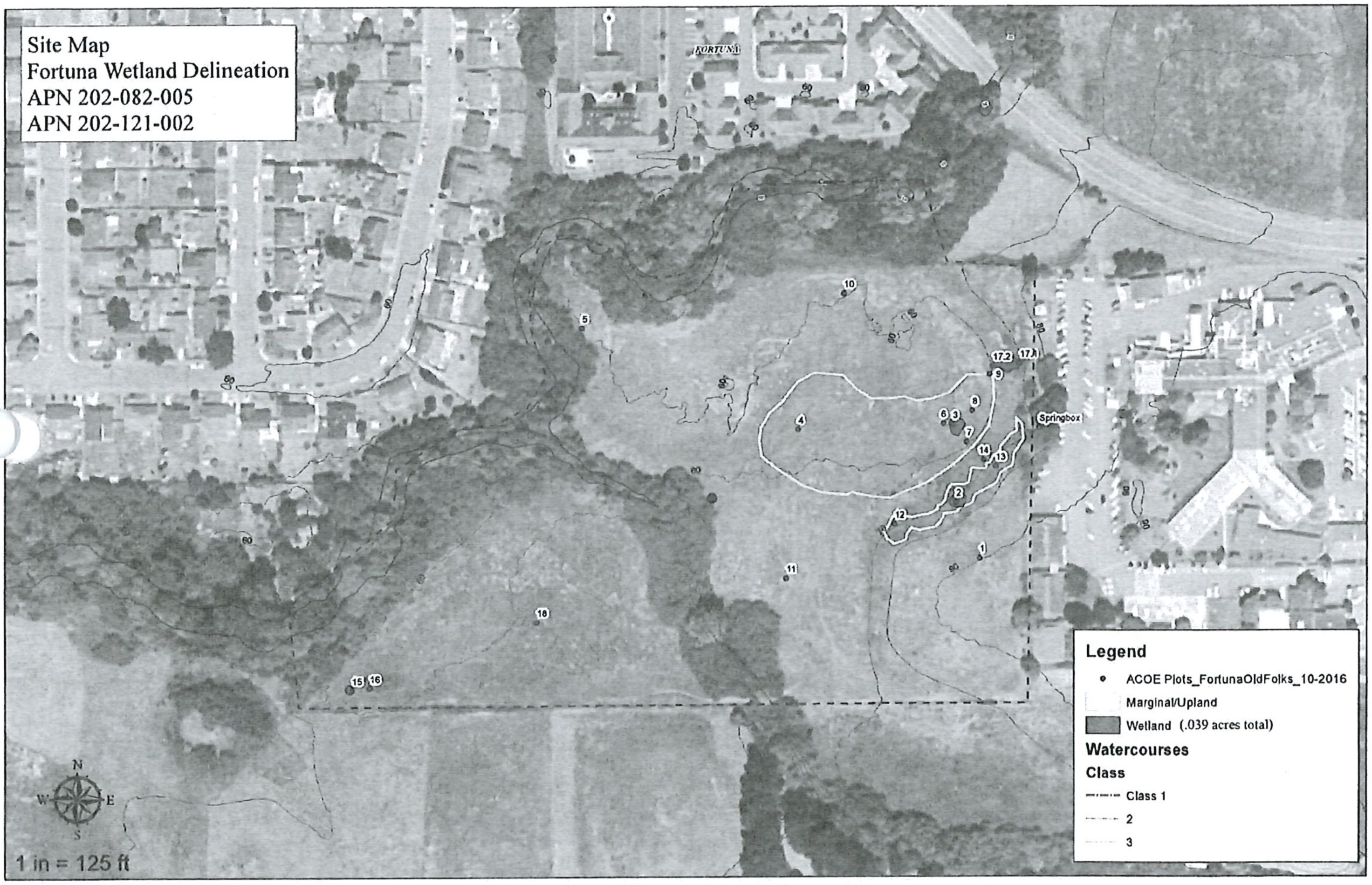
U. S. Fish and Wildlife Service. July 2016. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

# Appendix A

## Site Map


Site Map
Fortuna Wetland Delineation
APN 202-082-005
APN 202-121-002
Springbox
Legend
ACOE Plots_FortunaOldFolks_10-2016
Marginal/Upland
Wetland (.039 acres total)
Watercourses
Class
Class 1
2
3
N
S
E
W
1 in = 125 ft

# Appendix B

## Wetland Data Sheets

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 /002 City/County: Fortuna, Humboldt Sampling Date: 10/1/16

Applicant/Owner: ______ State: CA Sampling Point: 1

Investigator(s): Jones Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0–30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Ferndale/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ___ | No X |
| Hydric Soil Present? | Yes ___ | No X |
| Wetland Hydrology Present? | Yes ___ | No X |

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Holcus lanatus | 15% | Y | FAC |
| 3. Festuca perennis | 10% | ~~Y~~ N | UPL |
| 4. Bromus hordeaceus | 15% | Y | FACU |
| 5. Agrostis capillaris | 12% | Y | FAC |
| 6. Ranunculus repens | 5% | N | FAC |
| 7. Rumex acetosella | 15% | Y | FACU |
| 8. Mentha pulegium | 7% | N | OBL |
| 9. Daucus carota | 10% | N | FACU |
| 10. Anthoxanthum odoratum | 5 | N | FACU |
| 11. | | | |
| = Total Cover | 94% | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 10%

Remarks:

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 7 | x 1 = 7 |
| FACW species | — | x 2 = — |
| FAC species | 32 | x 3 = 96 |
| FACU species | 45 | x 4 = 180 |
| UPL species | 10 | x 5 = 50 |
| Column Totals: | 94 (A) | 333 (B) |

Prevalence Index = B/A = 3.5

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ___ No X

## SOIL

Sampling Point: 1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16" | 10yr 2/2 | 100 | | | | | loam | high organic, fine roots to 4" |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ____________

Depth (inches): ____________

**Hydric Soil Present?** Yes ____ No X

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

**Wetland Hydrology Present?** Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 / 002 City/County: Fortuna, Humboldt Sampling Date: 10/1/16

Applicant/Owner: ______ State: CA Sampling Point: 2

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Ferndale/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? Yes X No ___ | | Is the Sampled Area within a Wetland? Yes X No ___ |
| Hydric Soil Present? Yes X No ___ | | |
| Wetland Hydrology Present? Yes X No ___ | | |

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. Holcus lanatus | 15% | Y | FAC |
| 2. Bromus hordeaceus | 5 | | FACU |
| 3. Agrostis capillaris | 10 | | FAC |
| 4. Ranunculus repens | 15 | Y | FAC |
| 5. Trifolium repens | 7 | | FAC |
| 6. Juncus effusus | 12 | Y | FACW |
| 7. Festuca arundinacea | 15 | Y | UPL |
| 8. Lotus corniculatus | 10 | | FAC |
| 9. Anthoxanthum odoratum | 10 | | FACU |
| 10. | | | |
| 11. | | | |
| = Total Cover | 99 | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |
| % Bare Ground in Herb Stratum 5% | | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | – | x 1 = |
| FACW species | 12 | x 2 = 24 |
| FAC species | 57 | x 3 = 171 |
| FACU species | 15 | x 4 = 60 |
| UPL species | 15 | x 5 = 75 |
| Column Totals: | 99 (A) | 330 (B) |

Prevalence Index = B/A = 3.3

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No ___

Remarks:

## SOIL

Sampling Point: 2

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10YR 3/2 | 99 | 5YR 5/6 | 1 | C | PL | Clay loam | |
| 9-16 | 10YR 5/2 | 75% | 10YR 6/6 | 25% | C | M | Sandy Clay-loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes X No ___

Remarks:

Fine roots to 5-8"

Historic hard concretions present (Bright orange nodules)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ______

Water Table Present? Yes ___ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Moist soils below 12" — NOT SATURATED

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 / 002 City/County: Fortuna, Humboldt Sampling Date: 10/1/16

Applicant/Owner: ______ State: CA Sampling Point: 3

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Ferndale/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No ______ |
| Hydric Soil Present? | Yes X | No ______ |
| Wetland Hydrology Present? | Yes X | No ______ |

Is the Sampled Area within a Wetland? Yes X No ______

Remarks: Grazed + mown hay field at → low spot at base of slope

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | ______ = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | ______ = Total Cover | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Mentha pulegium | 40 | Y | OBL |
| 3. Lotus corniculatus | 30 | Y | FAC |
| 4. Hordeum marinum | 15 | | FAC |
| 5. Trifolium fragiferum | 10 | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 95% = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| | ______ = Total Cover | | |

% Bare Ground in Herb Stratum 5%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 40 | x 1 = 40 |
| FACW species | — | x 2 = — |
| FAC species | 45 | x 3 = 135 |
| FACU species | 10 | x 4 = 40 |
| UPL species | — | x 5 = — |
| Column Totals: | 95 (A) | 215 (B) |

Prevalence Index = B/A = 2.2

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No ______

Remarks:

## SOIL

Sampling Point: 3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-6 | 10YR 5/2 | 90 | 10YR 5/6 | 10 | C | M | Clay loam | |
| 7-16 | 10YR 2/2 | 99 | 10YR 5/6 | 1 | C | M | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) (except MLRA 1)
- __ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes X No ______

Remarks: 1-3" are homogenous soils
4-16" contains heavy clay chunks/blocky peds
Seems to indicate Perched water table (Seasonal)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) (LRR A)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) (LRR A)
- __ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ______

Water Table Present? Yes ____ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005/002 City/County: Fortuna, Humboldt Sampling Date: 10/1/16

Applicant/Owner: ______ State: CA Sampling Point: 4

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Farmland/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No ______ | Is the Sampled Area within a Wetland? Yes ______ No X |
| Hydric Soil Present? | Yes ______ No X | |
| Wetland Hydrology Present? | Yes X No ______ | |

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. Mentha pulegium | 20 | Y | OBL |
| 2. Lotus corniculatus | 20 | Y | FAC |
| 3. Hordeum marinum | 15 | Y | FAC |
| 4. Linum bienne | 5 | | UPL |
| 5. Plantago lanceolata | 15 | Y | FACU |
| 6. Leontodon saxatilis | 5 | | FACU |
| 7. Trifolium repens | 10 | | FAC |
| 8. Daucus carota | 5 | | FACU |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 95 | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |
| % Bare Ground in Herb Stratum 10% (thatch) | | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 20 | x 1 = 20 |
| FACW species | — | x 2 = — |
| FAC species | 45 | x 3 = 135 |
| FACU species | 25 | x 4 = 100 |
| UPL species | 5 | x 5 = 25 |
| Column Totals: | 95 (A) | 280 (B) |

Prevalence Index = B/A = 2.9

**Hydrophytic Vegetation Indicators:**

- X Dominance Test is >50%
- X Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No ______

Remarks:

## SOIL

Sampling Point: 4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16 | 10yr 4/3 | 98 | 10yr 5/8 | 2 | C | M | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) (except MLRA 1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ______ No X

Remarks: Fine roots to 10"
Even tone, slightly compact, maybe alluvium

Does not fit Hydric soil indicators matrix is not depleted...

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) (LRR A)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) (LRR A)
- __ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: 1-4" oxidized root pores, indicates some seasonal surface water, does not last long enough to drive wetland soils...

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005/002 City/County: Fortuna, Humboldt Sampling Date: 10/1/16

Applicant/Owner: ______ State: CA Sampling Point: 5

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, Slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Farmland/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | |
|---|---|
| Hydrophytic Vegetation Present? Yes ______ No X<br>Hydric Soil Present? Yes ______ No X<br>Wetland Hydrology Present? Yes ______ No X | Is the Sampled Area within a Wetland? Yes ______ No X |

Remarks: Grazed + mown hay field – between creeks

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. Cirsium arvense | 5 | | FAC |
| 2. Holcus lanatus | 30 | Y | FAC |
| 3. Anthoxanthum odoratum | 30 | Y | FACU |
| 4. Trifolium repens | 30 | Y | FAC |
| 5. Rumex acetosella | 2 | | FACU |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 97 | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 10

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | | x 2 = |
| FAC species | 65 | x 3 = 195 |
| FACU species | 32 | x 4 = 128 |
| UPL species | | x 5 = |
| Column Totals: | 97 (A) | 323 (B) |

Prevalence Index = B/A = 3.3

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X*

Remarks: Adjacent tree layer is rooted in creek, not on terrace being sampled. This layer is omitted in vegetation plot calculations. *Fails FAC neutral test + prevalence test

## SOIL

Sampling Point: 5

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-3 | 10yr 4/3 | 98 | 10 yr 4/6 | 2 | C | M | loam | |
| 4-16 | 10 yr 4/3 | 100 | | | | | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______________

Depth (inches): ______________

**Hydric Soil Present?** Yes _____ No X

Remarks:

Indication of Seasonal perched surface waters (puddles?)
↳ short duration

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes _____ No X Depth (inches): ______

Water Table Present? Yes _____ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005/002 City/County: Fortuna, Humboldt Sampling Date: 10/1/16

Applicant/Owner: ______ State: CA Sampling Point: 6

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Grassland/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ____ No X | Is the Sampled Area within a Wetland? Yes ____ No X |
| Hydric Soil Present? | Yes ____ No X | |
| Wetland Hydrology Present? | Yes X No ____ | |

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | ____ = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ____) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | ____ = Total Cover | | |
| **Herb Stratum** (Plot size: ____) | | | |
| 1. Mentha pulegium | 12 | ~~OBL~~ | OBL |
| 2. Plantago lanceolata | 5 | | FACU |
| 3. Lotus corniculatus | 15 | Y | FAC |
| 4. Trifolium fragiferum | 15 | Y | FACU |
| 5. Hordeum marinum | 20 | Y | FAC |
| 6. Festuca perennis | 5 | | UPL |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 72% = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ____) | | | |
| 1. | | | |
| 2. | | | |
| | ____ = Total Cover | | |

% Bare Ground in Herb Stratum 28%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 12 | x 1 = 12 |
| FACW species | | x 2 = |
| FAC species | 35 | x 3 = 105 |
| FACU species | 20 | x 4 = 80 |
| UPL species | 5 | x 5 = 25 |
| Column Totals: | 72 (A) | 222 (B) |

Prevalence Index = B/A = 3.1

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ____ No X

Remarks: Marginally hydric w/ many non natives, fail the Martial test + Prevalence test

## SOIL

Sampling Point: 6

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16 | 10YR 3/2 | 99 | 10YR 5/6 | 1 | C | M | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ____________

Depth (inches): ____________

**Hydric Soil Present?** Yes ____ No X

Remarks:

Past 16" clay inclusions (blocky, hard) w/ 10YR 4/2 80% + 5YR 5/8 20% - likely relict features, NOT soft masses

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

**Wetland Hydrology Present?** Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

1-6" oxidized root pores

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005/002 City/County: Fortuna, Humboldt Sampling Date: 10/4/16
Applicant/Owner: ______ State: CA Sampling Point: 7
Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2
Landform (hillslope, terrace, etc.): Terrace, Slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%
Subregion (LRR): A Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: N/A Farmland/Bottomland NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | |
|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ___ | No X | Is the Sampled Area within a Wetland? | Yes ___ No X |
| Hydric Soil Present? | Yes ___ | No X | | |
| Wetland Hydrology Present? | Yes X | No ___ | | |

Remarks: Grazed + mown hay field

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. Mentha pulegium | 12 | Y | OBL |
| 2. Holcus lanatus | 10 | Y | FAC |
| 3. Cynosurus cristatus | 5 | | FACU |
| 4. Festuca perennis | 5 | | UPL |
| 5. Agrostis capillaris | 12 | Y | FAC |
| 6. Linum bienne | 10 | Y | UPL |
| 7. Anthoxanthum odoratum | 10 | Y | FACU |
| 8. Festuca arundinacea | 25 | Y | UPL |
| 9. Daucus carota | 5 | | FACU |
| 10. Juncus occidentalis | 1 | | FACW |
| 11. Leontodon saxatilis | 2 | | FACU |
| = Total Cover | 97 | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 3

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 12 | x 1 = 12 |
| FACW species | 1 | x 2 = 2 |
| FAC species | 22 | x 3 = 66 |
| FACU species | 22 | x 4 = 88 |
| UPL species | 40 | x 5 = 200 |
| Column Totals: | 97 (A) | 368 (B) |

Prevalence Index = B/A = 3.8

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ___ No X

Remarks:

## SOIL

Sampling Point: 7

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16 | 10YR 3/2 | | | | | | Clay loam | * |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**
Type: Compact
Depth (inches): 6"

**Hydric Soil Present?** Yes ____ No X

Remarks: * Faint contrasting color when dry - not discernable when moist
Relict, hard nodules, some > 5mm

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) **(LRR A)**
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) **(LRR A)**
- __ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

**Wetland Hydrology Present?** Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: 1-4" oxidized root channels

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005/002 City/County: Fortuna, Humboldt Sampling Date: 10/10/16

Applicant/Owner: ______ State: CA Sampling Point: 8

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Ferndale/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | Yes | No |
|---|---|---|
| Hydrophytic Vegetation Present? | | X |
| Hydric Soil Present? | | X |
| Wetland Hydrology Present? | X | |

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Trifolium fragiferum | 40 | Y | FACU |
| 3. Hordeum marinum | 20 | Y | FAC |
| 4. Mentha pulegium | 10 | | OBL |
| 5. Lotus corniculatus | 5 | | FAC |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 75 | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 25%

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 10 | x 1 = 10 |
| FACW species | | x 2 = |
| FAC species | 25 | x 3 = 75 |
| FACU species | 40 | x 4 = 160 |
| UPL species | | x 5 = |
| Column Totals: | 75 (A) | 245 (B) |

Prevalence Index = B/A = 3.2

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ______ No X

Remarks:

## SOIL

Sampling Point: 8

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-4" | 10yr 3/2 | 95 | 10yr 4/6 | 5 | C | PL | Clay loam | |
| 5-16" | 10yr 3/2 | 99 | 10yr 4/6 | 1 | C | M | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) (except MLRA 1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ____ No X

Remarks:

Marginal soils but found non-hydric (doesn't meet indicators)

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) (LRR A)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) (LRR A)
- __ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ______

Water Table Present? Yes ____ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

1-4" oxidized pore linings

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 /002 City/County: Fortuna, Humboldt Sampling Date: 10/10/16

Applicant/Owner: ______ State: CA Sampling Point: 9

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Farmland/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ___ No X | Is the Sampled Area within a Wetland? Yes ___ No X |
| Hydric Soil Present? | Yes ___ No X | |
| Wetland Hydrology Present? | Yes X No ___ | |

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| Stratum | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| Sapling/Shrub Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| Herb Stratum (Plot size: ______) | | | |
| 1. Medicago sativa | 25 | Y | UPL |
| 2. Cynosurus cristatus | 10 | | FACU |
| 3. Trifolium fragiferum | 15 | Y | FACU |
| 4. Mentha pulegium | 12 | | OBL |
| 5. Hordeum marinum | 15 | Y | FAC |
| 6. Festuca perennis | 10 | | UPL |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 87 | | |
| Woody Vine Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 13

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 12 | x 1 = 12 |
| FACW species | | x 2 = |
| FAC species | 15 | x 3 = 45 |
| FACU species | 25 | x 4 = 100 |
| UPL species | 35 | x 5 = 175 |
| Column Totals: | 87 (A) | 332 (B) |

Prevalence Index = B/A = 3.8

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ___ No X

Remarks:

## SOIL

Sampling Point: 9

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-3 | 10 yr 3/2 | 95 | 7.5 yr 4/6 | 5 | C | PL | Clay loam | |
| 4-16 | 10 yr 3/2 | 98 | 10 yr 5/6 | 2 | C | M | | Some had relict concentrations |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ______ No X

Remarks:

Some re-dox concentrations but soil does not meet indicators...

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

@ 3" oxidized pores

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 / 002 City/County: Fortuna, Humboldt Sampling Date: 10/10/18

Applicant/Owner: ______ State: CA Sampling Point: 10

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1 + 2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Grassland / Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ___ No X | Is the Sampled Area within a Wetland? | Yes ___ No X |
| Hydric Soil Present? | Yes ___ No X | | |
| Wetland Hydrology Present? | Yes ___ No X | | |

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Leucanthemum vulgare | 10 | | FACU |
| 3. Festuca arundinacea | 30 | Y | UPL |
| 4. Holcus lanatus | 25 | Y | FAC |
| 5. Plantago lanceolata | 2 | | FACU |
| 6. Equisetum arvense | 1 | | FAC |
| 7. Rumex acetosella | 2 | | FACU |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 70 | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |
| % Bare Ground in Herb Stratum 30* | | | |

**Dominance Test worksheet:**

| | | |
|---|---|---|
| Number of Dominant Species That Are OBL, FACW, or FAC: | 1 | (A) |
| Total Number of Dominant Species Across All Strata: | 2 | (B) |
| Percent of Dominant Species That Are OBL, FACW, or FAC: | 50 | (A/B) |

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | — | x 1 = — |
| FACW species | — | x 2 = — |
| FAC species | 26 | x 3 = 78 |
| FACU species | 14 | x 4 = 56 |
| UPL species | 30 | x 5 = 150 |
| Column Totals: | 70 (A) | 284 (B) |

Prevalence Index = B/A = 4.0

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ___ No X

Remarks: *litter, thatch

## SOIL

Sampling Point: 10

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16 | 10yr 3/2 | 100 | | | | | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1) (except MLRA 1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

__ 2 cm Muck (A10)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ________

Depth (inches): ________

**Hydric Soil Present?** Yes ____ No X

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
__ Salt Crust (B11)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Stunted or Stressed Plants (D1) (LRR A)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
__ Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Saturation Visible on Aerial Imagery (C9)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ FAC-Neutral Test (D5)
__ Raised Ant Mounds (D6) (LRR A)
__ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

**Wetland Hydrology Present?** Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 / 002 City/County: Fortuna, Humboldt Sampling Date: 10/10/16

Applicant/Owner: ______ State: CA Sampling Point: 11

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Farmland/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ______ No X | Is the Sampled Area within a Wetland? Yes ______ No X |
| Hydric Soil Present? | Yes ______ No X | |
| Wetland Hydrology Present? | Yes X No ______ | |

Remarks: Grazed + mown hay field

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |

| Sapling/Shrub Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |

| Herb Stratum (Plot size: 1m²) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. Hordeum marinum | 30 | Y | FAC |
| 3. Agrostis capillaris | 10 | Y | FAC |
| 4. Festuca perennis | 5 | | UPL |
| 5. Plantago lanceolata | 5 | | FACU |
| 6. Rumex conglomeratus | 2 | | FACW |
| 7. Linum bienne | 2 | | UPL |
| 8. Lotus corniculatus | 10 | Y | FAC |
| 9. Trifolium fragiferum | 5 | | FACU |
| 10. Daucus carota | 5 | | FACU |
| 11. | | | |
| = Total Cover | 74 | | |

| Woody Vine Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 26

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100* (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | – | x 1 = – |
| FACW species | 2 | x 2 = 4 |
| FAC species | 50 | x 3 = 150 |
| FACU species | 15 | x 4 = 60 |
| UPL species | 7 | x 5 = 35 |
| Column Totals: | 74 (A) | ______ (B) |

Prevalence Index = B/A = 3.4

**Hydrophytic Vegetation Indicators:**

- X Dominance Test is >50% *
- __ Prevalence Index is ≤3.0[1]
- __ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ Wetland Non-Vascular Plants[1]
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: * all FAC, mostly non-native, fails FAC neutral + prevalence tests

## SOIL

Sampling Point: 11

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-3" | 10yr 3/2 | 95 | 5yr 4/6 | 5 | C | PL | Clay loam | |
| 4-16" | 10yr 3/2* w/ Inclusions -- chunky blocks w/ | | | | | 7 | | |
| * | 10yr 3/2 | 99% | 10yr 4/6 | 1% | | C | M | | Relict? ~~Plowed~~ |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ____________

Depth (inches): ____________

**Hydric Soil Present?** Yes ______ No X

Remarks:

Does not meet color or contrast indicators for hydric soils

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ______ No X Depth (inches): ____________

Water Table Present? Yes ______ No X Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ____________

**Wetland Hydrology Present?** Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

1-4" oxidized root pores

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 /002 City/County: Fortuna, Humboldt Sampling Date: 10/10/16

Applicant/Owner: ______ State: CA Sampling Point: 12

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1 + 2

Landform (hillslope, terrace, etc.): Terrace, Slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Ferndale / Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? Yes ___ No X | | Is the Sampled Area within a Wetland? Yes X No ___ |
| Hydric Soil Present? Yes ___ No X | | |
| Wetland Hydrology Present? Yes X No ___ | | |

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Agrostis capillaris | 20 | Y | FAC |
| 3. Juncus occidentalis | 7 | | FACW |
| 4. Lotus corniculatus | 18 | Y | FAC |
| 5. Daucus carota | 5 | | FACU |
| 6. Leontodon saxatilis | 10 | | FACU |
| 7. Anthoxanthum odoratum | 5 | | FACU |
| 8. Holcus lanatus | 15 | Y | FAC |
| 9. Trifolium repens | 10 | | FAC |
| 10. Prunella vulgaris | 2 | | FACU |
| 11. | | | |
| = Total Cover | 92 | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |
| % Bare Ground in Herb Stratum 8 | | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100* (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | 7 | x 2 = 14 |
| FAC species | 63 | x 3 = 189 |
| FACU species | 22 | x 4 = 88 |
| UPL species | | x 5 = |
| Column Totals: | 92 (A) | 291 (B) |

Prevalence Index = B/A = 3.2

**Hydrophytic Vegetation Indicators:**

- X Dominance Test is >50%
- __ Prevalence Index is ≤3.0[1]
- __ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ Wetland Non-Vascular Plants[1]
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ___ No X

Remarks: *all FAC, most non-native, fails FAC neutral + prevalence tests

## SOIL

Sampling Point: 12

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16 | 10yr 3/2 | 93 | 10yr 5/6 | 7 | C | M | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ______ No X

Remarks:

Does not meet color ~~or contact~~ for hydric (depleted) soil matrix

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

**Wetland Hydrology Present?** Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

1-4" oxidized pore linings

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005/002 City/County: Fortuna, Humboldt Sampling Date: 10/10/16

Applicant/Owner: ______ State: CA Sampling Point: 13

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, Slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Farmland/Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | Yes | No |
|---|---|---|
| Hydrophytic Vegetation Present? | | X |
| Hydric Soil Present? | X | |
| Wetland Hydrology Present? | X | |

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum (Plot size: ______)** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum (Plot size: 1m²)** | | | |
| 1. Ranunculus repens | 15 | Y | FAC |
| 2. Cynosurus cristatus | 10 | | FACW |
| 3. Agrostis capillaris | 12 | | FAC |
| 4. Festuca arundinacea | 10 | | UPL |
| 5. Holcus lanatus | 25 | Y | FAC |
| 6. Trifolium repens | 12 | Y | FAC |
| 7. Lotus corniculatus | 3 | | FAC |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 87 | | |
| **Woody Vine Stratum (Plot size: ______)** | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 13

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 * (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | — | x 1 = — |
| FACW species | 10 | x 2 = 20 |
| FAC species | 67 | x 3 = 201 |
| FACU species | — | x 4 = |
| UPL species | 10 | x 5 = 50 |
| Column Totals: | 87 (A) | 271 (B) |

Prevalence Index = B/A = 3.1

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: * all FAC, all non-native, fails FAC neutral + prevalence tests

## SOIL

Sampling Point: 13

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16 | 10 YR 4/1 | 93 | 7.5 YR 4/6 | 7 | C | PL, M | Sandy Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes X No ___

Remarks:

Common, distinct redox concentrations,

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ______

Water Table Present? Yes ___ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005/002 City/County: Fortuna, Humboldt Sampling Date: 10/10/16

Applicant/Owner: ____ State: CA Sampling Point: 14

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: N/A Farmland/Bottomland NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ____ No X | Is the Sampled Area within a Wetland? Yes ____ No X |
| Hydric Soil Present? | Yes ____ No X | |
| Wetland Hydrology Present? | Yes ____ No X | |

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | ____ = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ____) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | ____ = Total Cover | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Anthoxanthum odoratum | 25 | Y | FACU |
| 3. Holcus lanatus | 25 | Y | FAC |
| 4. Daucus carota | 13 | | FACU |
| 5. Plantago lanceolata | 5 | | FAC |
| 6. Agrostis capillaris | 20 | Y | FAC |
| 7. Linum bienne | 3 | | UPL |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 91 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ____) | | | |
| 1. | | | |
| 2. | | | |
| | ____ = Total Cover | | |

% Bare Ground in Herb Stratum 9

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | — | x 1 = — |
| FACW species | — | x 2 = — |
| FAC species | 50 | x 3 = 150 |
| FACU species | 38 | x 4 = 152 |
| UPL species | 3 | x 5 = 15 |
| Column Totals: | 91 (A) | 317 (B) |

Prevalence Index = B/A = 3.5

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ____ No X *

Remarks: Dominants are FAC and non-native, fails FAC Neutral + prevalence test

## SOIL

Sampling Point: 14

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16 | 10yr 3/2 | | | | | | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) (except MLRA 1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**
Type: Compacted
Depth (inches): 6"

**Hydric Soil Present?** Yes ____ No X

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) (LRR A)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) (LRR A)
- __ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

**Wetland Hydrology Present?** Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 / 002 City/County: Fortuna, Humboldt Sampling Date: 10/10/16

Applicant/Owner: State: CA Sampling Point: 15

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1 + 2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: N/A Ferndale / Bottomland NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No ___ | Is the Sampled Area within a Wetland? Yes X No ___ |
| Hydric Soil Present? | Yes X No ___ | |
| Wetland Hydrology Present? | Yes X No ___ | |

Remarks: Grazed + mown hay field → Man made depression (sharp edges) maybe site of water trough (historic)

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ___) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ___) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Lotus corniculatus | 25 | Y | FAC |
| 3. Mentha pulegium | 30 | Y | OBL |
| 4. Plantago lanceolata | 5 | | FACU |
| 5. Convolvulus arvensis | 3 | | UPL |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 63 | | |
| **Woody Vine Stratum** (Plot size: ___) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |
| % Bare Ground in Herb Stratum 37 | | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 30 | x 1 = 30 |
| FACW species | — | x 2 = — |
| FAC species | 25 | x 3 = 75 |
| FACU species | 5 | x 4 = 20 |
| UPL species | 3 | x 5 = 15 |
| Column Totals: | 63 (A) | 140 (B) |

Prevalence Index = B/A = 2.2

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No ___

Remarks: Small depression – maybe cattle trough location historically

## SOIL

Sampling Point: 15

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-16" | 10 YR 4/3 | 50 | | | | | | |
| | 10 YR 5/1 | 47% | 10 YR 5/8 | 3 | C | M,PL | Clay | |
| | | | ~~10 YR 5/8~~ | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ___

Depth (inches): ___

**Hydric Soil Present?** Yes X No ___

Remarks:

Small man-made depression

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present?** Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

1-6" oxidized pores

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 /002 City/County: Fortuna, Humboldt Sampling Date: 10/10/16

Applicant/Owner: ______ State: CA Sampling Point: 16

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Fenolad/Barronlod NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ______ | No X |
| Hydric Soil Present? | Yes ______ | No X |
| Wetland Hydrology Present? | Yes ______ | No X |

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Plantago lanceolata | 10 | Y | FAC |
| 3. Lotus corniculatus | 25 | Y | FAC |
| 4. Festuca arundinacea | 20 | Y | UPL |
| 5. Trifolium repens | 10 | Y | FAC |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 65 | | |
| **Woody Vine Stratum** (Plot size: ~~35~~) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 35 *

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | — | x 1 = — |
| FACW species | — | x 2 = — |
| FAC species | 45 | x 3 = 135 |
| FACU species | — | x 4 = — |
| UPL species | 20 | x 5 = 100 |
| Column Totals: | 65 (A) | 235 (B) |

Prevalence Index = B/A = 3.6 *

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: * litter + bare soils Fails FAC neutral + prevalence tests, all non-native

## SOIL

Sampling Point: 16

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-5 | 10YR 4/2 | 100 * | *Faint redox in pores, <1% | | | PL | Clay loam | |
| | | | | | | | Clay loam | |
| 6-16 | 10YR 4/2 | 100 | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ____ No X

Remarks:

* Faint redox pore linings visible when dry (<1%) but fade and are indistinguishable when moist

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ______

Water Table Present? Yes ____ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

1-5" oxidized pores @ 1%, below indicator standard, fades when moist...

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 / 002 City/County: Fortuna, Humboldt Sampling Date: 10/1/16

Applicant/Owner: ______ State: CA Sampling Point: 17

Investigator(s): James Regan Section, Township, Range: T2N, R1W, Sec. 1+2

Landform (hillslope, terrace, etc.): Terrace, slopes Local relief (concave, convex, none): Flat Slope (%): 0-30%

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: N/A Farmland / Bottomland NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No ___ | Is the Sampled Area within a Wetland? Yes X No ___ |
| Hydric Soil Present? | Yes X No ___ | |
| Wetland Hydrology Present? | Yes X No ___ | |

Remarks: Grazed + mown hay field

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. Juncus effusus | 80% | Y | FACW |
| 3. Cyperus eragrostis | 15% | | FACW |
| 4. Ranunculus repens | 10% | | FAC |
| 5. Veronica americana | 5% | | OBL |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 110% | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |
| % Bare Ground in Herb Stratum 0% | | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 5 | x 1 = 5 |
| FACW species | 95 | x 2 = 190 |
| FAC species | 10 | x 3 = 30 |
| FACU species | – | x 4 = |
| UPL species | – | x 5 = |
| Column Totals: | 110 (A) | 225 (B) |

Prevalence Index = B/A = 2.0

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No ___

Remarks:

## SOIL

Sampling Point: 17

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ____________

Depth (inches): ____________

**Hydric Soil Present?** Yes X No ___

Remarks:

No soil pit
dug – year round spring, dark mucky soils

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes X No ___ Depth (inches): ______

Water Table Present? Yes X No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

**Wetland Hydrology Present?** Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Spring on slope – dissipates at bottom.

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN 202-082-005 City/County: Fortuna, Humboldt Sampling Date: 11/2/16
Applicant/Owner: APN 202-121-002 State: CA Sampling Point: 18
Investigator(s): James Regan Section, Township, Range: ______
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Flat Slope (%): 0
Subregion (LRR): A Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: ______ NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? Yes ______ No X | | Is the Sampled Area within a Wetland? Yes ______ No ______ |
| Hydric Soil Present? Yes ______ No ______ | | |
| Wetland Hydrology Present? Yes ______ No ______ | | |

Remarks:
Representative Plot for Western Parcel

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 1m²) | | | |
| 1. | | | |
| 2. Festuca arundinacea | 20% | Y | UPL |
| 3. Agrostis capillaris | 20% | Y | FAC |
| 4. Plantago lanceolata | 10% | Y | FACU |
| 5. Leucanthemum vulgare | 7% | | FACU |
| 6. Juncus occidentalis | 2% | | FACW |
| 7. Trifolium repens | 7% | | FAC |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | 66 | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |
| % Bare Ground in Herb Stratum *34% | | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | — | x 1 = — |
| FACW species | 2 | x 2 = 4 |
| FAC species | 27 | x 3 = 81 |
| FACU species | 17 | x 4 = 68 |
| UPL species | 20 | x 5 = 100 |
| Column Totals: | 66 (A) | 253 (B) |

Prevalence Index = B/A = 3.8

**Hydrophytic Vegetation Indicators:**

__ Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Wetland Non-Vascular Plants[1]
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks:
*open ground + Vegetation litter

## SOIL

Sampling Point: 18

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1-18" | 10yr 3/2 | 100 | | | | | Clay loam | |
| 19+" | 10yr 4/1 | 98 | 10yr 5/6 | 2% | C | M | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ___

Depth (inches): ___

**Hydric Soil Present?** Yes X No ___

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) **(LRR A)**
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) **(LRR A)**
___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present?** Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

after 10+" of rain

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment C: Wetland Setback Communications and Reduction Request

**DEPARTMENT OF THE ARMY**
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16TH FLOOR
SAN FRANCISCO, CALIFORNIA 94103-1398

20 June 2017

Regulatory Division

Subject: File No. 2017-00162N

Mr. Mike Atkins
2660 Clay Road
McKinleyville, CA 95519

Dear Mr. Atkins:

This correspondence is in reference to your submittal of November 18, 2016, on behalf of Mr. Dennis Fitze, requesting a preliminary jurisdictional determination of the extent of navigable waters of the United States (U.S.) and waters of the U.S. occurring on APNs 202-082-005 and 202-121-002, located west of Renner Drive and behind the Redwood Community Hospital Complex, in the City of Fortuna, Humboldt County, California.

All proposed discharges of dredged or fill material occurring below the plane of ordinary high water in non-tidal waters of the U.S.; or below the high tide line in tidal waters of the U.S.; and within the lateral extent of wetlands adjacent to these waters, typically require Department of the Army authorization and the issuance of a permit under Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq*.). Waters of the U.S. generally include the territorial seas; all traditional navigable waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters subject to the ebb and flow of the tide; wetlands adjacent to traditional navigable waters; non-navigable tributaries of traditional navigable waters that are relatively permanent, where the tributaries typically flow year-round or have continuous flow at least seasonally; and wetlands directly abutting such tributaries. Where a case-specific analysis determines the existence of a "significant nexus" effect with a traditional navigable water, waters of the U.S. may also include non-navigable tributaries that are not relatively permanent; wetlands adjacent to non-navigable tributaries that are not relatively permanent; wetlands adjacent to but not directly abutting a relatively permanent non-navigable tributary; and certain ephemeral streams in the arid West.

The enclosed delineation map entitled, "Preliminary Jurisdictional Determination for the Fortuna Senior Living Center Project", in 1 sheet and date certified March 7, 2017, depicts the extent and location of wetlands within the boundary area of the site that **may be** subject to U.S. Army Corps of Engineers' regulatory authority under Section 404 of the Clean Water Act. This preliminary jurisdictional determination is based on the current conditions of the site, as verified during a field investigation of February 14, 2017, and a review of other data included in your submittal. While this preliminary jurisdictional determination was conducted pursuant to Regulatory Guidance Letter No. 16-01, *Jurisdictional Determinations*, it may be subject to future revision if new information or a change in field conditions becomes subsequently apparent. The basis for this preliminary jurisdictional determination is fully explained in the enclosed

*Preliminary Jurisdictional Determination Form*. You are requested to sign and date this form and return it to this office within two weeks of receipt.

You are advised that the preliminary jurisdictional determination may **not** be appealed through the U.S. Army Corps of Engineers' *Administrative Appeal Process*, as described in 33 C.F.R. Part 331 (65 Fed. Reg. 16,486; Mar. 28, 2000). Under the provisions of 33 C.F.R § 331.5(b)(9), non-appealable actions include preliminary jurisdictional determinations since they are considered to be only advisory in nature and make no definitive conclusions on the jurisdictional status of the water bodies in question. However, you may request this office to provide an approved jurisdictional determination that precisely identifies the scope of jurisdictional waters on the site; an approved jurisdictional determination may be appealed through the *Administrative Appeal Process*. If you anticipate requesting an approved jurisdictional determination at some future date, you are advised not to engage in any on-site grading or other construction activity in the interim to avoid potential violations and penalties under Section 404 of the Clean Water Act. Finally, you may provide this office new information for further consideration and request a reevaluation of this preliminary jurisdictional determination.

You may refer any questions on this matter to L. Kasey Sirkin of my Regulatory staff by telephone at 707-443-0855 or by e-mail at l.k.sirkin@usace.army.mil. All correspondence should be addressed to the Regulatory Division, North Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. My Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner, while preserving and protecting our nation's aquatic resources. If you would like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website: www.spn.usace.army.mil/Missions/ Regulatory.aspx.

Sincerely,

Holly Costa

Digitally signed by COSTA.HOLLY.N.1249736780
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=COSTA.HOLLY.N.1249736780
Date: 2017.06.19 17:56:42 -07'00'

Holly N. Costa
Regulatory North Branch Chief

Enclosures

Copy Furnished electronically (w/ encls):

Dennis Fitze: sherlockstorage@aol.com

Copy Furnished electronically (w/ encl 1 only):

US EPA, San Francisco; Siu.Jennifer@epa.gov
CA RWQCB, Santa Rosa; Brendan.Thompson@waterboards.ca.gov

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment C: Wetland Setback Communications and Reduction Request

**J. Regan Consulting**
**Eureka, CA. 95502**
**707-443-3329**
**707-845-0821**

**18 October 2018**

Liz Shorey
Jennifer Ourique
City of Fortuna
Community Development Dept.

**Re: Wetland buffer recommendations for Rhonerville Road Project, Fortuna, CA. APN's 202-082-005 and 202-121-002**

Ms. Shorey and Ms. Ourique,

I am writing this in order to provide recommendations and justification for reduction of wetland buffers and setbacks for a development project within the limits of the City of Fortuna, CA. The project includes the development of parcels adjacent to two perennial creeks (Jameson Creek and Strongs Creek). The proposed development area contains five small, isolated palustrine emergent wetland areas (.036 acres total) which I delineated using Army Corps of Engineers (ACOE) methodologies during the fall of 2016. The wetland delineation report was verified in the field with ACOE staff and a final delineation report reflecting ACOE staff recommendations was completed in March of 2017. ACOE determined that all five isolated wetlands were jurisdictional and subject to federal regulation under the Clean Water Act. While the federal jurisdiction does not include any particular buffers or protective measures for the wetlands, other than avoidance, the City of Fortuna General Plan provides measures for wetland protection that include a 50 foot setback during permitted developments. Included in the measures listed in the General Plan is a provision which allows wetland buffers to be expanded, contracted, or fully removed based on adequate biological evidence.

During project development it has become evident that the 50 foot wetland buffers provided by the City of Fortuna on these wetlands will likely impose restrictions on the development that may affect the feasibility of the project. Project proponents have asked that I evaluate the wetlands and associated buffers in order to determine if a reduced buffer width from 50 to 25 feet would be appropriate given the wetlands physical, biological, and cultural functions and values.

Wetland function and value is a partially objective way to view the importance of wetlands and can provide measurable criteria for evaluating the biological, physical, and social benefits of the subject wetlands in regard to their importance on the landscape. Wetland functions are the physical, chemical, and biological processes the can occur in wetlands. Wetland values are the true or perceived importance of those wetlands to society. Functional Capacity is the ability of the wetland ecosystem to perform or provide a function. I used two publications during my evaluation of these wetlands, the first is "Wetlands: Characteristics and Boundaries" compiled by the National Research Council in 1995. The second is "Wetland Evaluation Technique (WET); Volume II: Methodology." (Adamus 1987) which is an ACOE publication intended to provide technical guidance to wetland evaluators. I should note that I did not complete the WET technical evaluation but used the definitions and guidance to support my recommendations. Both publications provide similar measurable attributes to evaluate wetlands; I have listed those attributes in the tables below with a brief summary of whether the subject wetlands either provide or contain those attributes and to what extent based on my observations.

| Wetland Functions | Description | Functional Capacity/Evaluation |
|---|---|---|
| Groundwater recharge/discharge | The movement of external water into or out of the groundwater system | Three of the wetlands identified do act as groundwater recharge areas (on flat topography), where precipitation settles and percolates into the groundwater system. Two of the features are slope wetlands and acts as a groundwater discharge, where sub-surface water comes to the soil surface. The small size and isolation of the features leads me to believe that they do not contribute significantly to groundwater recharge or discharge. |
| Flood Flow Attenuation | Wetlands along flood prone areas slow and store flood waters, preventing or reducing damage to surrounding areas. | These wetlands are isolated from the adjacent streams and are located outside of the 100 and 500 year flood prone areas. These features do not attenuate flood waters. |
| Sediment Stabilization | Wetlands provide a space for sediment laden water to slow and drop sediments. Along watercourses wetlands slow flows reducing erosive potential of stream banks. | These features are isolated from the adjacent streams and have no surface water connection to other waters. They are not stream fed and do not act as significant sediment traps or stabilize erosion prone areas. |
| Nutrient Removal/Transformation | Wetlands provide space and time for biotic metabolism of nutrients esp. nitrogenous compounds often generated by agricultural endeavors | The current land use for the parcels is agricultural but it is unlikely that the area is fertilized. Several horses do inhabit the pasture at this time, while the wetlands likely provide some nutrient cycling the small size makes it unlikely that they provide a significant benefit to the ecosystem. |
| Toxicant Retention | Wetlands and wetland plants can store toxins in a similar manner as above. | The wetlands in question do not have the size or opportunity to process significant amounts of toxins. There may be some runoff from adjacent developed parcels (parking lots and buildings) but it is unlikely that these wetlands function to process a significant portion of those inputs if they exist. |

| Wetland Values | Description | Evaluation |
|---|---|---|
| Production for Export | Wetlands that provide crops or are used for animal farming, fisheries etc. with products that contribute to the economy. | This area is currently used as a pasture and has been mown, likely for grass hay production in the past. It is unlikely that these activities significantly contribute to the local or national economy. |
| Wildlife/Botanical Resources | Wetlands can provide habitat and sustenance for local plants and animals some of which may be protected species | These wet areas are not large enough, deep enough, or persist long enough to provide significant habitat for fish or aquatic lifeforms requiring year round aquatic habitat. A botanical survey was conducted for the area and no protected plants were found. The wet areas are largely populated by non-native plants. These areas do provide some forage and seasonal drinking water for birds (potential seasonal use by waterfowl) or land based animals and may provide enough water for long enough to allow some invertebrates and potentially vertebrate animals to use for breeding and feeding (such as frogs and insects that have aquatic portions of their lifecycles). The small area and relative abundance of other such habitat in the region lead me to believe that these subject wetlands provide minimal habitat for those processes. The areas will still be available for those processes during and after development. |
| Aquatic Diversity | Wetland habitats are known to have some of the highest diversity of plants and aquatic organisms. | These are small, shallow, seasonal wetlands which have been impacted by past land management and livestock activities. The vegetation community is common to disturbed areas and is composed of many non-native plants. The waters are seasonal and do not likely provide habitat for significantly diverse aquatic life. |
| Recreation | Wetlands can provide recreation opportunities such as hunting (waterfowl), bird watching, botanizing, areas of visual beauty for walking or camping, and other outdoor activities. | These wetland features are located on private land and would not be considered ideal sites for any recreational activities. |
| Uniqueness | Some wetlands are rare or unique features on the landscape. | These wetland features are not unique to the region, many agricultural areas, especially with flat topography near the coast as these are, provide similar features. |

I should note that the full 50 foot setback recommended by the City of Fortuna, in my estimation, would be appropriate for wetlands providing the most function and value and having the greatest benefit to the ecosystem and society that surrounds it. Wetlands that provide minimal function and value or provide no function or value would be categorically deserving of reduced buffers and minimal mitigation measures.

I should also note that the project proponents do not wish to fully remove buffers or enter the wetlands themselves. In order to provide protection to the wetlands and continue with a feasible development the proponents plan to provide all five wetlands with a 25 foot buffer during and after development. During construction activities the wetland buffers shall be fenced and adequately marked so as to avoid any impacts during construction. Within these 25 foot buffers no equipment shall travel or operate, no stockpiling of spoils or materials shall occur, and all feasible attempts shall be made to avoid impacts to the wetland buffers or wetlands contained therein. Potential impacts include the addition or delivery of sediment to the wetlands, during construction it may be necessary to install sediment traps and wattles around these features to remove or reduce the potential of sediment laden runoff from leaving the construction site and entering the wetlands. Additionally, drainage and storm water facilities incorporated into the development should provide adequate measures to remove or reduce sediments or pollutants from entering the wetlands by either trapping or removing sediment and pollutants prior to entering the wetland or directing those facilities away from delivery to jurisdictional wetlands.

In conclusion, I find the reduction of the wetland buffers to 25 feet, provided that mitigation measures are followed, is appropriate for these wetland features and will likely minimize potential impacts to the wetlands while allowing permitted development to occur.

I am available for questions and comments.

Thank you,

James Regan
Botanist/Wetland Delineator
J Regan Consulting

**References**

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National Research Council. 1995. Wetlands: Characteristics and Boundaries. Washington, DC: The National Academies Press. https://doi.org/10.17226/4766.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment D: October 2018 - Wetland Delineation Report and ACOE Jurisdictional Determination

# Wetland Delineation Report
# For
# APN 202-082-004-000
# Fortuna, CA.
**October 23, 2018**


**Prepared by:**

**James Regan**
**Botanist/Wetland Delineator**
**707-845-2827**


**For:**

## Mad River Properties, Inc.
**McKinleyville, CA**

## Table of Contents



## Appendices

# 1.0 INTRODUCTION AND PURPOSE

On 19 August 2017 Mr. James Regan (botanist/ wetland delineator) conducted site review for potential wet areas within the city of Fortuna, Humboldt County, California (APN #202-082-004-000). The property is located in the City of Fortuna adjacent to Redwood Way and Strongs Creek. The subject property is located in an open, undeveloped lot. No structures exist on the subject parcel at this time. This investigation is meant to delineate the extent of any wetlands on the subject parcels. The project and surrounding areas were described in a previous delineation report for APNs 202-082-005-000 and 202-121-002-000 completed and reviewed by ACOE in 2017. This report details the survey of a proposed access route to planned development on adjacent parcels.

This assessment serves to provide a wetland determination/delineation conducted to investigate the environmental setting of the subject property for future development needs. This report is the result of surveys conducted on the dates above, reviews of relevant scientific literature, and professional knowledge. Mr. Regan holds a Bachelor's degree in botany and has worked as a professional botanist in Northern California (Humboldt, Trinity, and Mendocino Counties) for the past 15 years and as a wetland delineator for the past 10 years.

# 2.0 METHODS

## 2.1 GENERAL INFORMATION

Plots for the wetland delineation were surveyed on 19 August 2018 by Mr. James Regan. The subject area was assessed using guidelines outlined in the U.S. Army Corps of Engineers (ACOE) Wetland Delineation Manual Technical Report Y-87-1 (referred to as the 1987 manual) and the Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region. The 1987 manual provides technical guidelines for identifying wetlands, distinguishing them from non-wetlands, and provides methods for applying the technical guidelines. Three key provisions of the ACOE wetland definition include:

i. Inundated or saturated soil conditions resulting from permanent or periodic inundation by ground or surface water.

ii. A prevalence of vegetation typically adapted for life in saturated soil conditions (hydrophytic vegetation)

iii. The presence of "normal circumstances"

Explicit in the ACOE definition is the consideration of three environmental parameters: Hydrology, Vegetation, and Soils. Positive wetland indicators of all three parameters are normally present in wetlands. The ACOE methodology requires one positive indicator from each parameter in order to make a positive wetland determination.

Plots were chosen using intuitive measures based on identification of obvious wetland features (i.e. vegetation, hydrology). A total of 4 sampling plots were established within the subject property (Site Map, Appendix A). Plant communities were fairly uniform throughout the area and were composed of species common grassland and pasture habitats. ACOE Routine Wetland Determination Data Forms were used in the field to record site-specific soil, vegetation, and hydrologic information. A data form was completed for each sample observation point. Copies of these data forms and a plot map are included as Appendix B.

### 2.3 VEGETATION

The subject parcel was walked/assessed first to determine the location of distinct plant community types. During the site visit two separate vegetation communities were noted; open pasture/managed grassland and riparian shrub/woodland. Sample plots were chosen to provide representation of the vegetation communities onsite and sample plot locations are included in Appendix A.

Dominant plant species were recorded on ACOE data forms at each plot surveyed during this investigation. Where the plant community consisted of herbaceous species, a $1m^2$ plot was used. At this site woody overstory vegetation in the riparian corridor was included in plot calculations for plots adjacent to the riparian fringe. However, this vegetation community is mature and deep rooted, often in the channel for the watercourse, which is up to 15 feet below the elevation of the slope proposed for development.

Indicator status for each species was obtained from the WESTERN MOUNTAINS, VALLEYS, AND COAST 2016 Regional Wetland Plant List developed with the ACOE.

### 2.4 SOILS

A total of 4 soil pits were dug during this examination. Pits were dug to a depth of at least 16 inches. Soil profiles were examined and profile descriptions were recorded on ACOE data sheets for soil characteristics throughout the soil profile (Appendix B). The Munsell color chart (Macbeth, 2000) was used to determine soil color, value, and chroma. Soil profile textures were determined using a standard soil texture by feel technique and ribbon test. All soil profiles were examined for secondary hydrology indicators including oxidized root channels and redoxomorphic concentrations.

### 2.5 HYDROLOGY

Each observation point was examined for indicators of wetland hydrology, and observations were recorded on ACOE data forms (Appendix B).

Indicators of wetland hydrology include drainage patterns, drift lines, sediment deposits, watermarks, and visual observations of saturated soils and/or inundation. Visual observations of soil saturation were made in each pit to determine the level at which water (if any) stands in each pit after several minutes had elapsed. Drainage patterns were determined by observing any signs of surface flow into or through the subject parcel.

# 3.0 RESULTS

## 3.1 VEGETATION

Vegetation within the sampled area is generally non-native and common to grazed and disturbed areas with little canopy cover. The species composition is mixed with often three or four species sharing dominance. No sampled plots showed dominance of hydrophytic plants and none met the standard for wetland plant communities. Plot 2 was placed in a small patch of *Juncus effuses* (lamp rush) which is a facultative wetland plant (FACW) often found in wetlands in the region. This patch of vegetation is located mid-slope above the adjacent creek transition line and appears to hold more water than surrounding areas, however, the *Juncus* is mixed with several common range grasses and the resulting vegetation community does not meet the standard for a wetland plant community. Plots 1, 3, and 4 contained similar mixes of plants and while some indicator species are present (includes willows adjacent to Strongs Creek) none of the sampled plots met the standard for wetland vegetation.

## 3.2 SOILS

Results of samples taken from the test pits were recorded on the data sheets attached to the end of this report. Soils from sample pits were generally loam or clay loam and have historically been grazed, mown, and likely graded.

None of the sampled plots showed primary indicators of hydric soil conditions and positive wetland setting. Plot 2 had some very faint contrasting soil colors but did not qualify as a hydric soil type. Likewise, plot 4 showed some minor contrasting color within some dense clay inclusions but did not meet the standard for hydric wetland soils.

## 3.3 HYDROLOGY

The delineations were performed in August of 2017, in a year with slightly above average rainfall. Any primary indicators or secondary indicators that were present at any of the test pits or on the surface of any part of the subject area were recorded on the delineation forms. Field observations of hydrology include surface water, saturated soils, or shallow water table at the time of the samples.

None of the sampled plots showed primary or secondary indicators of wetland hydrology.

## 4.0 CONCLUSIONS

Positive wetland indicators of all three parameters are normally present in jurisdictional wetlands. The ACOE methodology requires one positive indicator from each parameter (vegetation, soils, and hydrology).

None of the plots sampled during this investigation showed positive indicators of wetland vegetation, soils, or hydrology. None of the sampled area meets ACOE definition of wetland.

This report and accompanying maps and data should be transmitted to the reviewing agents for review and included in any application for permits necessary for completion of any proposed development projects on the subject property.

## 5.0 TERMS AND CONDITIONS

This report is based on conditions observed and recorded August 2017. This report has not been reviewed nor has concurrence with the conclusion been obtained. Although a wetland has been identified, verification by agencies may be necessary in the future. Land use practices and regulations can change thereby affecting current conditions and delineation results described herein.

This report was prepared for exclusive use; consultants are not liable for any actions arising out of the reliance of any third party on the information contained in this report.

Please call with any questions or comments.

James Regan
Botanist/Wetland Delineator

707-845-2827
jreganii@aol.com

## 6.0 REFERENCES


Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. The Jepson Manual: Vascular Plants of California, second edition. University of California Press, Berkeley.

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Sawyer, J.O. ,T.Keeler-Wolf, and, J.M. Evens. 2009. *A Manual of California Vegetation, 2nd edition.* California Native Plant Society, Sacramento,CA.

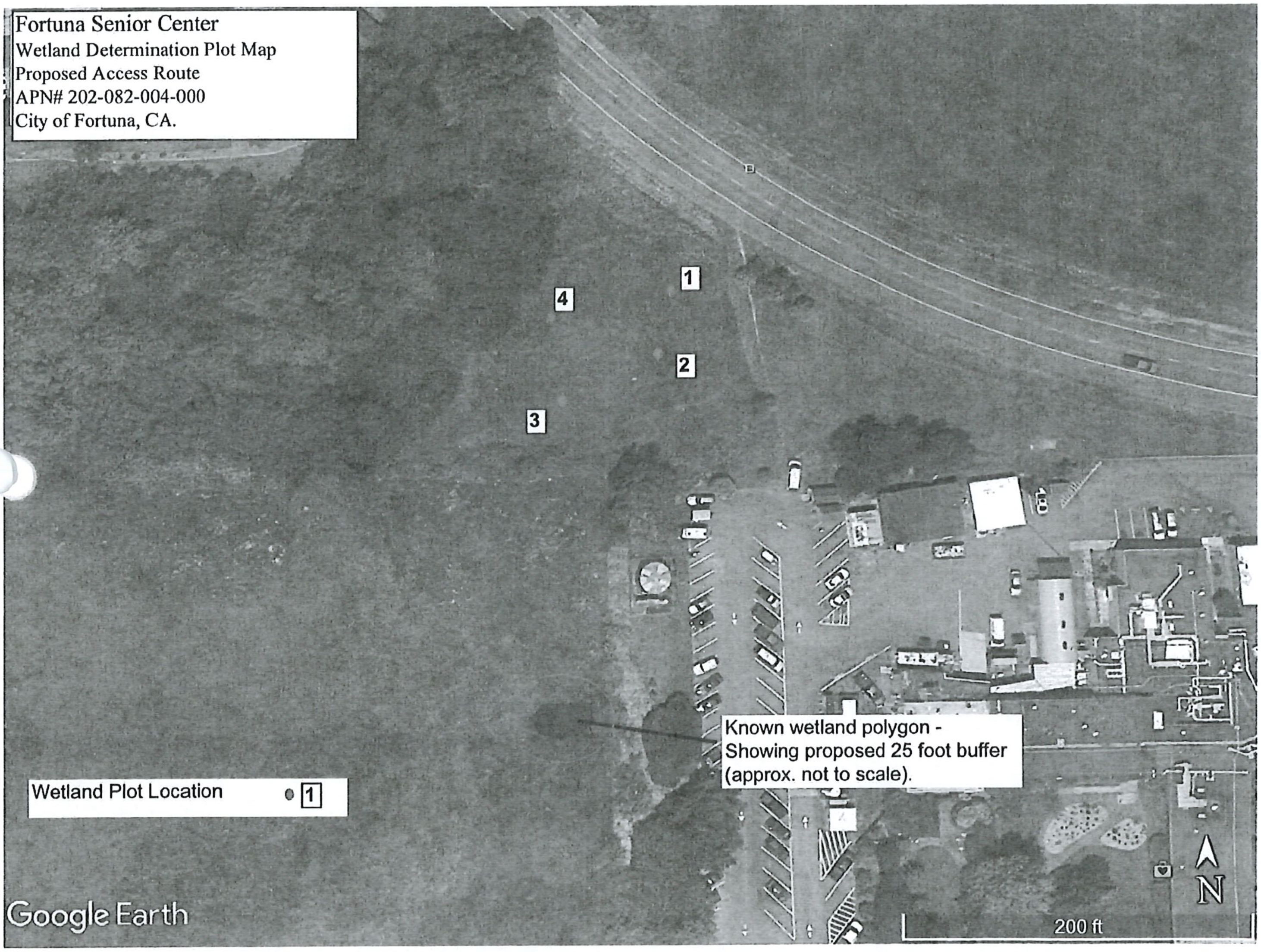
US Army Corps of Engineers (ACOE). 1987. Corps of Engineers Wetland Delineation Manual. Wetlands Research Program Technical Report Y-87-1.

US Army Corps of Engineers (ACOE). Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region. Revised. 4-9-2007.

U. S. Fish and Wildlife Service. August 2017. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

# Appendix A

## Site Map


Fortuna Senior Center
Wetland Determination Plot Map
Proposed Access Route
APN# 202-082-004-000
City of Fortuna, CA.
1
4
2
3
Known wetland polygon -
Showing proposed 25 foot buffer
(approx. not to scale).
Wetland Plot Location 1
Google Earth
N
200 ft

# Appendix B

## Wetland Data Sheets

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Fitze (Fortuna Senior Center) City/County: Fortuna, Humboldt Sampling Date: 8/19/17

Applicant/Owner: ↳ APN 202-082-004-000 State: CA Sampling Point: 1

Investigator(s): JR Section, Township, Range: ______

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Slope Slope (%): >5%

Subregion (LRR): ______ Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ______ No X | Is the Sampled Area within a Wetland? | Yes ______ No X |
| Hydric Soil Present? | Yes ______ No X | | |
| Wetland Hydrology Present? | Yes ______ No X | | |

Remarks:

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| Sapling/Shrub Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| Herb Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. Festuca arundinacea | 35 | Y | UPL(NI) |
| 3. Anthoxanthum odoratum | 40 | Y | FACU |
| 4. Daucus carota | <5 | N | |
| 5. Lotus corniculatus | 10 | N | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | | | |
| Woody Vine Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 15

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | ______ | x 1 = ______ |
| FACW species | ______ | x 2 = ______ |
| FAC species | ______ | x 3 = ______ |
| FACU species | ______ | x 4 = ______ |
| UPL species | ______ | x 5 = ______ |
| Column Totals: | ______ (A) | ______ (B) |

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks:

↳ BioTurbation

US Army Corps of Engineers Western Mountains, Valleys, and Coast – Interim Version

1

## SOIL

Sampling Point: ______

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-16+ | 10 yr 3/2-3/3 | 100 | | | | | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ______ No X

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) **(LRR A)**
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) **(LRR A)**
- __ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

**Wetland Hydrology Present?** Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Sitze APN 202-082-004-010 City/County: Fortuna (Humboldt) Sampling Date: 8/19/17

Applicant/Owner: ______ State: CA Sampling Point: 2

Investigator(s): PR Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______ Slope (%): ______

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ______ | No X |
| Hydric Soil Present? | Yes ______ | No X |
| Wetland Hydrology Present? | Yes ______ | No X |

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. Juncus effusus | 60 | Y | FACW |
| 2. Festuca arundinacea | 30 | Y | Upl |
| 3. Anthoxanthum odoratum | 20 | Y | FACU |
| 4. | | | |
| 5. * Ranunculus repens / cal.? | 10 | N | FAC/FACW |
| = Total Cover | 110 | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| = Total Cover | | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum ______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (2) (A)

Total Number of Dominant Species Across All Strata: 3 (4) (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33%, 50% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | 60 (70) | x 2 = 120 (140) |
| FAC species | | x 3 = |
| FACU species | 20 | x 4 = 80 |
| UPL species | 30 | x 5 = 150 |
| Column Totals: | 110 (120) (A) | 350 (370) (B) |

Prevalence Index = B/A = 3.18 (3.08)

**Hydrophytic Vegetation Indicators:**

__ Dominance Test is >50% no

__ Prevalence Index is ≤3.0[1] no

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: * may be considered dominant @ [illegible]...

## SOIL

Sampling Point: 2

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-2 | 10yr 2/3-3/2 | 100 | | | | | loam | |
| 3-16+ | 10yr 2/2 | 99 | 10yr 3/4 | 1% | C | M | loam | Tiny, faint (<1mm dia.)* |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ____ No X

Remarks: Some pores in upper profile w/ faint contrast when dry – no visible color change/contrast when moist.
*Distinct contrast but don't meet A11, F3 or F6

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) **(LRR A)**
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) **(LRR A)**
- __ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

**Wetland Hydrology Present?** Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Late in season, above avg. rainfall
adjacent sites w/ surface H2O *

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Fitz APN 202-082-004-000 City/County: Fortuna, Humboldt Sampling Date: 8/19/17

Applicant/Owner: ______ State: CA Sampling Point: 3

Investigator(s): JR Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______ Slope (%): ______

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ______ | No X |
| Hydric Soil Present? | Yes ______ | No X |
| Wetland Hydrology Present? | Yes ______ | No X |

**Is the Sampled Area within a Wetland?** Yes ______ No X

Remarks:

**VEGETATION – Use scientific names of plants.**

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. Agrostis sp. (Colonial) | 20 | Y | FAC |
| 2. Anthoxanthum od. | 25 | Y | FACU |
| 3. Trisetum canescens | 10 | Y | UPL |
| 4. Danthonia cal. | 10 | Y | ~~FACU~~ FAC |
| 5. Festuca arundinacea | 5 | N | Upl |
| 6. Daucus carota | 5 | N | FACU |
| 7. Plantago lanceolata | 10 / 85 | Y | FACU |
| 8. | | | |
| 9. * Juncus effusus | 10 | Y | FACW |
| 10. (* Patchy in veg type) | | | |
| 11. | | | |
| = Total Cover | 85 (95) | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 15%

Remarks: Bare soil/Litter

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (3) (A)

Total Number of Dominant Species Across All Strata: 5 (6) (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (50%) (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | ~~0~~ (10) | x 1 = |
| FACW species | 0 (10) | x 2 = 0 (20) |
| FAC species | ~~20~~ 30 | x 3 = 90 |
| FACU species | 40 | x 4 = 160 |
| UPL species | 5 | x 5 = 25 |
| Column Totals: | 85 (95) (A) | 275 (295) (B) |

Prevalence Index = B/A = 3.2 (3.10)

**Hydrophytic Vegetation Indicators:**

- __ Dominance Test is >50%
- __ Prevalence Index is ≤3.0[1]
- __ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ Wetland Non-Vascular Plants[1]
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ______ No X

## SOIL

Sampling Point: 3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-16 | 10yr 3/2 | 100 | | | | | loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) (except MLRA 1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ___ No X

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) (LRR A)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) (LRR A)
- __ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ___ | No X | Depth (inches): ___ |
| Water Table Present? | Yes ___ | No X | Depth (inches): ___ |
| Saturation Present? (includes capillary fringe) | Yes ___ | No X | Depth (inches): ___ |

**Wetland Hydrology Present?** Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Late in Season, but above average rainfall.

## WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Fitze APN 202-082-004-000 City/County: Fortuna, Humboldt Sampling Date: 8/19/17

Applicant/Owner: ______ State: CA Sampling Point: 4

Investigator(s): FR Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Toe slope Local relief (concave, convex, none): Flat Slope (%): ______

Subregion (LRR): A Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ______ | No X |
| Hydric Soil Present? | Yes ______ | No X |
| Wetland Hydrology Present? | Yes ______ | No X |

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks:

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______) | | | |
| 1. Salix lasolepis (Fringe) | * | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. Holcus lanatus | 30 | Y | FAC |
| 2. Anthoxanthum odoratum | 30 | Y | FACU |
| 3. Festuca arundinacea | 40 | Y | UPL |
| 4. ~~Rubus ursinus~~ | | | |
| 5. Plantago lanceolata | 10 | N | FACU |
| 6. Cirsium arvense | <5 | N | FAC |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | | = Total Cover | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. Rubus ursinus | 40 | Y | FACU |
| 2. | | | |
| | | = Total Cover | |

% Bare Ground in Herb Stratum ______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1(2) (A)

Total Number of Dominant Species Across All Strata: 4(5) (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25%, 40% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | ______ | x 1 = ______ |
| FACW species | ______ | x 2 = ______ |
| FAC species | ______ | x 3 = ______ |
| FACU species | ______ | x 4 = ______ |
| UPL species | ______ | x 5 = ______ |
| Column Totals: | ______ (A) | ______ (B) |

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ______ No X

Remarks: *Plots on Salix fringe w/ Dominant Salix in cut ~~###~~

## SOIL

Sampling Point: 4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6 | 10yr 3/2 | 100 | | | | | Clay loam | |
| 7-16 | 10yr 3/2-2/2 | 100 | | | | | Clay loam | |
| * | ~~10yr~~ 2.5yr 3/1 | 90 | 2.5 YR 2.5/2 | 10% | C | M | Clay | Very faint redox |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**
Type: ___
Depth (inches): ___

**Hydric Soil Present?** Yes ___ No X

Remarks:
* Clay inclusions ~10% of profile.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present?** Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**DEPARTMENT OF THE ARMY**
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16TH FLOOR
SAN FRANCISCO, CALIFORNIA 94103-1398

November 28 2018

Regulatory Division

Subject: File No. 2018-00488N

Mr. Meritt Perry
City of Fortuna
621 11th Street
Fortuna, CA 95540

Dear Mr. Perry:

This correspondence is in reference to your submittal of October 26, 2018, on behalf of the City of Fortuna, requesting an approved jurisdictional determination of the extent of navigable waters of the United States and waters of the United States occurring on a 4.5 acre undeveloped parcel, at an unknown address on Redwood Way, in the city of Fortuna, Humboldt County, with a center point latitude 40.5834°N longitude -124.1372°W.

All proposed discharges of dredged or fill material occurring below the plane of ordinary high water in non-tidal waters of the United States; or below the high tide line in tidal waters of the United States; and within the lateral extent of wetlands adjacent to these waters, typically require Department of the Army authorization and the issuance of a permit under section 404 of the Clean Water Act of 1972, as amended, 33 U.S.C. § 1344 *et seq.*

All proposed structures and work, including excavation, dredging, and discharges of dredged or fill material, occurring below the plane of mean high water in tidal waters of the United States, in former diked baylands currently below mean high water, outside the limits of mean high water but affecting the navigable capacity of tidal waters or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States, typically require Department of the Army authorization and the issuance of a permit under section 10 of the Rivers and Harbors Act of 1899, as amended, 33 U.S.C. § 403 *et seq.*

The enclosed delineation map entitled, "Approved Jurisdictional Determination, Pursuant to Section 404 Clean Water Act, Fortuna Senior Center, in 1 sheet date, certified November 13, 2018, reflects the absence of jurisdictional waters of the United States and navigable waters of the United States within the boundary area of the site, as defined by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. This approved jurisdictional determination is based on the current upland conditions of the site, a review of available digital photographic imagery, and a review of other data included in your submittal. This approved jurisdictional determination will expire in five years from the date of this letter, unless new information or a change in field conditions warrants a revision to the delineation map prior to the expiration date. The basis for this approved jurisdictional determination is explained in the enclosed *Approved Jurisdictional Determination Form.*

The current absence of jurisdictional navigable waters of the United States and waters of the United States within the boundary area of the site does not obviate any requirement to obtain other Federal, State, or local approvals necessitated by law. Any impacts to federally-listed threatened or endangered species and/or designated critical habitat may be subject to regulation by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service under Section 10 of the Endangered Species Act of 1973, as amended, 16 U.S.C. § 1531 *et seq*. If "waters of the state" are potentially present, the site may be subject to regulation by the California Regional Water Quality Control Board, North Coast Region, under the Porter-Cologne Water Quality Control Act, as amended, California Water Code § 1300 *et seq*.

You are advised that the approved jurisdictional determination may be appealed through the U.S. Army Corps of Engineers' Administrative Appeal Process, as described in 33 C.F.R. pt. 331 (65 Fed. Reg. 16,486; Mar. 28, 2000), and outlined in the enclosed flowchart and Notification of Administrative Appeal Options, Process, and Request for Appeal (NAO-RFA) Form. If you do not intend to accept the approved jurisdictional determination, you may elect to provide new information to this office for reconsideration of this decision. If you do not provide new information to this office, you may elect to submit a completed NAO-RFA Form to the Division Engineer to initiate the appeal process; the completed NAO-RFA Form must be submitted directly to the Appeal Review Officer at the address specified on the NAO-RFA Form. You will relinquish all rights to a review or an appeal, unless this office or the Division Engineer receives new information or a completed NAO-RFA Form within 60 days of the date on the NAO-RFA Form. If you intend to accept the approved jurisdictional determination, you do not need to take any further action associated with the Administrative Appeal Process.

You may refer any questions on this matter to L. Kasey Sirkin of my Regulatory staff by telephone at 707-443-0855 or by e-mail at l.k.sirkin@usace.army.mil. All correspondence should be addressed to the Regulatory Division, North Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. My Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner, while preserving and protecting our nation's aquatic resources. If you would like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website:
http://www.spn.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,

Frances Malamud-Roam

Rick M. Bottoms, Ph.D.
Chief, Regulatory Division

Enclosures

Electronic Copy Furnished (w/ encls):

Mr. Mike Atkins, Mike@madriverpropertiesinc.com
NCRWQCB, Jacob Shannon Jacob.shannon@waterbaords.ca.gov

CF:
CESPN-R Rdg File
CESPN-R-N (Sirkin)

# Attachment E: Tribal Communication Letters

# A Cultural Resources Investigation for the Fitze Planned Unit Development At Assessor's Parcel Numbers 202-082-005, 202-121-002, 202-082-004 Located in Fortuna, Humboldt County, California


*Prepared by:*
William Rich M.A., RPA
With contributions by Jerry Rohde, M.A.
PO Box 184
Bayside, CA 95524

*Prepared for:*
Dennis and Corey Fitze
1749 Alamar Way
Fortuna, CA 95540


May 2019

## CONFIDENTIAL INFORMATION

**Archaeological and other heritage resources can be damaged or destroyed through uncontrolled public disclosure regarding the location, character or ownership. This information is exempt from the Freedom of Information Act pursuant to 16 U.S.C. 470w-3; Section 304 of the National Historic Preservation Act, 36 CFR 800(6)(a)(5) and 36 CFR 800.11(c); Section 9(a) of the Archaeological Resources Protection Act; Executive Order 13007; Section 6254.10 of the California State Government Code: and the 2005 California Senate Bill 922. Portions of this report may contain culturally sensitive information that should be redacted before public review.**

*Cover Photo: View to the north of City property to be used for new access road.*

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## Appendices

## 1.0 INVESTIGATION SUMMARY

This report presents the methods, findings and results of a cultural resources investigation of Assessor's Parcel Numbers (APN) 202-082-005, 202-121-002, 202-082-004, in the city of Fortuna. These parcels encompass approximately 14 acres and are situated along Redwood Way in the southwest portion of Fortuna, Humboldt County, California (Figure 1). The cultural resources investigation was requested by Dennis and Corey Fitze who are proposing to develop the parcels into 59 residential units and access road from Redwood Way. This requires the City of Fortuna, as the lead agency, to take into account the effects of their actions on historical resources prior to approval of this action. The cultural resources survey reported here was completed as partial fulfillment of the City's obligation under CEQA.

The purpose of this investigation was to determine whether historical resource(s), as defined in the California Environmental Quality Act (CEQA) Guidelines *Title 14. California Code of Regulations* (CCR) Section 15064.5(a), are present within the proposed project area, or adjacent areas within the subject parcels. This report demonstrates William Rich has made a reasonable and good faith effort to identify historical resources within the proposed project area pursuant to Section 15064.5 (a) of CEQA.

The investigation methods included a review of the records search from the Northwest Information Center (NWIC). Review of archaeological and historical literature and historic photographs pertinent to the project region was also conducted at the Humboldt County Historical Society, Humboldt State University (HSU) Library-Humboldt Room, and the authors' personal files. Correspondence with Native American Tribes was initiated by the City of Fortuna. William Rich and Associates (WRA) obtained a sacred land search from the Native American Heritage Commission (NAHC) and wrote follow-up letters to the Tribal Historic Preservation Officer (THPO) for the Bear River Band of the Rohnerville Rancheria and the Chairman of the Wiyot Tribe.

According to the NWIC records search, a portion of the project area has been subject to a previous cultural resources survey in 1976 by Barbara Gorrell for the proposed Rohnerville sewage system. The NWIC has no record of historic districts, historical landmark, locally registered historic resources, nationally registered historic properties or other archaeological or historic sites in the project area. Based on previous work in the area, WRA is aware of previous surveys on adjacent parcels to the west and northeast of the current project area (Roscoe et al. 2012, Verwayen 2005). No known cultural resources are recorded in the area proposed for subdivision; however, four Native American archaeological sites, an archaeologically sensitive area and an historic period barn and residence are located within ½ mile of the project area.

Ethno-geographic information for the specific project location is sparse. Research indicated that the Wiyot's ancestral area included what is today Fortuna and extended south to Alton. The closest Wiyot village was known to be situated at the mouth of Strongs Creek along the Eel River, well outside of the project area (Loud 1918).

A pedestrian field survey was completed for the entire project area on April 30, 2019 by Registered Professional Archaeologist (RPA), William Rich, M.A. Survey conditions were adequate with sunny weather and numerous exposures of mineral soil throughout the survey area. One piece of flaked stone debitage was identified in exposed sediments along the edge of the upper terrace in the southeast quadrant of the project area. Through an intensive survey with a shovel and examination of each rodent tailing, the artifact was determined to be isolated. This author suspects the find is associated with a potential travel corridor from the confluence of Jameson Creek and Strongs Creek. The artifact was recorded on California Department of Parks and Recreation Primary Record forms (DPR 523 series) and incorporated in this report. Despite good surface visibility and a thorough search of the area, the flake fragment was not associated with any other artifacts, features or sites.

It is the opinion of WRA that the background research and field survey methods were adequately matched to identify archaeological or other cultural resources at this project location. This report concludes that no significant archaeological or historic period resources, that for the purposes of CEQA would be considered an historical resource, exist in the limits of the proposed subdivision area. At this time, no further archaeological studies are recommended for the project, as it is currently proposed. Consultation between the City of Fortuna and the local Tribes representing Wiyot people should; however, continue and the findings of this report be made available.

It appears relatively unlikely that significant buried archaeological materials will be unearthed during project implementation. This report does, however suggest that protocol to stop work in the event of a discovery be conditioned as part of the permitting process. Suggested protocol for such a discovery is provided later in this report.

## 2.0 PROJECT DESCRIPTION AND SURVEY AREA SETTING

The proposed subdivision project is located at Humboldt County an affects Assessor's Parcel Numbers (APNs) 202-082-005, 202-121-002, in Fortuna, Humboldt County, California. They are situated between Kenmar Road and Fortuna Boulevard. An easement through city owned APN 202-082-004, will provide access to the project parcels. Specifically, the project is located in Township 2 North, Range 1 West, Sections 1 and 2 (Humboldt B&M), and are shown on the accompanying 7.5 USGS Topographic Quadrangle Map, Fortuna, California 1959 (Photo Revised 1972) (Figure 1).

The combined acreage of the three parcels is approximately 18 acres. The parcels are situated in an open, grassy pastoral setting which is currently unoccupied. The land contains generally flat topography bounded by an incised channel of Strongs Creek to the north, the end of a terrace to the south east, and is split by Jameson Creek. Generally, this land is covered with grass and a dense willow riparian area along the creek corridors. The land is currently used for stock grazing. The western portion of the project area had once been used for a fruit orchard.

**Project Description**

The proposed project is a Planned Unit Development (PUD) to include the installation of utilities, road ways and drainage installation, and the construction of the new living units (Figure 2) (Appendix A).

The purpose of this proposed project is to construct 59 units that will house senior residents. The residences will be developed as 2-bedroom, 1.5 bathroom with a garage. The main access to the PUD will be from Redwood Way. A new road will be installed to connect the PUD to Redwood Way on the northern edge of the project area. The interior development will include three cul-de-sacs and access across Jameson Creek to a looped road. An additional all-weather road will be provided from St. Joseph Way for emergency access by the fire department. The final development will be built out with a 20-foot-wide road with a 4-foot-wide sidewalk. Parking will be in designated areas adjacent to the road or in driveways. Access to the western parcel will be provided by installation of a bridge(s) which will allow two-way traffic over the creek.

Installation of utilities includes water, sewer, and power lines to service each new residence. The sewer system will require the use of two pump stations to transfer the waste to the City's sewer system located on Redwood Way. The water system will be connected to the City's water main in Redwood Way to the west of the development and on St. Joseph Way. Initial sizing and estimation of the layout of these systems are included and based on the City of Fortuna waste management models. Drainage for the project will be designed in conformance with Humboldt County Low Impact Development Manual requirements. The use of self-retaining areas to retain and infiltrate drainage water will be utilized in the open space areas associated with the development.

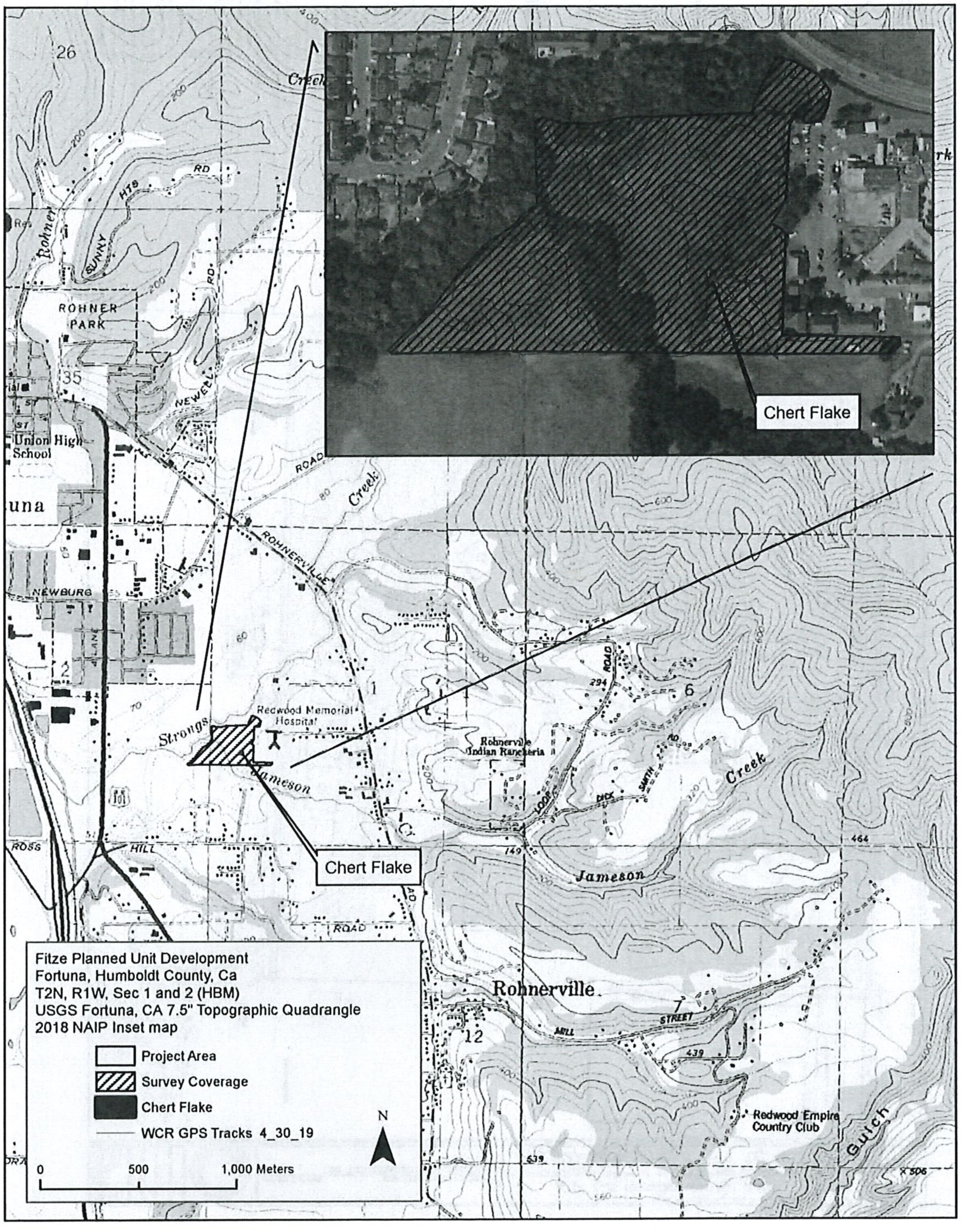


**Figure 1. Project location and survey coverage map.**

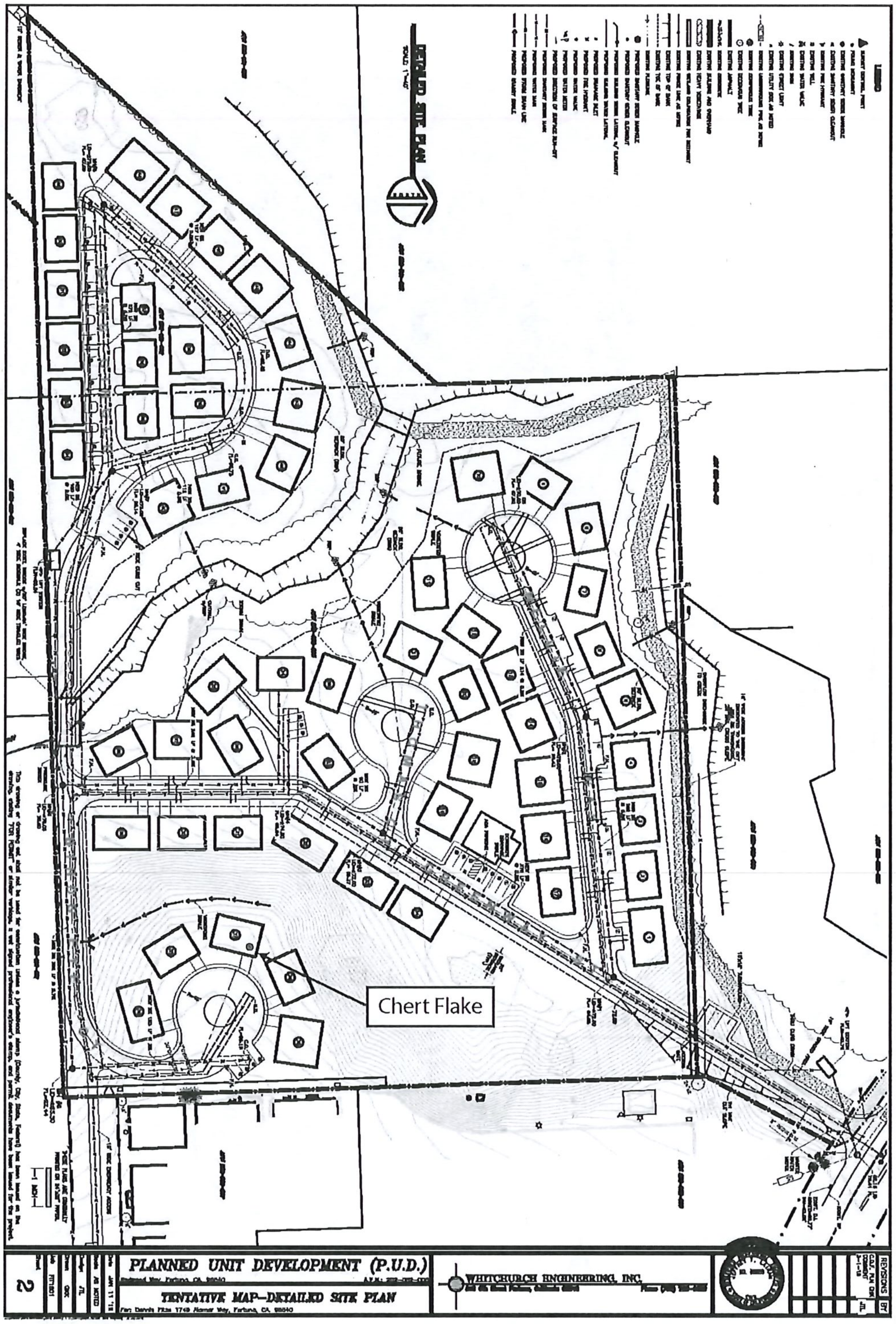


**Figure 2. Project plan with location of isolated chert flake shown.**

# 3.0 Regulatory Framework

## 3.1 California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires a Lead Agency to consider the possible adverse effects a project could have to historical resources (Public Resources Code (PRC) Sections 21084 and 21084.1). CEQA's intent ensures that government decision makers consider the potential significant environmental effects of proposed projects before taking action. CEQA applies to all discretionary projects and equates a substantial adverse change in the significance of a historical resource with a significant effect on the environment (PRC 21084.1). The Lead Agency is responsible for determining whether adverse change will occur and whether it can be mitigated to a level considered less than significant. Where evidence indicates that a significant adverse effect will occur, the Lead Agency shall prepare an Environmental Impact Report which discusses the potential impacts and feasible means of avoiding or reducing it. Where adverse effects can be mitigated to a level of insignificant through changes in the project or other requirements, a mitigated negative declaration can be prepared.

Section 15064.5(a) of the CEQA Guidelines defines "historical resource" as the following:

> *(1) A resource listed in or determined to be eligible for listing in, the California Register of Historical Resources*
>
> *(2) A resource included in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code, or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Lead agencies must treat any such resource as significant unless a preponderance of the evidence demonstrates otherwise*
>
> *(3) Any object, building, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (PRC 5024.1, Title 14 CCR, Section 4852) including the following:*
>
> > *(A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;*
> > *(B) Is associated with the lives of persons important in our past;*
> > *(C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or*

*(D) Has yielded, or may be likely to yield, information important in prehistory or history.*

*(4) The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources, or identified in an historical resources survey does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1."*

Based on Section 15064.5(b)(2), a project would have a significant adverse effect on historic resources if the project causes a substantial adverse change in the significance of a historical resource. This includes demolishing or altering the physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources or a local historic register, or by disturbing any human remains including those interred outside of formal cemeteries.

Section 15064.5(c) applies to effects on archaeological sites as follows:

*(1) When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource, as defined in subsection (a).*

*(2) If a lead agency determines that the archaeological site is an historical resource, it shall refer to the provisions of this section and Section 15126.4 of the Guidelines.*

In addition, the CEQA Guidelines (Section 15064.5(c) (3), and (4)) provide tests for significance for archaeological resources, as summarized below:

*(1) If the site does not meet the criteria [for a historical resource] (a), but does meet the definition of a unique archaeological resource in Section 21083.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of section 21083.2.*

*(2) If an archaeological resource is neither a unique archaeological nor an historical resource,the effects of the project on those resources shall not be considered a significant effect on the environment.*

In addition to meeting one or more of the above criteria, the resources must be at least 50 years of age. A resource less than 50 years of age may qualify if it is exceptionally important to understanding our more recent history.

# 4.0 Cultural Setting

## 4.1 Archaeological Setting and Culture Chronology

Archaeological research in the north coast region of California has shown evidence of Native American occupation over the last 8,000 years. Archaeological assemblages in the Humboldt Bay region have been generally divided into three time periods, which seemed to be linked with climatic and population changes (Hughes 1978, Hildebrandt and Swensen 1985, Hildebrandt and Hayes 1983, Levulett and Hildebrandt 1987, Hildebrandt and Roscoe 2003). The early period assemblages have been documented on the ridgelines east of Humboldt Bay and at a coastal terrace overlooking Little River, north of the project area (Hildebrandt and Hayes 1983, 1984, Roscoe 1995). Archaeological sites associated with middle period assemblages have been located in the coastal hills adjacent to Humboldt Bay and at bay margin sites in Arcata (Eidsness 1993). Late period cultures have been investigated at habitation sites on Indian Island in Humboldt Bay (Loud 1918). Provided below is a summary of the major environmental and archaeological trends for this region.

### 4.1.1 Prehistoric Archaeology

***Lower Archaic (8,000 to 3,000 B.P.)***

The Borax Lake Pattern is the oldest assemblage known for this region. The assemblage is thought to represent hunting and gathering by small, highly mobile family groups, and defines the earliest known prehistoric occupation, known as the Lower Archaic period. Provisional dates of 8,000 to 3,000 years B.P. have been assigned to the Borax Lake Pattern sites distributed from Sonoma to Humboldt County.

Archaeological investigations at Pilot Ridge-South Fork Mountain located approximately 20 miles east of Eureka, revealed archaeological sites with Borax Lake assemblages that were dated to 7120 +/- 50 radiocarbon years (Hildebrandt and Hayes 1983, 1984). This is one of the earliest archaeological deposits that has been dated in the North Coast region. Artifacts diagnostic of the Borax Lake Pattern have also been identified in the coastal setting of Dows Prairie, 15 miles north of Eureka (Roscoe 1995). The Borax Lake Pattern assemblage generally consists of relatively large Borax Lake Widestem projectile points (typically made of locally available chert), handstones and millingslabs, and ovoid and dome scrapers. Borax Lake Pattern sites typically contain a similar array of artifact types, implying each served as a base camp where similar activities took place, and a lack of specialization. Obsidian is poorly represented; suggesting exchange networks with obsidian rich areas (southern North Coast Ranges, northeast California) were not established. This adaptive pattern corresponded to a significant warming trend that followed the Ice Age, when higher elevations could have been occupied for a longer portion of the year. Palynological studies demonstrated that the upland environments within the South Fork Mountain area had been affected by a mid-Holocene warm period with the result of an upward migration of the oak woodland environment (Hildebrandt and Hayes 1983).

### *Middle Archaic Period (5,000 to 2,500 B.P.)*

The Middle Period is represented by the Mendocino Pattern as proposed by Hildebrandt and Hayes (1983, 1984) based on their research at Pilot Ridge and South Fork Mountain and Bickel (1979) with her work in the Bald Hills of Redwood National Park. This adaptive pattern was oriented towards use of low elevation villages, located along salmon bearing streams near acorn crops and occupied by larger concentrations of people during the winter months. Compared to the earlier Borax Lake Pattern, this adaption is hypothetically linked to the advent of storage facilities, particularly for fish and acorns to feed the population during the lean winter months. It represents an adaptive shift wherein resources were moved to the people, resulting in a variety of functionally different site types that reflect more specialized activities (Binford 1980). This shift coincided with a significant cooling trend, the Neo-glacial, beginning ca. 3300 years ago, which particularly affected the resource base of interior northwest California. The variety and productivity of upland resources declined; whereas annual salmon runs were more productive and reliable in local rivers. Archaeologically, Mendocino Pattern sites are marked by a greater reliance on mortars and pestles (associated with acorn processing) over millingslabs and handstones and greater variety of generally smaller projectile point forms.

Middle Period components excavated at high elevation sits on South Fork Mountain implied specialized activities, including the establishment of native burning practices to maintain open prairies as implied by Palynological dates (Hildebrandt and Hayes 1983). Hildebrandt and Hayes (1983) noted that Mendocino Pattern components at lower elevations in interior northwest California contained a diversity of artifacts including bowl mortars, pestles, non-utilitarian items, and well-developed middens. Initial use of coastal resources is evident by Mendocino Pattern components investigated at sites located at the mouth of the Mattole River (Levulett and Hildebrandt 1987). Mendocino Pattern time markers and obsidian hydration data support the finding of a Middle Period component on the northern margin of Humboldt Bay at the Arcata Sports Complex Site (Eidsness 1993).

### *Upper Archaic Period (2,500 to 1,100 B.P.)*

The artifacts and assemblages of this period generally represent a continuation of the patterns from the Middle Archaic Period. Sites dating to this time are found throughout the central North Coast Ranges in moderate density. Large side- and corner-notched projectile points continue to occur. Medium-to-large, shouldered, lanceolate points appear. Leaf shaped points are also present. Mano-metate grinding technology is replaced by bowl mortars and pestles, indicating initial development and elaboration of the "acorn complex" (Basgall 1987). Bone tools such as fishing equipment are present. In general, cultural components are rich in cultural materials; artifact numbers become greater, artifact categories become broader, and tool kit variability higher. Obsidian develops into the preferred material for tool making in many parts of the central North Coast Ranges, often manifested by an elaborate obsidian biface reworking industry. This is seen as reflecting greater complexity of exchange systems, characterized by occurrence of regular, sustained exchange between social groups. During the Early Late Holocene, non-utilitarian features and artifacts (e.g., beads, pendants, and rock art) begin to appear in numbers. In particular, shell beads become an important grave good artifact, and may be indicators of sustained exchange and social status differentiation. During this period, the growth of sociopolitical complexity is evidenced by apparent development of status distinctions based upon wealth, and emergence of group-oriented religions (Hildebrandt and Hayes 1983).

***Late or Emergent Period (1,100 to 150 B.P.)***

The Late Period in north-coastal California exemplifies some of the most socially complex hunter-gather populations who relied heavily on marine and/or riverine resources (Loud 1918, Kroeber 1925, Fredrickson 1984). The Tuluwat Pattern (previously called the Gunther Pattern) characterizes the Late Period adaptation in north-coastal California. The Tuluwat Pattern dates from ca. 1100 years B.P. to historic contact, and characterizes the material culture of north-coast tribes such as the Tolowa, Yurok and Wiyot. This Late Period assemblage was first described by Loud (1918) based on archaeological data from Gunther Island at the ancestral village of Tuluwat in Humboldt Bay. The assemblage comprises several specialized tool kits intended for a variety of subsistence activities, including sea and terrestrial mammal hunting, fishing, and vegetal resource procurement and storage. Significant traits include a well-developed wood-working technology, riverine fishing specialization, wealth consciousness, and distinctive artifact types including zoomorphs, large obsidian ceremonial blades, antler spoons, steatite bowls and pipes, and small distinctive barbed, Tuluwat Series projectile points. Populations were concentrated in permanent villages situated around the coast and adjacent to the major rivers. This adaptation is similar to, but a more refined and specialized form, of the preceding Mendocino Pattern adaptation. Exchange networks had become regularized in the Late Period. Trade is documented both archaeologically (Hughes 1978, Levulett and Hildebrandt 1987) and ethnographically (Powers 1877, Loud 1918, Kroeber 1925, Nomland 1935), with exchange relationships reaching north to Vancouver Island for dentalium shells, east to the Warner Mountains and Medicine Lake Highlands for obsidian, and south to the San Francisco Bay region for clam shell disc beads.

A blending of adaptive traits employed by Late Period populations of interior northwest California, referred to as the Tuluwat/Augustine Pattern, is described above. Focused in California's Central Valley, the Augustine Pattern adaptation is distinguished by an emphasis on hunting, fishing and reliance on acorns as a staple food source. Tuluwat/Augustine Pattern assemblages identified in the upper Redwood Creek drainage in Redwood National Park a variety of small barbed and notched stone arrow points, and hopper mortar slabs and pestles (Hayes et al. 1985).

### 4.2 Ethnographic Background

The Wiyot tribe traditionally held the lower Eel River and its surroundings. Their territory extended upriver to approximately the site of today's Alton. No villages are shown in the vicinity of the project area. The closest was tswokërok, which was situated just south of the mouth of Strong's Creek. This location is about one mile away from the project (Loud 1918). A brief review of John P. Harrington's rehearing of Loud's place names did not reveal any additional information about the Wiyot presence in the specific project area.

### 4.3 HISTORIC PERIOD BACKGROUND by Jerry Rohde, M.A.

The early settlers who began arriving in the early 1850s found a gently sloping benchland that rose southward from the drainage of Strong's Creek to bluffs that overlooked the valleys of the Eel and Van Duzen. The land lay safely above the floodplains of the rivers, yet held much of the fertility of the rich bottomlands below the bluffs. Eastward were mountains thick with timber that offered a source of lumber.

According to one vivid account of the area, "in the early 1850s, land claims were being taken up by bold young men from the East seeking their fortunes in California." It is uncertain which "bold young man" first claimed land in the locale, but (according to his biography at least), it was Benjamin T. Jameson who, in 1851, "bu ilt the first house ever erected" in Rohnerville (Anonymous 1891:671). In September of that year the Redick McKee party passed through the area, providing the first recorded account of the developing community. They found:

> a high table prairie, exceedingly fertile, watered with springs, and well timbered. Here quite a settlement had been made; a number of houses built, or in the course of construction, and a considerable quantity of land enclosed, and under cultivation. Some crops of potatoes, planted late in the season, looked well; others were in bloom, or even just out of the ground; but the owners seemed to have no fear of their not reaching maturity. We were informed that rain had fallen occasionally during the summer, and that the same was the case last year; and the appearance of the vegetation indicated its frequency, as compared with the valley of the Sacramento (Heizer 1972:126).

When government surveyors mapped the area between 1853 and 1857 they noted, in addition to several dwellings, fields belonging to Jamison, Borden, Lieurence, Lyell, and Fish that covered various parts of the benchland, along with a trail that approximated the later course of Rohnerville Road. Among these properties, at least one appears to have been near the project area. This is "Borden's Ho[use] and field," which was located on the line between sections 11 and 12, approximately 250 yards north of the center section line (Surveyor General 1876) (Figure 3). If this rendering is accurate relative to today's maps, this would place Borden's property about 300 yards northwest of the intersection of Ross Hill Road with Cypress Lane, said intersection representing the southwestern edge of the project area (United States Geological Survey 2009). Another property, "Showers House," is mapped approximately one-quarter mile north of the project area, while "Jamison's f[ie]l[d]" is shown about one-half mile to the south. Jamison's House, reputedly the first in the area, lay a little more than one-half mile to the southeast.

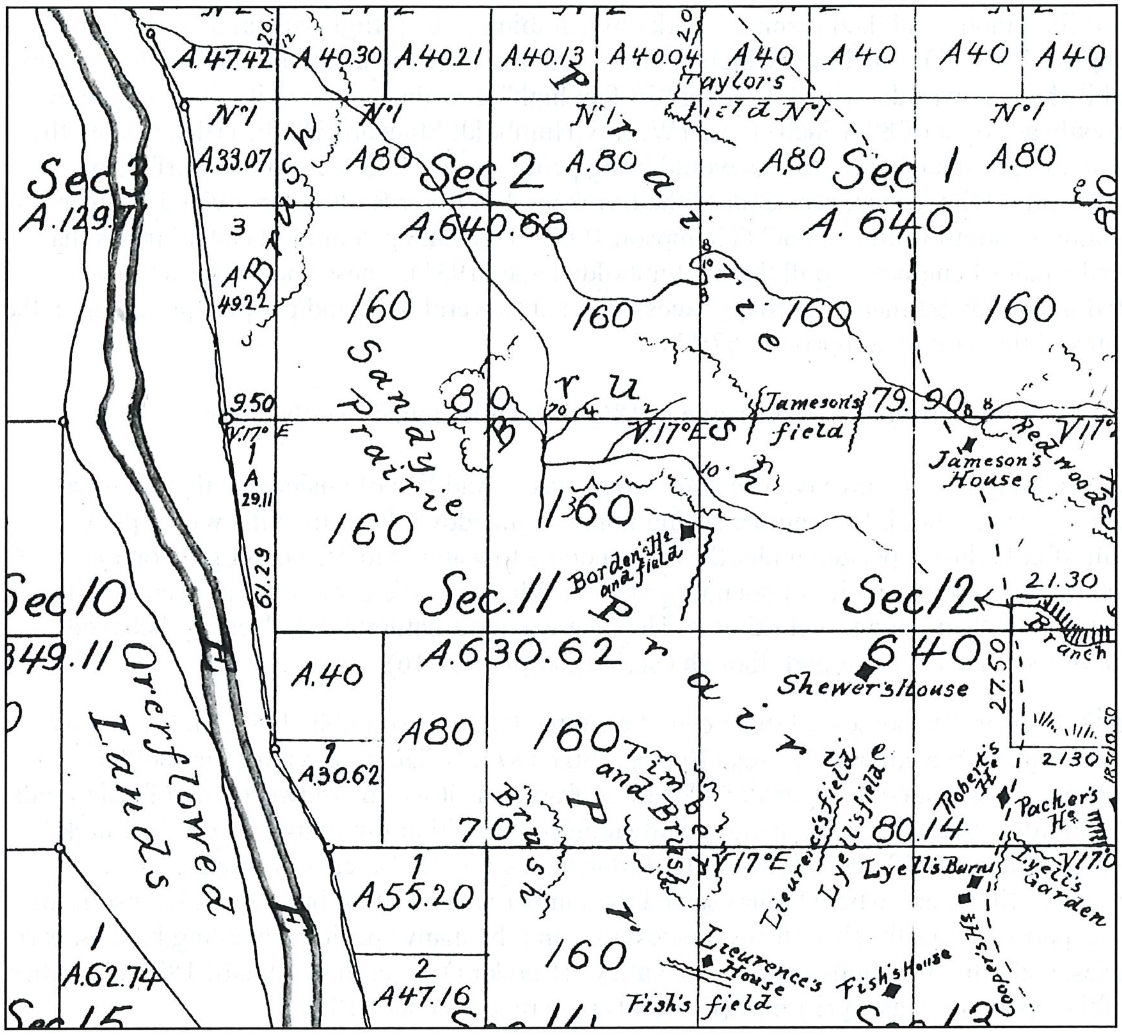


**Figure 3. Surveyor General Map 1876 for Township 2N, R1W showing project location in the NW ¼ of the SE ¼, Section 1, Humboldt Base Meridian.**

By the 1860s, the area "on both sides of what is now Rohnerville Road and Main Street, as far as the eyes could see westward to the Eel River were fields of hay and grain" (Thompson 1967:11). The community gained a post office, which was unimaginatively called Eel River (Turner 1993:71), but soon another name became prominent. It was that of Swiss immigrant Henry Rohner, who in 1856 (Van Kirk, n.d.:1) opened the first business in the area, a store that was located just southeast of the corner of today's First Street and Rohnerville Road (Fountain 2001:(128)42).

After a time, an attraction developed west of town, where Al Campton built Campton Park. It featured "a handmade merry-go-round with horses, swings, a small animal zoo, flower beds and a bubbling fountain [which] made this the favorite recreation area for families to spend the day"

(Thompson 1964:7). A picnic area and large pavilion were also part of the park, and at the latter couples would waltz to the tunes of Ambrose's band. Out-of-towners could arrive by train at Rohnerville Station and then reach the park "by climbing a steep flight of stairs up the bluff" (Thompson 1967:11). The bluff, which in later days was to be crenellated by the roofs of a row of mobile homes, was described as being "70 feet high" near the depot, while the stairs were supposedly a "flight of 80 8-inch steps,"(Weekly Humboldt Standard 1890:3) (this despite the fact that a flight of such dimensions would bring people only 53.33 feet up the bluff.) For special events, John Vance, president of the Eureka & Eel River Railroad, provided "flatcars to bring families south from Eureka" (Thompson 1967:11), creating "double-header" trains that required a pair of engines to pull them (Humboldt Times 1931). These special excursions resulted in crowds estimated (perhaps excessively) at "several thousand people" partaking in the pleasures of the park (Thompson 1967:11).

Charles Carr, who arrived in Rohnerville in 1869 as a child, found that the town

> was coming into its heyday. The main street was a solid line of businesses then....As a youngster in school, I remember seeing miners come down from the hills with a poke full of gold dust. I peeked under the saloon doors to watch 'em weigh out gold on the bar scales, and trade it in for spending money. What with the gambling that went on, it didn't take them long to get rid of it. They were a good-natural [*sic*], decently behaved lot of men, for the most part, though (Schwarzkopf 1949:16).

By 1877, Rohnerville possessed three churches, three lodges, two public halls, and "the only mile race track in the county" (Eureka Evening Star 1877:2). The following year another newspaper article lauded Rohnerville's location, framed as it was by redwoods and fertile fields, concluding that "it thereby commands an advantageous position for an inland town" (Eureka Democratic Standard 1878). The sawmill of Martin, Kellogg & Gates was situated on eponymous Mill Street, where "it has sawed the lumber wherewith to build the town itself, for the most part its beautiful sister town, Hydesville, and the many spacious dwelling houses, barns, granaries, and other buildings that dot the valley" (Eureka Democratic Standard 1878). Another part of the operation was a grist mill (Eureka Democratic Standard 1878).

As the century drew to a close, however, Rohnerville's commercial star began to wane. In May, 1898, one observer noted that "like Hydesville, Rohnerville is now more of a residence place, the business flowing naturally to the line of the railroad, about a mile distant" (Western Watchman 1898).

In 1913 Rohnerville held its last Fourth of July celebration. Then, according to Olive Jessen, "we lost our Rohnerville freight depot and Wells-Fargo agency. Our freight was sent on to the Fortuna depot and the local depot building torn down" (Jessen 1967a:4) The town's decline continued with the death of all-purpose businessman George Patmore in 1914. A year later, Patmore's son consolidated the family business, moving the hardware store and office into the grocery store (Jessen 1967:5). An observer in 1921 recalled the Rohnerville of yesteryears, when "it was on the main highway to the interior and the headquarters of a great horse teaming traffic."

Now he looked out upon "miles of wooden sidewalks that once resounded to the tread of bustling throngs [and] have now grown very rickety" (Fountain 2001:(126)341).

The construction of a county airport was part of a sort of Rohnerville Renaissance stimulated by the post-World-War-II housing boom. Accordingly, "mill owners, logging operators, truckers, their employes [*sic*] and families moved down from the Northwest" (Genzoli 1951) with many of them landing in Rohnerville. In January, 1948, the Campton Heights subdivision opened. By 1950 it contained 35 houses and by 1963 it had 350 (Genzoli 1951). The subdivision, which lay near the bluffs above the Eel, brought most of Rohnerville's business district with it. By 1964 the old "downtown" had only six businesses left, while over to the west, Campton Heights claimed nine establishments, along with eight churches and a mobile home park (Genzoli 1951).

## 5.0 Methods and Results

### 5.1 Pre-field Research

Background archival research was aimed at obtaining information pertinent to the prehistoric and historical uses of the general vicinity. Historic research included an examination of historical maps, records and published documents at the Humboldt County Historical Society and the Humboldt State University Library, as well as, other local repositories.

### 5.1.1 Northwest Information Center Records Search

The background archival research for the survey also included a records search at the California Historical Resources Information System's Northwest Information Center (NWIC) in Rohnert Park, CA. The records search of the project area was requested by Liz Shorey, from the City of Fortuna's Community Development Department and results were received on April 18, 2019 (NWIC File No, 18-1979) (Appendix B). In addition, WRA searched our files and incorporated other known surveys and resources, that are not yet filed at the NWIC.

Also searched at the NWIC were files on the Humboldt County National Register of Historic Places-Listed Properties and Determined Eligible Properties, California Register of Historical Resources, California Points of Historical Interest, California Inventory of Historical Resources, and the listing of the California Historical Landmarks.

The records search revealed that a portion of the project area (APN 202-121-002) has been included in a previous cultural resources survey by Gorrell (1976) for the Rohnerville Sewage System (Appendix B). According to WRA files, a survey was also completed on parcels immediately to the west of the project area for a wetland mitigation project in 2012 by Roscoe et al. One additional prior survey for a fisheries restoration project along Strongs Creek is known to the northeast (Table 1).

**Table 1. Cultural resources surveys in the project area and ½ mile buffer.**

| Survey # | Title of Report: | Author/Date |
|---|---|---|
| 275 | An Archaeological Survey of the Proposed Sewage System Area for the Town of Rohnerville, Humboldt County, California | Gorrell, B., 1976 |
| 24995 | A Cultural Resources Investigation of the Strongs Creek Salmonid Habitat Restoration Project Phase I | Verwayen, D., 2005 |
| No S# | A Cultural Resources Investigation for the East Littlefield and Strongs Creek Plaza | Roscoe J., Rich W. and Rohde, J., 2012 |

The NWIC and WRA files indicate that no archaeological or historical sites are known in the project area. A previously recorded historic period barn and residence were recorded south of the project area on an adjacent parcel (Roscoe et al. 2012), and Native American archaeological sites CA-HUM-137,-138,-140, -318 are recorded south of the project area, with the closest CA-HUM-140, approximately ¼ mile from the current project area (Table 2). The site was originally recorded by W.H. Kinsey in 1949 and described as a location containing surface scatter of flakestone and groundstone artifacts situated on "a small hill and the level area below this hill". Gorrell (1976) attempted to re-identify CA-HUM-140, and reported that the location was surveyed but could not be found due to "housing construction in the area, or possibly due to inaccuracies in the records."

As a result of the Roscoe et al. (2012) survey an area measuring 50 meters by 20 meters (approximately 0.3 acres), was identified as sensitive for potential buried archaeological resources associated with CA-HUM-140. This location is situated in a shallow topographic saddle, ¼ mile from the proposed project area.

**Table 2. Previously archaeological sites documented in or within ½ mile of project area.**

| Site #: | Description of Site: | Recorder/Date: | Distance from project area: |
|---|---|---|---|
| CA-HUM-137 | Lithic scatter | Kinsey, W.H., (likely 1949) | More than 2000 feet south |
| CA-HUM-138 | Groundstone, lithic scatter, formed tools; According to recorder " May be part of HUM-137" | Kinsey, W.H., (likely 1949) | More than 150 meters |
| CA-HUM-140 | Lithic scatter | Damon, L. 1976 | 1,500 feet to the south east |
| CA-HUM-318 | Lithic scatter | Origer, T. 1976 | More than 2000 feet south |
| Not assigned | Historic period barn and residence | Roscoe et al. 2012 | More than 2000 feet south |

### 5.2 Native American Correspondence

The City of Fortuna sent a consultation letter regarding this proposed project to the Bear River Band of the Rohnerville Rancheria and the Wiyot Tribe on December 14, 2018 (Appendix C). On April 29, 2019, WRA sent a letter to the Native American Heritage Commission (NAHC) requesting a search of the Sacred Lands Inventory File. The NAHC responded on May 1, 2019. A follow-up letter was sent to Erika Cooper, THPO for the Bear River Band of the Rohnerville Rancheria and Chairman Ted Hernandez of the Wiyot Tribe on May 6, 2019. The letter described the isolated artifact that was found during the field survey. Ms. Cooper acknowledged receipt of the letter and no further responses were received (Appendix C).

### 5.3 Survey Methods and Results

William Rich, M.A., RPA conducted a pedestrian field survey on April 30, 2019. Survey methods were aided through the use of a shovel to optimize the surveyor's ability to identify archaeological resources. This survey included walking systematic parallel and zig-zag transects, between 30 and 10 meters apart at the greatest, while visually scanning the ground surface for mineral soil exposures and archaeological materials. This was conducted over the entire extent of the proposed project area and some of the stream channels. The total area covered during this investigation included approximately 14 acres (See Figure 1). In areas where vegetation or ground cover obscured visibility of mineral soil, a shovel was used to clear the ground and expose the soil surface (Figures 4 and 5).

**Figure 4. View to the north west of the Jameson Creek channel**

**Figure 5. View to the west of project area and terrace at distance from the confluence of Jameson Creek and Strongs Creek.**

One item of flaked stone debitage was encountered in exposed rodent tailings along the edge and point of a terrace about 30 feet above an alluvial flood plain adjacent to the confluence of Jameson Creek and Strongs Creek. The artifact measures 34 x 22 x 5 mm and is composed of reddish-brown Franciscan chert and is a secondary interior flake fragment from a large core. Despite an abundance of rodent tailings, horse trails and other exposures of mineral sediment at this location, no other artifacts were observed. Although the artifact appears to be isolated, there may be an association with the nearby stream confluence and this terrace edge. The artifact was recorded on standard California Department of Parks and Recreation Primary Forms (DPR 523a) (Appendix D).

## 6.0 CONCLUSIONS

One chert flake fragment was identified in the southeast portion of the survey area and despite an intensive survey no other artifacts were encountered. This isolated artifact does not appear to meet criteria set forth in CEQA (15064.5 (a)) for consideration as an historical resource.

It is the opinion of WRA that the background research and field survey methods employed during this investigation were adequately matched to identify cultural resources at this project location. No archaeological, ethnographic or historic-period sites, artifacts, features or deposits which would, for the purposes of CEQA (15064.5 (a)), be considered an historical resource or unique archaeological resource were identified during the field survey. At this time, no further archaeological studies are recommended for the project, as it is currently proposed. Consultation between the City of Fortuna and the Wiyot area tribes should be continued and the results of this report made available.

### 6.1 PROTOCOLS FOR INADVERTENT DISCOVERIES

Although discovery of cultural resources during the development project is not anticipated, the following pages offer recommendations to follow in this event. These recommendations are designed to ensure that potential project impacts on inadvertently discovered cultural resources are eliminated or reduced to less than significant levels.

**Inadvertent Discovery of Cultural Resources**

If cultural resources are encountered during construction activities, all onsite work shall cease in the immediate area and within a 50-foot buffer of the discovery location. A qualified archaeologist will be retained to evaluate and assess the significance of the discovery, and develop and implement an avoidance or mitigation plan, as appropriate. For discoveries known or likely to be associated with Native American heritage (prehistoric sites and select historic period sites), the Tribal Historic Preservation Officer (THPO) for the Bear River Band of Rohnerville Rancheria and the Chairman of the Wiyot Tribe be contacted immediately to evaluate the discovery and, in consultation with the project proponent, the County, and consulting archaeologist, develop a treatment plan in any instance where significant impacts cannot be avoided. Prehistoric materials which could be encountered include obsidian and chert debitage or formal tools, grinding implements, (e.g., pestles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic archaeological discoveries may include nineteenth century building foundations, structural remains, or concentrations of artifacts made of glass, ceramics, metal or other materials found in buried pits, wells or privies.

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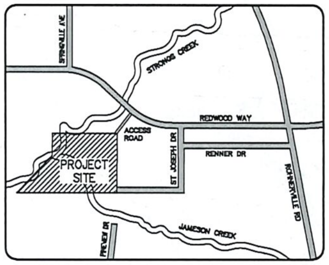
Appendix A
Proposed Project Plans




## LOCATION MAP

NO SCALE

SHEET INDEX

1. LOCATION MAP/OVERALL SITE PLAN
2. DETAILED SITE PLAN
3. EASEMENT MAP
4. PRELIMINARY GRADING & DRAINAGE PLAN

PROJECT DESCRIPTION

59 UNIT PLANNED UNIT DEVELOPMENT.
THIS DEVELOPMENT WILL BE A SENIOR GATED COMMUNITY WITH 59 COTTAGE STYLE STRUCTURE UNITS. EACH UNIT WILL CONSIST OF A 2 BEDROOM, 1.5 BEDROOM RESIDENCE WITH A 1 CAR GARAGE. IMPROVEMENTS FOR THE SITE WILL INCLUDE ACCESS ROADS, UTILITIES TO SERVE EACH PARCEL (WATER, SEWER, GAS AND ELECTRIC). PROPERTY LINES WILL BE ESTABLISHED AT THE WALLS OF THE STRUCTURE AND INCLUDE PATIO AND PORCH AREAS WITHIN EACH PARCEL. THE COMMUNITY WILL HAVE SHARED COMMON AREAS WHICH WILL BE CONNECTED ALONG THE ROADWAYS WITH ACCESSIBLE SIDEWALKS.

BASIS OF BEARING:

1. THE PROPERTY LINES SHOWN HEREIN ARE BASED SOLELY UPON THAT RECORD OF SURVEY RECORDED IN BOOK 8 OF PARCEL MAPS, PAGE 44 OF HUMBOLDT COUNTY SURVEY RECORDS AS PARCEL MAP NO. 698 BASED ON RECORD SURVEY MONUMENTS FOUND IN THE FIELD.
2. BOUNDARY AND EASEMENT INFORMATION INDICATED HEREON IS PER THAT CERTAIN PRELIMINARY TITLE REPORT NUMBER FFHO-0031600145-KP, EFFECTIVE DATE JULY 8, 2016. PREPARED BY FIDELITY NATIONAL TITLE COMPANY OF CALIFORNIA.

APPLICANT INFORMATION:

DENNIS FITZE
1749 ALAMAR WAY
FORTUNA, CA. 95540

MAP PREPARER:

JEFF LAIKAM
WHITCHURCH ENGINEERING
610 9th STREET, FORTUNA, CA. 95540
(707) 725-6926
jtl@whitchurchengineering.com

| APN | EXISTING | PROPOSED | EXISTING ZONING |
|---|---|---|---|
| 202-082-005 | 10.96 ACRES | 47 UNITS | R-1-10 |
| 202-121-002 | 1.87 ACRES | 12 UNITS | R-1-10 |

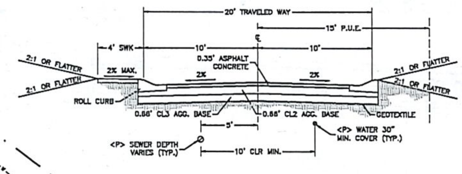
LOT SIZE

MINUS RIPARIAN AREA, SIDEWALKS, DRIVEWAYS, PATIOS, BLDG. FOOTPRINT, AND ROADWAYS
491,531 S.F. (11.3 AC)

| PHASING | AREA (S.F.) | *OPEN SPACE (S.F.) | UNITS |
|---|---|---|---|
| 1 | 189,781 | 98,513 | 17 |
| 2 | 129,572 | 49,919 | 17 |
| 3 | 81,223 | 51,454 | 5 |
| 4 | 159,151 | 71,475 | 20 |

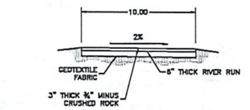
*OPEN SPACE AREAS FOR EACH PHASE TO BE CREATED AS SEPARATE PARCELS

| PUD LOT FOOTPRINTS | SYM. | #UNITS |
|---|---|---|
| 48'x34' | A | 28 |
| 48'x39' | B | 9 |
| 48'x44' | C | 12 |
| 53'x34' | D | 5 |
| 58'x34' | E | 5 |




## A — TYP. 20' WIDE ROAD SECTION

SCALE: 1"=5'

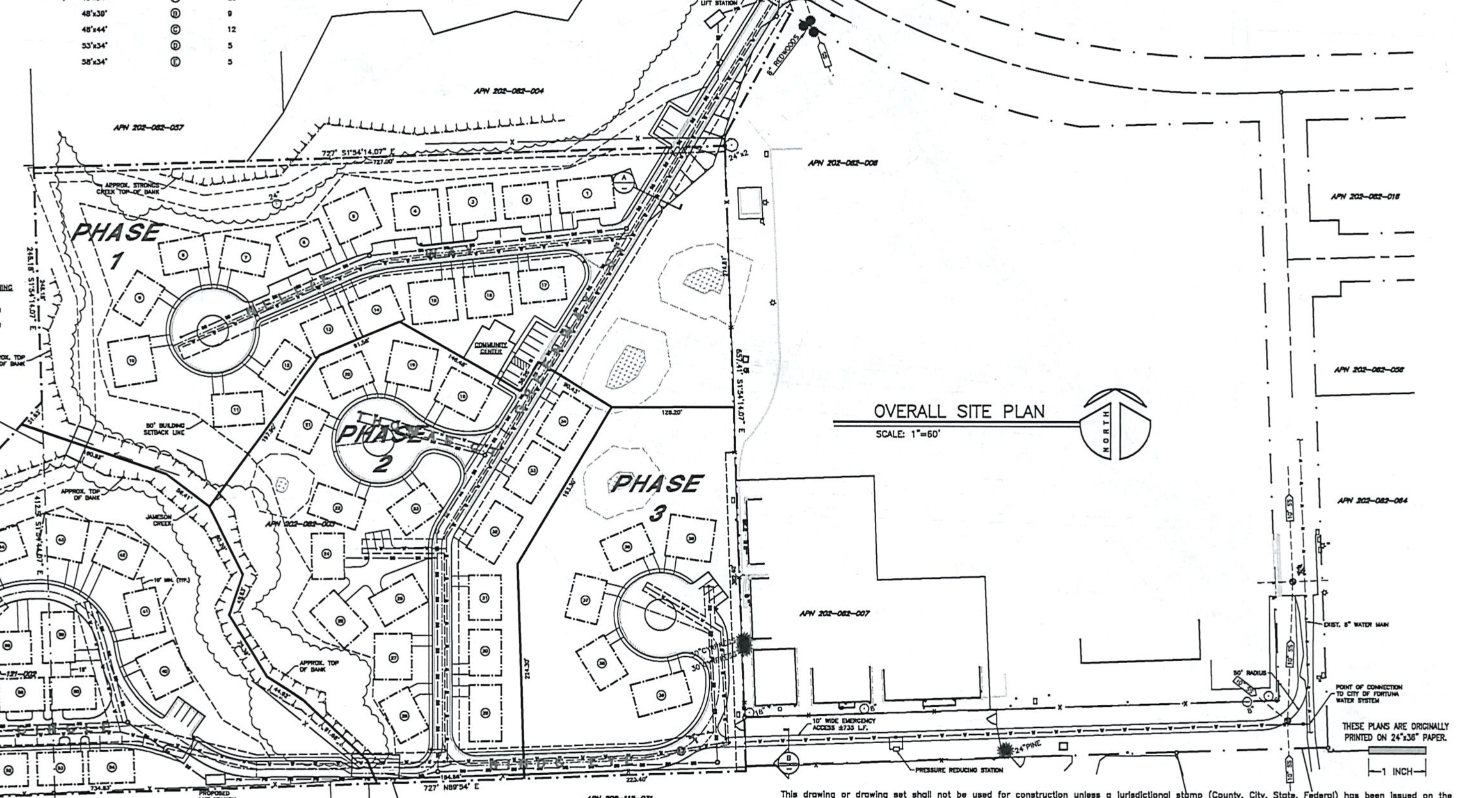



## B — TYP. EMERGENCY ACCESS ROAD

SCALE: 1"=5'

SANITARY SEWER DESIGN CRITERIA

1. THE SANITARY SEWER SYSTEM SHALL BE DESIGNED AND CONSTRUCTED IN CONFORMANCE WITH THE CRITERIA ESTABLISHED BY THE AMERICAN SOCIETY OF CIVIL ENGINEERS IN THE "MANUAL OF ENGINEERING PRACTICES NO. 60, GRAVITY SANITARY SEWER DESIGN AND CONSTRUCTION," AND IN ACCORDANCE WITH THE PLANS, PREPARED BY A REGISTERED CIVIL ENGINEER, AND APPROVED BY THE CITY ENGINEER.
2. THE SANITARY SEWER SYSTEM SHALL BE WITHIN THE ROAD RIGHT-OF-WAY OF CITY STREETS EXCEPT WHERE EASEMENTS ARE NECESSARY TO PROVIDE A GRAVITY FLOW SYSTEM.
3. SANITARY SEWER MAINS:
3.1. MINIMUM DIAMETER – SIX (6) INCHES.
3.2. ALIGNMENT WITH WATER MAINS – SANITARY SEWERS SHALL BE INSTALLED IN ACCORDANCE WITH CALIFORNIA CODE OF REGULATIONS, TITLE 22, SECTION 64572, WATER MAIN SEPARATION.
4. SANITARY SEWER MANHOLES:
4.1. NO MORE THAN 300' APART ON A COMMON MAIN, AND AT ADDITIONAL LOCATIONS SUCH AS CHANGES IN GRADE, PIPE SIZE, OR ALIGNMENT AS REQUIRED BY THE CITY ENGINEER.
4.2. MANHOLE RIM ELEVATIONS SHALL BE LOWER THAN THE TOPS OF ALL CLEANOUTS AT OR UPSTREAM OF THE MANHOLE AND LOWER THAN NEARBY FINISH FLOORS.
4.3. REQUIRED MANHOLE INSIDE DIAMETERS:
4.3.1. 48 " – TO BE USED ON SEWER MAINS LESS THAN 18" DIAMETER AND LESS THAN 8' DEEP FROM FINISHED GRADE.
4.3.2. 60 " – TO BE USED FOR SEWER MAINS GREATER THAN OR EQUAL TO 18" DIAMETER OR GREATER THAN OR EQUAL TO 8' DEEP FROM FINISHED GRADE.
4.4. CHANNELS WITHIN MANHOLES SHALL BE DESIGNED TO ACCOMMODATE BOTH EXISTING AND EXPECTED FUTURE MAINS.
5. SANITARY SEWER LATERALS:
5.1. IF A PROPOSED SANITARY SEWER LATERAL CONNECTION IS GREATER THAN 60 FEET IN LENGTH WITHIN THE PUBLIC RIGHT-OF-WAY, THE MAINLINE SEWER SHALL BE EXTENDED AS REQUIRED BY THE CITY ENGINEER.
6. ADDITIONAL SUBDIVISION REQUIREMENTS:
6.1. AN ADEQUATE SANITARY SEWER SYSTEM, INCLUDING PIPES, MANHOLES, PUMP STATIONS, AND OFFSITE LINES, CONNECTED TO THE SEWER SYSTEM SERVING THE CITY OF FORTUNA SHALL BE INSTALLED IN EACH SUBDIVISION.
6.1. WHERE A SANITARY SEWER MAIN IS CONSTRUCTED OR LAID WITHIN A ROAD RIGHT-OF-WAY, SANITARY SEWER LATERAL LINES SHALL BE INSTALLED TO SERVE EACH LOT IN A SUBDIVISION.
6.2. AN AT-GRADE CLEANOUT SHALL BE INSTALLED AT THE PROPERTY LINE ON EACH SEWER LATERAL CONNECTIO




## OVERALL SITE PLAN

SCALE: 1"=60'

THESE PLANS ARE ORIGINALLY PRINTED ON 24"x36" PAPER.

1 INCH

This drawing or drawing set shall not be used for construction unless a jurisdictional stamp (County, City, State, Federal) has been issued on the drawing, stating "FOR PERMIT" or similar verbiage, a wet signed professional engineer's stamp, and permit documents have been issued for the project.

| REVISIONS | BY |
|---|---|
| C.O.F. PLN CHK COMMENT 3-1-19 | JTL |

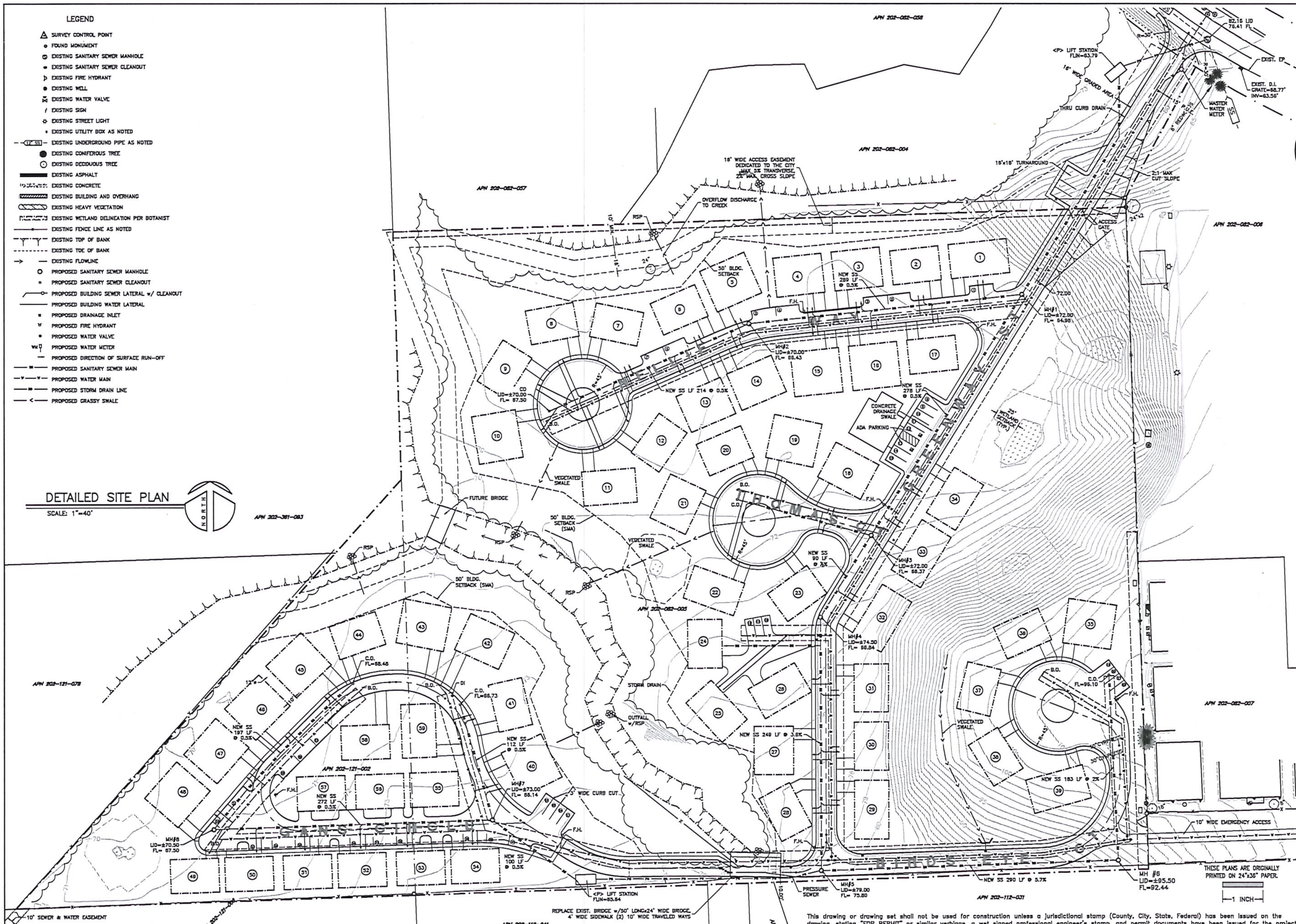
REGISTERED PROFESSIONAL ENGINEER JEFFREY T. LAIKAM NO. 65568 CIVIL STATE OF CALIFORNIA

**WHITCHURCH ENGINEERING, INC.**
610 9th Street Fortuna, California 95540 Phone (707) 725-6926

**PLANNED UNIT DEVELOPMENT (P.U.D.)**
Redwood Way, Fortuna, CA 95540 A.P.N.: 202-082-005

**TENTATIVE MAP-OVERALL SITE PLAN**
For: Dennis Fitze 1749 Alamar Way, Fortuna, CA 95540

| | |
|---|---|
| Date | JAN 11 '19 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | GKK |
| Job | FIT1801 |
| Sheet | 1 |




This drawing or drawing set shall not be used for construction unless a jurisdictional stamp (County, City, State, Federal) has been issued on the drawing, stating "FOR PERMIT" or similar verbiage, a wet signed professional engineer's stamp, and permit documents have been issued for the project.

| REVISIONS | BY |
|---|---|
| C.O.F. PLN CHK COMMENT 3-1-19 | JTL |

**WHITCHURCH ENGINEERING, INC.**
610 9th Street Fortuna, California 95540
Phone (707) 725-6926

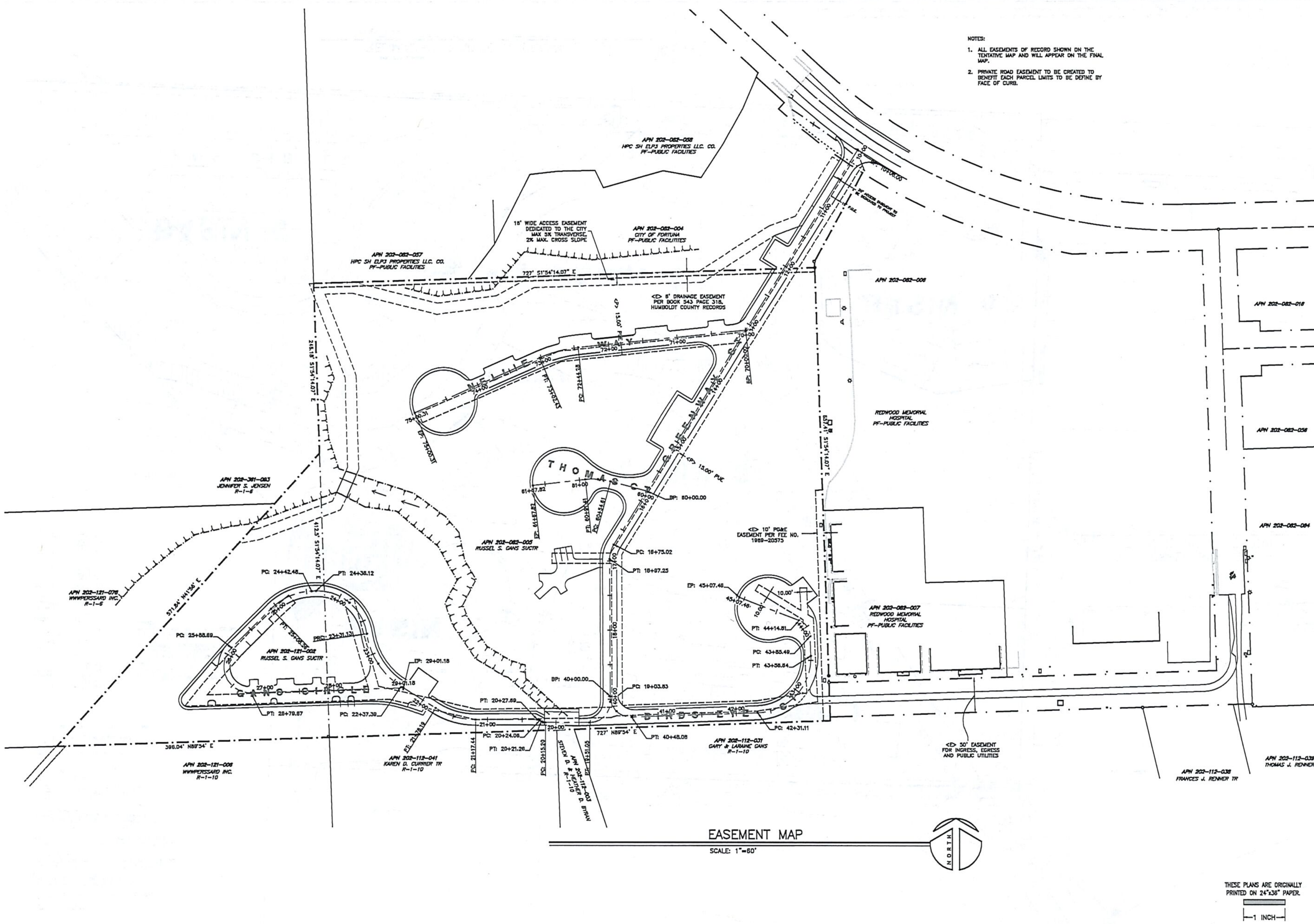
# PLANNED UNIT DEVELOPMENT (P.U.D.)

Redwood Way, Fortuna, CA. 95540 — A.P.N.: 202-082-005

## TENTATIVE MAP-DETAILED SITE PLAN

For: Dennis Fitze 1749 Alamar Way, Fortuna, CA. 95540

| | |
|---|---|
| Date | JAN 11 '19 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | CKK |
| Job | FIT1801 |
| Sheet | 2 |




NOTES:

1. ALL EASEMENTS OF RECORD SHOWN ON THE TENTATIVE MAP AND WILL APPEAR ON THE FINAL MAP.
2. PRIVATE ROAD EASEMENT TO BE CREATED TO BENEFIT EACH PARCEL LIMITS TO BE DEFINE BY FACE OF CURB.

EASEMENT MAP

SCALE: 1"=60'

THESE PLANS ARE ORIGINALLY PRINTED ON 24"x36" PAPER.

1 INCH

This drawing or drawing set shall not be used for construction unless a jurisdictional stamp (County, City, State, Federal) has been issued on the drawing, stating "FOR PERMIT" or similar verbiage, a wet signed professional engineer's stamp, and permit documents have been issued for the project.

| REVISIONS | BY |
|---|---|
| C.O.F. PLN CHK COMMENT 3-1-19 | JTL |

REGISTERED PROFESSIONAL ENGINEER JEFFREY T. LATHAM NO. 66565 CIVIL STATE OF CALIFORNIA

WHITCHURCH ENGINEERING, INC.
610 9th Street Fortuna, California 95540 Phone (707) 725-6926

# PLANNED UNIT DEVELOPMENT (P.U.D.)

Redwood Way, Fortuna, CA 95540 A.P.N.: 202-082-005

## TENTATIVE MAP-EASEMENT MAP

For: Dennis Fitze 1749 Alamar Way, Fortuna, CA 95540

| | |
|---|---|
| Date | JAN 11 '19 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | CKK |
| Job | FIT1801 |
| Sheet | 3 |

GRADING NOTES:

1. PROVIDE 5% SLOPE AWAY FROM ALL FOUNDATIONS.
2. ALL ROOF DRAINS TO BE ROUTED TO DRAINAGE FEATURES OR TIGHTLINED TO STREET.
3. UNITS 29, 30, 31, & 32 WILL HAVE RETAINING WALLS ASSOCIATED WITH THEIR FOUNDATIONS OR TO THE EAST OF THE LOTS.
4. TOPSOIL LAYER AT THE SITE RANGES FROM 18" TO 20" PHASE 1 & 2, 18" PHASE 3, AND 7 TO 13" PHASE 4.
5. PROJECT WILL BE DESIGNED TO MEET HUMBOLDT COUNTY LID REQUIREMENTS. PRELIMINARY DESIGN INDICATES THE FOLLOWING REQUIREMENTS FOR THE PHASES MUST BE MET:

   PHASE 1 (2 DMA'S)
   16,087 $ft^2$ OF SELF RETAINING AREA
   7,887 $ft^2$ OF SOIL QUALITY IMPROVEMENT

   PHASE 2 (2 DMA'S)
   17,185 $ft^2$ OF SELF RETAINING AREA

   PHASE 3
   8,095 $ft^2$ OF SELF RETAINING AREA

   PHASE 4
   17,275 $ft^2$ OF SELF RETAINING AREA

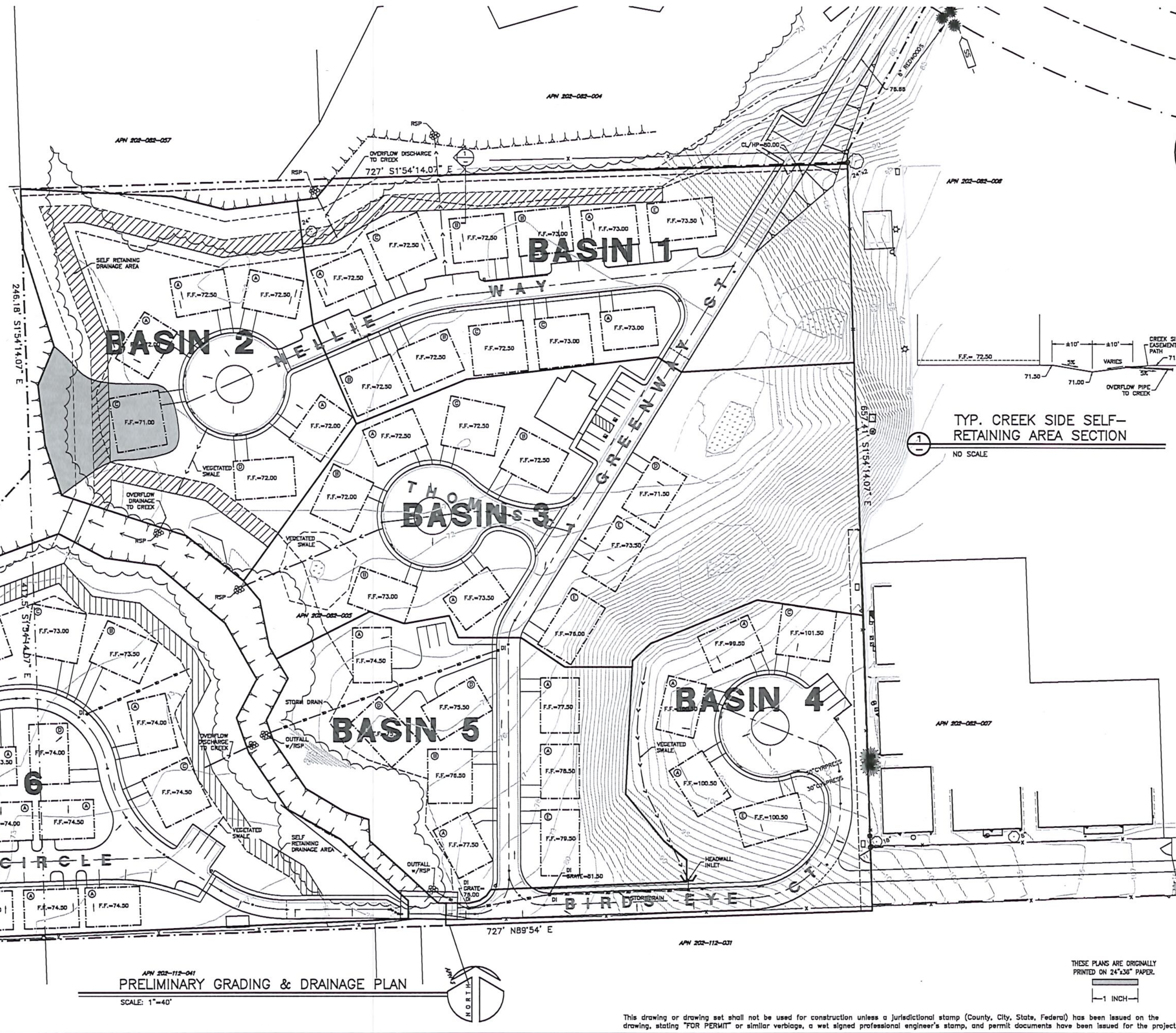
6. NOT ALL SELF RETAINING AREAS ARE SHOWN ON THIS DRAWING.

| | |
|---|---|
| BASIN #1 | 84,077 S.F. |
| ROOF: | 17,952 S.F. |
| ASPHALT: | 12,348 S.F. |
| CONCRETE: | 3,955 S.F. |
| SMA: | 8,440 S.F. |
| BASIN #2 | 71,090 S.F. |
| ROOF: | 7,992 S.F. |
| ASPHALT: | 6,897 S.F. |
| CONCRETE: | 3,291 S.F. |
| SMA: | 30,382 S.F. |
| BASIN #3 | 110,936 S.F. |
| ROOF: | 13,438 S.F. |
| ASPHALT: | 15,897 S.F. |
| CONCRETE: | 4,904 S.F. |
| SMA: | 4,284 S.F. |
| BASIN #4 | 56,877 S.F. |
| ROOF: | 8,160 S.F. |
| ASPHALT: | 16,243 S.F. |
| CONCRETE: | 4,258 S.F. |
| SMA: | 0 |
| BASIN #5 | 52,625 S.F. |
| ROOF: | 13,058 S.F. |
| ASPHALT: | 4,170 S.F. |
| CONCRETE: | 3,007 S.F. |
| SMA: | 13,705 S.F. |
| BASIN #6 | 146,038 S.F. |
| ROOF: | 32,840 S.F. |
| ASPHALT: | 21,828 S.F. |
| CONCRETE: | 3,458 S.F. |
| SMA: | 29,365 S.F. |

–ZONE AE FLOOD PLAIN

NOTE:
BUILDING WITHIN THE FLOOD PLAIN IS ELEVATED ABOVE THE PLAIN. FILL WILL NOT INCREASE FLOOD PLAIN ELEVATION.

SITE SOILS ARE WITHIN THE HYDROLOGIC SOIL GROUP C (USCS SOIL SURVEY)




PRELIMINARY GRADING & DRAINAGE PLAN
SCALE: 1"=40'

THESE PLANS ARE ORIGINALLY PRINTED ON 24"x36" PAPER.
1 INCH

This drawing or drawing set shall not be used for construction unless a jurisdictional stamp (County, City, State, Federal) has been issued on the drawing, stating "FOR PERMIT" or similar verbiage, a wet signed professional engineer's stamp, and permit documents have been issued for the project.

| REVISIONS | BY |
|---|---|
| C.O.F. PLN CHK COMMENT 3-1-19 | JTL |

WHITCHURCH ENGINEERING, INC.
610 9th Street Fortuna, California 95540
Phone (707) 725-6926

PLANNED UNIT DEVELOPMENT (P.U.D.)
Redwood Way, Fortuna, CA. 95540 A.P.N.: 202-082-005
PRELIMINARY GRADING & DRAINAGE PLAN
For: Dennis Fitze 1749 Alamar Way, Fortuna, CA. 95540

| | |
|---|---|
| Date | JAN 11 '19 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | CKK |
| Job | FIT1801 |
| Sheet | 4 |

Appendix B
NWIC Record Search

CALIFORNIA
HISTORICAL
RESOURCES
INFORMATION
SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
DEL NORTE

HUMBOLDT
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO

SAN FRANCISCO
SAN MATEO
SANTA CLATA
SANTA CRUZ
SOLANO
SONOMA
YOLO

**Northwest Information Center**
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://www.sonoma.edu/nwic

April 18, 2019 NWIC File No.: 18-1979

Liz Shorey
City of Fortuna Community Development
PO Box 545
Fortuna, CA 95540

Re: Record search results for the proposed Fitze Planned Unit Development.

Dear Liz Shorey:

Per your request received by our office on 4/15/19, a records search was conducted for the above referenced project by reviewing pertinent Northwest Information Center (NWIC) base maps that reference cultural resources records and reports, historic-period maps, and literature for Humboldt County. Please note that use of the term cultural resources includes both archaeological resources and historical buildings and/or structures.

Review of this information indicates that there has been one archaeological study that covers approximately 50% of the Fitze Planned Unit Development project area, S-000275 (Gorrell 1976). This project area contains no recorded archaeological resources. The State Office of Historic Preservation Historic Property Directory (OHP HPD) (which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places) lists no recorded buildings or structures within or adjacent to the proposed project area. In addition to these inventories, the NWIC base maps show no recorded buildings or structures within the proposed project area.

At the time of Euroamerican contact the Native Americans that lived in the area were speakers of the Wiyot language, part of the Algic stock (Shipley 1978: 90). There are no Native American resources in or adjacent to the proposed project area referenced in the ethnographic literature [Loud 1918; Nomland and Kroeber 1936; Kroeber 1925; Elsasser 1978].

Based on an evaluation of the environmental setting and features associated with known sites, Native American resources in this part of Humboldt County have been found in the foothill to valley floor interface, ridgelines, adjacent to intermittent or perennial watercourses, and in particular concentration near major watercourses such as Eel River. The Fitze Planned Unit Development project area is situated approximately 0.7-mi from the current course of Eel River and contains wetlands, Jameson Creek, and the confluence of Jameson and Strongs Creeks. Given the similarity of one or more of these environmental factors, there is a moderate to high potential for unrecorded Native American resources in the proposed Fitze Planned Unit Development project area.

Review of historical literature and maps gave little indication of the possibility of historic-period activity within the Fitze Planned Unit Development project area. The Belcher Atlas of Humboldt County (1921) depicts the proposed project area as within the lands of "Merkey"; however, outside of landownership, there are no clear indicators of historic-period activity within the proposed project area. With this in mind, there is a low potential for unrecorded historic-period archaeological resources in the proposed Fitze Planned Unit Development project area.

The 1959 USGS Fortuna 15-minute topographic quadrangle fails to depict any buildings or structures within the Fitze Planned Unit Development project area. Therefore, there is a low possibility of identifying any buildings or structures 45 years or older within the project area.

**RECOMMENDATIONS:**

1) There is a moderate to high potential of identifying Native American archaeological resources and a low potential of identifying historic-period archaeological resources in the project area. Considering the incomplete coverage of S-000275, as well as the passage of time since the previous survey (Gorrell 1976) and the changes in archaeological theory and method since that time, we recommend a qualified archaeologist conduct further archival and field study to identify cultural resources. Field study may include, but is not limited to, pedestrian survey, hand auger sampling, shovel test units, or geoarchaeological analyses as well as other common methods used to identify the presence of archaeological resources. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

2) We recommend the lead agency contact the local Native American tribe(s) regarding traditional, cultural, and religious heritage values. For a complete listing of tribes in the vicinity of the project, please contact the Native American Heritage Commission at 916/373-3710.

3) If the proposed project area contains buildings or structures that meet the minimum age requirement, prior to commencement of project activities, it is recommended that this resource be assessed by a professional familiar with the architecture and history of Humboldt County. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

4) Review for possible historic-period buildings or structures has included only those sources listed in the attached bibliography and should not be considered comprehensive.

5) If archaeological resources are encountered **during construction,** work should be temporarily halted in the vicinity of the discovered materials and workers should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources. Native American resources include chert or obsidian flakes, projectile points, mortars, and pestles; and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic-period resources include stone or adobe foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

6) It is recommended that any identified cultural resources be recorded on DPR 523 historic resource recordation forms, available online from the Office of Historic Preservation's website: http://ohp.parks.ca.gov/default.asp?page_id=1069

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the California Historical Resources Information System (CHRIS) Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

Thank you for using our services. Please contact this office if you have any questions, (707) 588-8455.

Sincerely,

Cameron Felt
Researcher

## LITERATURE REVIEWED

In addition to archaeological maps and site records on file at the Northwest Information Center of the Historical Resources Information System, the following literature was reviewed:


Benson, James R., David A. Fredrickson, and Karen C. McGrew
1977 Archaeological Reconnaissance of the Humboldt Bay Area. Anthropology Laboratory, Sonoma State College, Rohnert Park, CA. Northwest Information Center, File No: S-886.

Cook, S.F.
1956 *The Aboriginal Population of the North Coast of California*. University of California Anthropological Records 16(3):81-130. Berkeley and Los Angeles.

Elsasser, Albert B.
1978 Wiyot. In *California*, edited by Robert F. Heizer, pp. 155-163. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Fickewirth, Alvin A.
1992 *California Railroads*. Golden West Books, San Marino, CA.

General Land Office
1857 Survey Plat for Township 2 North/Range 1 West.

1876 Survey Plat for Township 2 North/Range 1 West.

Gorrell, Barbara (The Anthropology Laboratory, California State College, Sonoma)
1976 *An Archaeological Survey of the Proposed Sewage System Area for the Town of Rohnerville, Humboldt County, California*. **NWIC Report S-000275.**

Gudde, Erwin G.
1969 *California Place Names*. Third Edition. University of California Press, Berkeley and Los Angeles.

Hart, James D.
1987 *A Companion to California*. University of California Press, Berkeley and Los Angeles.

Herbert, Rand F., Alan M. Paterson, and Stephen R. Wee
1980 *The Historical Development of Interior Sections of Humboldt and Mendocino Counties*. California-Pacific Research Associates, Davis. Northwest Information Center, File No: S-2541.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, revised by William N.Abeloe
1966 *Historic Spots in California*. Third Edition. Stanford University Press, Stanford, CA.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, William N. Abeloe, revised by Douglas E. Kyle
1990 *Historic Spots in California*. Fourth Edition. Stanford University Press, Stanford, CA.

Hope, Andrew
2005 *Caltrans Statewide Historic Bridge Inventory Update*. Caltrans, Division of Environmental Analysis, Sacramento, CA.

Kroeber, A.L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology, Bulletin 78, Smithsonian Institution, Washington, D.C. (Reprint by Dover Publications, Inc., New York, 1976)

Loud, Llewellyn L.
1918 *Ethnogeography and Archaeology of the Wiyot Territory*. University of California Publications in American Archaeology and Ethnology 14(3):221-436. University of California Press, Berkeley. (Reprint by Kraus Reprint Corp., New York, 1965.)

Myers, William A. (editor)
1977 *Historic Civil Engineering Landmarks of San Francisco and Northern California*. Prepared by The History and Heritage Committee, San Francisco Section, American Society of Civil Engineers. Pacific Gas and Electric Company, San Francisco, CA.

Nomland, Gladys A. and Alfred L. Kroeber
1936 *Wiyot Towns*. University of California Publications in American Archaeology and Ethnology 35(5):39-48. University of California Press, Berkeley. (Reprint by Kraus Reprint Corp., New York, 1965.)

Roberts, George, and Jan Roberts
1988 *Discover Historic California*. Gem Guides Book Co., Pico Rivera, California.

Shipley, William F.
1978 Native Languages of California. In *California*, edited by Robert F. Heizer, pp. 80-90. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

State of California Department of Parks and Recreation
1976 *California Inventory of Historic Resources*. State of California Department of Parks and Recreation, Sacramento.

State of California Department of Parks and Recreation and Office of Historic Preservation

1988 *Five Views: An Ethnic Sites Survey for California*. State of California Department of Parks and Recreation and Office of Historic Preservation, Sacramento.

State of California Office of Historic Preservation **
2012 *Historic Properties Directory*. Listing by City (April 2012). State of California Office of Historic Preservation, Sacramento.

Thornton, Mark V.
1993 An Inventory and Historical Significance Evaluation of CDF Fire Lookout Stations. CDF Archaeological Reports No. 12.

Williams, James C.
1997 *Energy and the Making of Modern California*. The University of Akron Press, Akron, OH.

Woodbridge, Sally B.
1988 *California Architecture: Historic American Buildings Survey*. Chronicle Books, San Francisco, CA.

Works Progress Administration
1984 *The WPA Guide to California*. Reprint by Pantheon Books, New York. (Originally published as California: A Guide to the Golden State in 1939 by Books, Inc., distributed by Hastings House Publishers, New York).

**Note that the Office of Historic Preservation's *Historic Properties Directory* includes National Register, State Registered Landmarks, California Points of Historical Interest, and the California Register of Historical Resources as well as Certified Local Government surveys that have undergone Section 106 review.

Appendix C
Native American Correspondence

Date 12/14/2018

Wiyot Tribe—Table Bluff Reservation
Attn: Thomas Torma, Cultural Director/THPO
1000 Wiyot Drive
Loleta, CA 95551

RE: Redwood Way, Fortuna CA 95540 – Planned Unit Development

Dear Mr. Torma:

The City of Fortuna has received an application for a subdivision of 13.35 acres into 59 residential parcels, located along Redwood Way. A location map of the proposed project is attached. The City of Fortuna is the Lead Agency for the project.

Purpose of Government-to-Government Consultation

The primary purpose of government-to-government consultation, under Assembly Bill (AB) 52, is to ensure that Federally Recognized Tribes are given the opportunity to provide meaningful and timely input regarding proposed project actions that uniquely or significantly affect Tribal Cultural Resources. Tribal Cultural Resources are defined as either (1) "sites, features, places cultural landscapes, sacred places and objects with cultural value to a California Native American tribe" that are included in the state register of historical resources or a local register of historical resources, or that are determined to be eligible for inclusion in the state register; or (2) resources determined by the lead agency, in its discretion, to be significant based on the criteria for listing in the state register.

Consultation Initiation

With this letter, the City of Fortuna is seeking input on concerns that uniquely or significantly affect your Tribe related to this project. Early identification of Tribal concerns will allow the City of Fortuna and the project applicant to avoid and minimize potential impacts to Tribal resources and practices, as project planning and alternatives are developed and refined. We would be pleased to discuss details of the proposed project with you.

## Project Information

The proposed project is a Planned Unit Development (PUD) on Redwood Way in Fortuna, California. The construction and implementation of a PUD involves several components. These components include the installation of utilities, road ways and drainage installation, and the construction of the new living units. The PUD is anticipated to be constructed in four phases.

## Utilities

Installation of utilities includes water, sewer, and power lines to service each new residence. The sewer system will require the use of two pump stations to transfer the waste to the City's sewer system located on Redwood Way. The water system will be connected to the City's water main in Redwood Way to the west of the development and on St. Joseph Way. Initial sizing and estimation of the layout of these systems are included and based on the City of Fortuna SWWM models.

## Roadway

The main access to the PUD will be from Redwood Way. A new road will be installed to connect the PUD to Redwood Way on the northern edge of the parcel. The interior development will include three cul-de-sacs and access across Jameson Creek to a looped road. An additional all-weather road will be provided from St. Joseph Way for emergency access by the fire department. The final development will be built out with a 20-foot-wide road with a 4-foot-wide sidewalk. Parking will be in designated areas adjacent to the road or in driveways. Access to the western parcel will be provided by installation of a bridge(s) which will allow two-way traffic over the creek.

## Drainage

Drainage for the project will be designed in conformance with Humboldt County LID Manual requirements. The use of self-retaining areas to retain and infiltrate drainage water will be utilized in the open space areas associated with the development.

## Residential

The purpose of this proposed project is to construct 59 units that will house senior residents in Fortuna. The residences will be developed as 2-bedroom, 1.5 bathroom with a garage. Each unit will have access to roads per the connected driveway. Refer to the attached documents for Figures 1 through 3 which show a location map, USGS Survey Map, and aerial view.

## Confidentiality

We understand that you may have concerns regarding the confidentiality of information on areas or resources of religious, traditional and cultural importance to the Tribe. We would be happy to discuss these concerns and develop procedures to ensure the confidentiality of such information is maintained.

City of Fortuna - Contact Information

If you wish to provide comments related to this proposed project, or need additional information, please contact me directly at the address above, at **707-725-7600**, or by e-mail at **lshorey@ci.fortuna.ca.us**.

Project Consultation Options Form

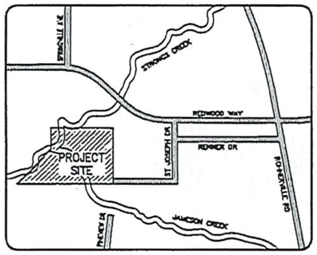
Your timely response will greatly assist us in incorporating your concerns into project planning. We respectfully request that you review the project and return your response within thirty days of your receipt of this correspondence. If you have any questions, please do not hesitate to contact me.

Sincerely,

Liz Shorey

Liz Shorey
Deputy Director of Community Development

Attachments: Location Map
U.S. Geological Survey map
Aerial Photograph.




LOCATION MAP
NO SCALE

PROJECT DESCRIPTION

81 UNIT PLANNED UNIT DEVELOPMENT
THIS DEVELOPMENT WILL BE A SENIOR GATED COMMUNITY WITH 81 COTTAGE STYLE STRUCTURE UNITS. EACH UNIT WILL CONSIST OF A 2 BEDROOM, 1.5 BEDROOM RESIDENCE WITH A 1 CAR GARAGE. IMPROVEMENTS FOR THE SITE WILL INCLUDE ACCESS ROADS, UTILITIES TO SERVE EACH PARCEL (WATER, SEWER, GAS AND ELECTRIC). PROPERTY LINES WILL BE ESTABLISHED AT THE WALLS OF THE STRUCTURE AND INCLUDE PATIO AND PORCH AREAS WITHIN EACH PARCEL. THE COMMUNITY WILL HAVE SHARED COMMON AREAS WHICH WILL BE CONNECTED ALONG THE ROADWAYS WITH ACCESSIBLE SIDEWALKS.

APPLICANT INFORMATION:

DENNIS FITZE
1749 ALAMAR WAY
FORTUNA, CA. 95540

MAP PREPARER:

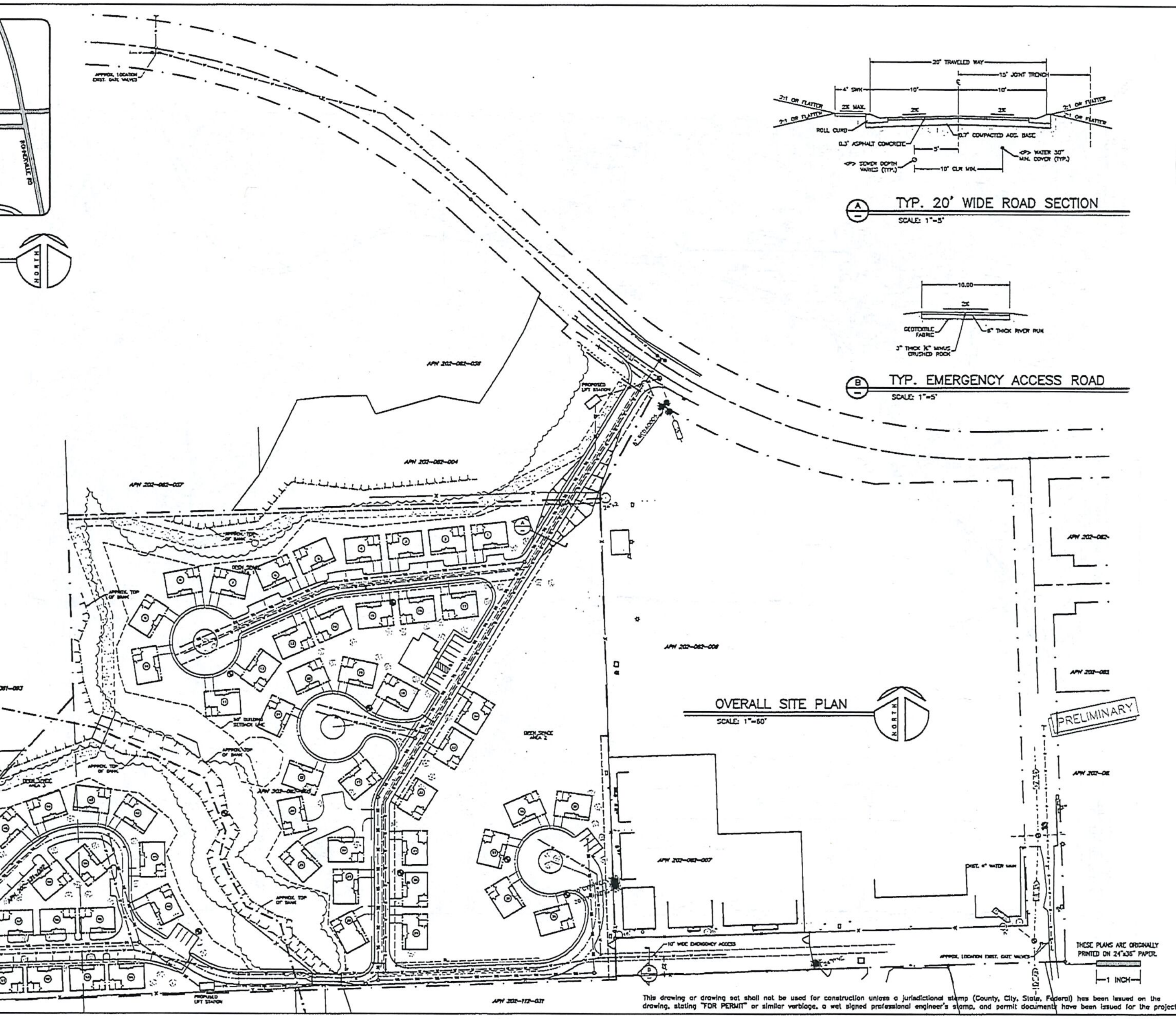
JEFF LAIKAM
WHITCHURCH ENGINEERING
610 9th STREET, FORTUNA, CA. 95540
(707) 725-6926
jl@whitchurchengineering.com

OPEN SPACE

| | |
|---|---|
| AREA 1– | 126,485 S.F. (2.9 AC) |
| AREA 2– | 95,356 S.F. (2.2 AC) |
| AREA 3– | 39,725<br>1,822<br>5,481<br>3,974<br>11,074<br>11,869 |
| CUL-DE-SAC | 2,263 S.F.<br>65,436 S.F. (1.5 AC) |
| TOTAL | 287,277 S.F. (6.6 AC) |

LOT SIZE

MINUS RIPARIAN AREA, SIDEWALKS, DRIVEWAYS, PATIOS, BLDG. FOOTPRINT, AND ROADWAYS
491,531 S.F. (11.3 AC)



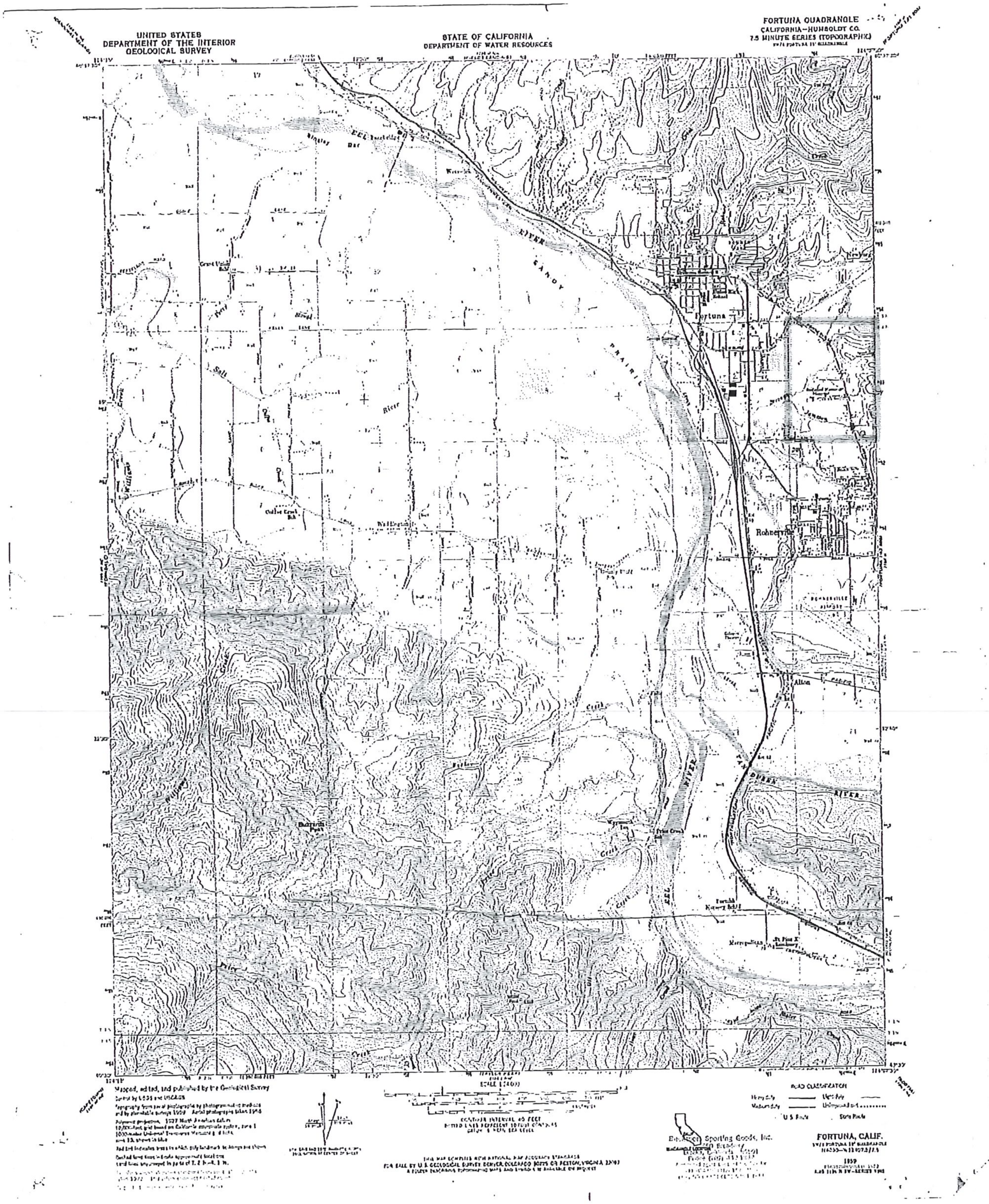

This drawing or drawing set shall not be used for construction unless a jurisdictional stamp (County, City, State, Federal) has been issued on the drawing, stating "FOR PERMIT" or similar verbiage, a wet signed professional engineer's stamp, and permit documents have been issued for the project.

| REVISIONS | BY |
|---|---|
| | |

WHITCHURCH ENGINEERING, INC.
610 9th Street Fortuna, California 95540
Phone (707) 725-6926

PLANNED UNIT DEVELOPMENT (P.U.D.)
Redwood Way, Fortuna, CA 95540
APN: 202-032-005
TENTATIVE MAP–OVERALL SITE PLAN
For: Dennis Fitze 1749 Alamar Way, Fortuna, CA 95540

| | |
|---|---|
| Date | OCT 24 '18 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | CKK |
| Job | FIT1801 |
| Sheet | 1 |


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
FORTUNA QUADRANGLE
CALIFORNIA-HUMBOLDT CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
EEL RIVER
SANDY PRAIRIE
Fortuna
Rohnerville
Alton
Salt River
Mapped, edited, and published by the Geological Survey
CONTOUR INTERVAL 40 FEET
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
ROAD CLASSIFICATION
Heavy duty
Medium duty
Light duty
Unimproved dirt
U.S. Route
State Route
Sporting Goods, Inc.
FORTUNA, CALIF.
1959


Legend
(PROJECT AREA - APN: 202-082-005)
N
Redwood Way
St Joseph Dr
400 ft

Date 12/14/2018

Bear River Band of the Rohnerville Rancheria
Attn: Erika Collins, M.A., THPO
266 Keisner Road
Loleta, CA 95551

RE: Redwood Way, Fortuna CA 95540 – Planned Unit Development

Dear Ms. Collins:

The City of Fortuna has received an application for a subdivision of 13.35 acres into 59 residential parcels, located along Redwood Way. A location map of the proposed project is attached. The City of Fortuna is the Lead Agency for the project.

Purpose of Government-to-Government Consultation

The primary purpose of government-to-government consultation, under Assembly Bill (AB) 52, is to ensure that Federally Recognized Tribes are given the opportunity to provide meaningful and timely input regarding proposed project actions that uniquely or significantly affect Tribal Cultural Resources. Tribal Cultural Resources are defined as either (1) "sites, features, places cultural landscapes, sacred places and objects with cultural value to a California Native American tribe" that are included in the state register of historical resources or a local register of historical resources, or that are determined to be eligible for inclusion in the state register; or (2) resources determined by the lead agency, in its discretion, to be significant based on the criteria for listing in the state register.

Consultation Initiation

With this letter, the City of Fortuna is seeking input on concerns that uniquely or significantly affect your Tribe related to this project. Early identification of Tribal concerns will allow the City of Fortuna and the project applicant to avoid and minimize potential impacts to Tribal resources and practices, as project planning and alternatives are developed and refined. We would be pleased to discuss details of the proposed project with you.

Project Information

The proposed project is a Planned Unit Development (PUD) on Redwood Way in Fortuna, California. The construction and implementation of a PUD involves several components. These components include the installation of utilities, road ways and drainage installation, and the construction of the new living units. The PUD is anticipated to be constructed in four phases.

Utilities

Installation of utilities includes water, sewer, and power lines to service each new residence. The sewer system will require the use of two pump stations to transfer the waste to the City's sewer system located on Redwood Way. The water system will be connected to the City's water main in Redwood Way to the west of the development and on St. Joseph Way. Initial sizing and estimation of the layout of these systems are included and based on the City of Fortuna SWWM models.

Roadway

The main access to the PUD will be from Redwood Way. A new road will be installed to connect the PUD to Redwood Way on the northern edge of the parcel. The interior development will include three cul-de-sacs and access across Jameson Creek to a looped road. An additional all-weather road will be provided from St. Joseph Way for emergency access by the fire department. The final development will be built out with a 20-foot-wide road with a 4-foot-wide sidewalk. Parking will be in designated areas adjacent to the road or in driveways. Access to the western parcel will be provided by installation of a bridge(s) which will allow two-way traffic over the creek.

Drainage

Drainage for the project will be designed in conformance with Humboldt County LID Manual requirements. The use of self-retaining areas to retain and infiltrate drainage water will be utilized in the open space areas associated with the development.

Residential

The purpose of this proposed project is to construct 59 units that will house senior residents in Fortuna. The residences will be developed as 2-bedroom, 1.5 bathroom with a garage. Each unit will have access to roads per the connected driveway. Refer to the attached documents for Figures 1 through 3 which show a location map, USGS Survey Map, and aerial view.

Confidentiality

We understand that you may have concerns regarding the confidentiality of information on areas or resources of religious, traditional and cultural importance to the Tribe. We would be happy to discuss these concerns and develop procedures to ensure the confidentiality of such information is maintained.

City of Fortuna - Contact Information
If you wish to provide comments related to this proposed project, or need additional information, please contact me directly at the address above, at **707-725-7600**, or by e-mail at **lshorey@ci.fortuna.ca.us**.

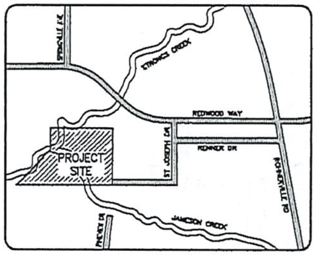
Project Consultation Options Form
Your timely response will greatly assist us in incorporating your concerns into project planning. We respectfully request that you review the project and return your response within thirty days of your receipt of this correspondence. If you have any questions, please do not hesitate to contact me.

Sincerely,

Liz Shorey

Liz Shorey
Deputy Director of Community Development

Attachments: Location Map
U.S. Geological Survey map
Aerial Photograph




## LOCATION MAP

NO SCALE

NORTH

PROJECT DESCRIPTION

61 UNIT PLANNED UNIT DEVELOPMENT
THIS DEVELOPMENT WILL BE A SENIOR GATED COMMUNITY WITH 61 COTTAGE STYLE STRUCTURE UNITS. EACH UNIT WILL CONSIST OF A 2 BEDROOM, 1.5 BEDROOM RESIDENCE WITH A 1 CAR GARAGE. IMPROVEMENTS FOR THE SITE WILL INCLUDE ACCESS ROADS, UTILITIES TO SERVE EACH PARCEL (WATER, SEWER, GAS AND ELECTRIC). PROPERTY LINES WILL BE ESTABLISHED AT THE WALLS OF THE STRUCTURE AND INCLUDE PATIO AND PORCH AREAS WITHIN EACH PARCEL. THE COMMUNITY WILL HAVE SHARED COMMON AREAS WHICH WILL BE CONNECTED ALONG THE ROADWAYS WITH ACCESSIBLE SIDEWALKS.

APPLICANT INFORMATION:

DENNIS FITZE
1749 ALAMAR WAY
FORTUNA, CA 95540

MAP PREPARER:

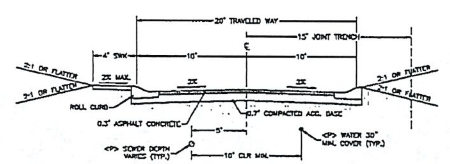
JEFF LAIKAM
WHITCHURCH ENGINEERING
610 9th STREET, FORTUNA, CA 95540
(707) 725-6926
jl@whitchurchengineering.com

OPEN SPACE

| | |
|---|---|
| AREA 1– | 126,485 S.F. (2.9 AC) |
| AREA 2– | 95,336 S.F. (2.2 AC) |
| AREA 3– | 39,725 |
| | 1,822 |
| | 5,481 |
| | 3,974 |
| | 11,074 |
| | 11,869 |
| CUL-DE-SAC | 2,365 S.F. |
| | 65,436 S.F. (1.5 AC) |
| TOTAL | 287,277 S.F. (6.6 AC) |

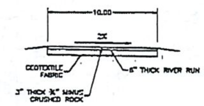
LOT SIZE

MINUS RIPARIAN AREA, SIDEWALKS, DRIVEWAYS, PATIOS, BLDG. FOOTPRINT, AND ROADWAYS
491,531 S.F. (11.3 AC)



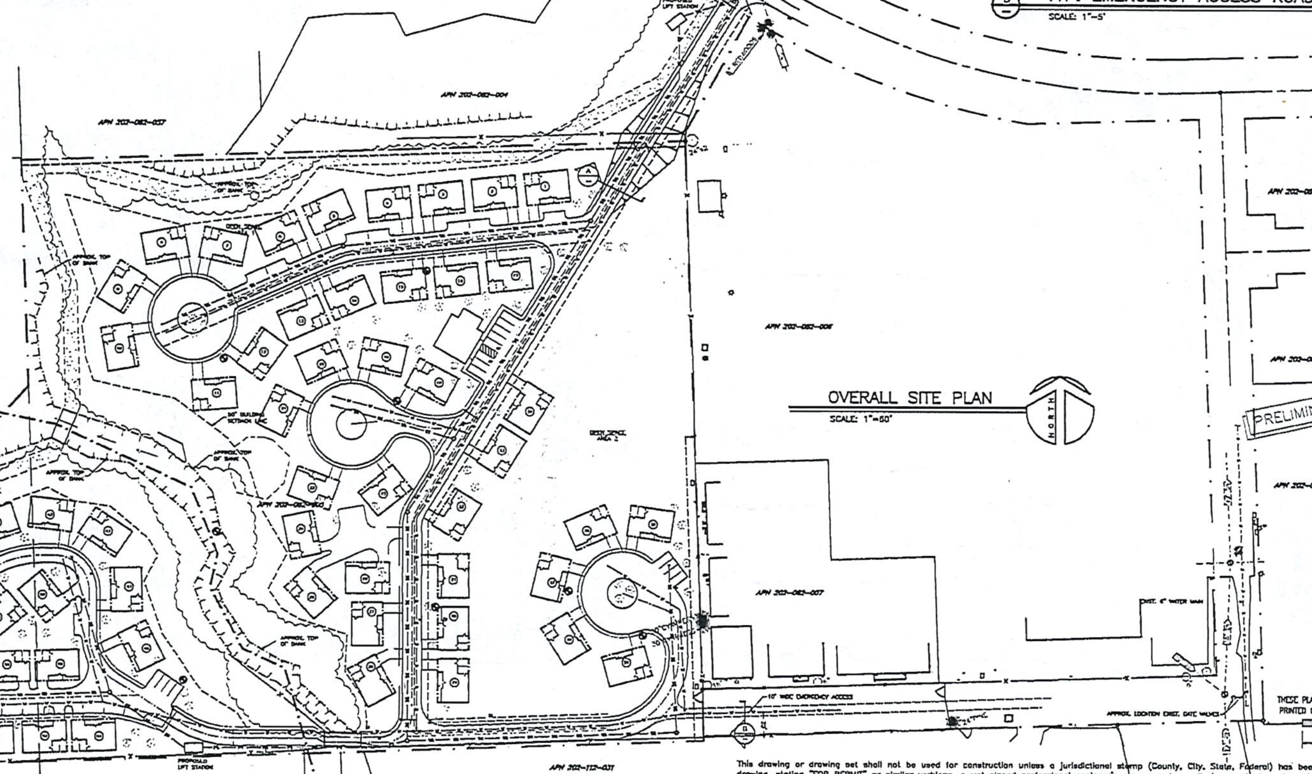

## (A) TYP. 20' WIDE ROAD SECTION

SCALE: 1"=5'




## (B) TYP. EMERGENCY ACCESS ROAD

SCALE: 1"=5'




## OVERALL SITE PLAN

SCALE: 1"=60'

NORTH

THESE PLANS ARE ORIGINALLY PRINTED ON 24"x36" PAPER.

1 INCH

This drawing or drawing set shall not be used for construction unless a jurisdictional stamp (County, City, State, Federal) has been issued on the drawing, stating "FOR PERMIT" or similar verbiage, a wet signed professional engineer's stamp, and permit documents have been issued for the project.

| REVISIONS | BY |
|---|---|
| | |

REGISTERED PROFESSIONAL ENGINEER No. 73735 STATE OF CALIFORNIA CIVIL

WHITCHURCH ENGINEERING, INC.
610 9th Street Fortuna, California 95540 Phone (707) 725-6926

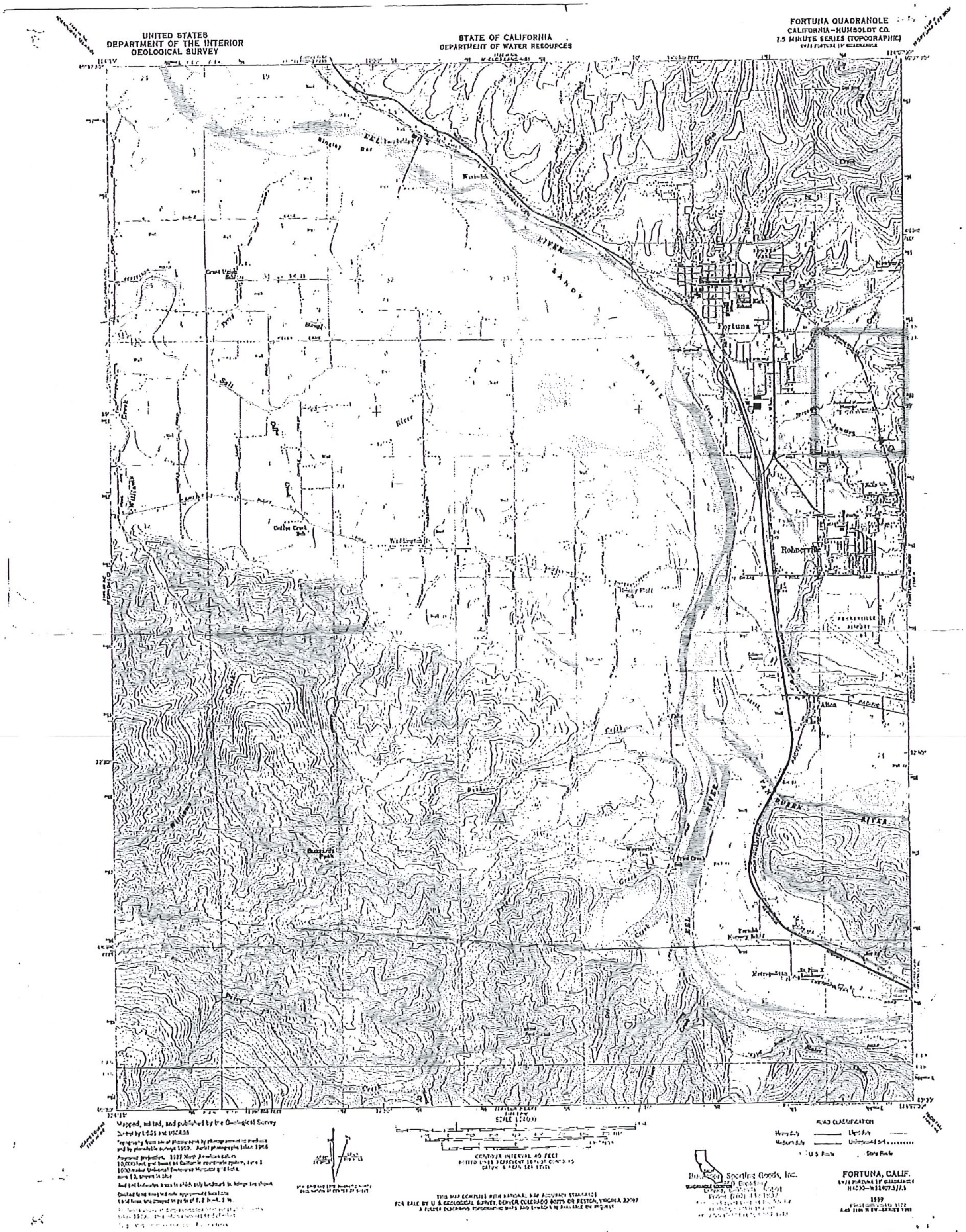
# PLANNED UNIT DEVELOPMENT (P.U.D.)

Redwood Way, Fortuna, CA 95540 APN: 202-082-005

## TENTATIVE MAP–OVERALL SITE PLAN

For: Dennis Fitze 1749 Alamar Way, Fortuna, CA 95540

| | |
|---|---|
| Date | OCT 24 '18 |
| Scale | AS NOTED |
| Design | JTL |
| Drawn | CKK |
| Job | FIT1801 |
| Sheet | 1 |


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
FORTUNA QUADRANGLE
CALIFORNIA—HUMBOLDT CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
EEL
RIVER
SANDY
PRAIRIE
Fortuna
Rohnerville
Alton
VAN DUZEN
RIVER
Mapped, edited, and published by the Geological Survey
SCALE 1:24000
CONTOUR INTERVAL 40 FEET
FORTUNA, CALIF.


Legend
(PROJECT AREA - APN: 202-082-005)
N
Redwood Way
St Joseph Dr
400 ft

William Rich and Associates
*Cultural Resources Consultants*

DATE: April 29, 2019

TO: Native American Heritage Commission

FROM: William Rich, M.A., RPA

SUBJECT: Sacred Lands Database Search: **Fitz Planned Unit Development, Fortuna, Humboldt County, CA**

PAGES: 2

Dear NAHC,

William Rich and Associates have been retained to conduct a cultural resources investigation for a subdivision project in Fortuna, Humboldt County, California. Specifically, the project is located in Section 1 and 2, T2N, R1W, as shown on the USGS 7.5' Fortuna, CA Topographic Quadrangle. The project area is indicated on the accompanying map.

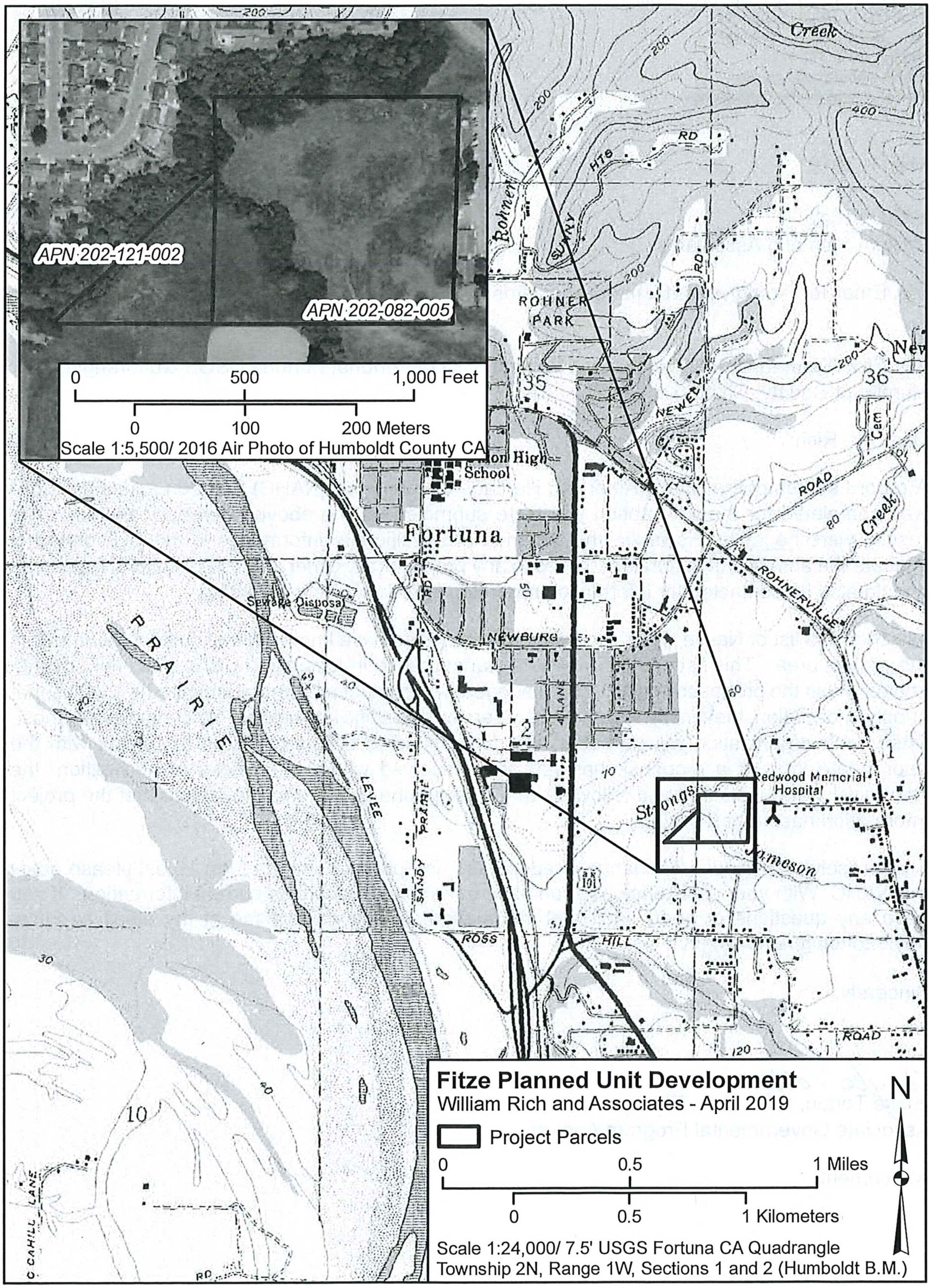
I would greatly appreciate a list of Native American contacts and the results of a search of the sacred lands database for previously identified sites of concern within the project area.

Many thanks in advance for your assistance.

Sincerely,

*William Rich*

William Rich, M.A., RPA
Principal Investigator
P.O. Box 184
Bayside, CA 95524
(707) 834-5347
wcr@williamrichandassociates.com


APN 202-121-002
APN 202-082-005
0
500
1,000 Feet
0
100
200 Meters
Scale 1:5,500/ 2016 Air Photo of Humboldt County CA
Fortuna
ROHNER PARK
Redwood Memorial Hospital
Strongs
Jameson
PRAIRIE
LEVEE
SANDY PRAIRIE
NEWBURG
ROHNERVILLE
ROAD
Creek
Sewage Disposal
High School
ROSS
HILL
Fitze Planned Unit Development
William Rich and Associates - April 2019
Project Parcels
0
0.5
1 Miles
0
0.5
1 Kilometers
Scale 1:24,000/ 7.5' USGS Fortuna CA Quadrangle
Township 2N, Range 1W, Sections 1 and 2 (Humboldt B.M.)
N

**NATIVE AMERICAN HERITAGE COMMISSION**
**Cultural and Environmental Department**
**1550 Harbor Blvd., Suite 100**
**West Sacramento, CA 95691**
**Phone: (916) 373-3710**
**Email: nahc@nahc.ca.gov**
**Website: http://www.nahc.ca.gov**

May 1, 2019

William Rich
William Rich and Associates

VIA Email to: wcr@williamrichandassociates.com

RE: **Fitz Planned Unit Development Project,** City of Fortuna; Fortuna USGS Quadrangle, Humboldt County, California.

Dear Mr. Rich:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information. If you have any questions or need additional information, please contact me at my email address: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, B.S., M.A., Ph.D.
Associate Governmental Program Analyst

Attachment

**Native American Heritage Commission**
**Native American Contact List**
**Humboldt County**
**5/1/2019**

***Bear River Band of Rohnerville Rancheria***
Erika Cooper, Tribal Historic Preservation Officer
266 Keisner Road — Mattole, Wiyot
Loleta, CA, 95551
Phone: (707) 733 - 1900
Fax: (707) 733-1727
erikacooper@brb-nsn.gov

***Bear River Band of Rohnerville Rancheria***
Barry Brenard, Chairperson
266 Keisner Road — Mattole, Wiyot
Loleta, CA, 95551
Phone: (707) 733 - 1900
Fax: (707) 733-1727

***Big Lagoon Rancheria***
Virgil Moorehead, Chairperson
P. O. Box 3060 — Tolowa, Yurok
Trinidad, CA, 95570
Phone: (707) 826 - 2079
Fax: (707) 826-1737
vmoorehead@earthlink.net

***Cher-Ae Heights Indian Community of the Trinidad Rancheria***
Garth Sundberg, Chairperson
P.O. Box 630 — Miwok, Tolowa, Yurok
Trinidad, CA, 95570-0630
Phone: (707) 677 - 0211
Fax: (707) 677-3921
gsundberg@TrinidadRancheria.com

***Hoopa Valley Tribe***
Ryan Jackson, Chairperson
P.O. Box 1348 — Hoopa
Hoopa, CA, 95546
Phone: (530) 625 - 4211
Fax: (530) 625-4594

***Wiyot Tribe***
Ted Hernandez, Chairperson
1000 Wiyot Drive — Wiyot
Loleta, CA, 95551
Phone: (707) 733 - 5055
Fax: (707) 733-5601
ted@wiyot.us

***Wiyot Tribe***
Tom Torma, Tribal Historic Preservation Officer
1000 Wiyot Drive — Wiyot
Loleta, CA, 95551
Phone: (707) 733 - 5055
Fax: (707) 733-5601
tom@wiyot.us

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Fitz Planned Unit Development Project, Humboldt County.

WILLIAM RICH AND ASSOCIATES
*Cultural Resources Consultants*

May 6, 2019

1. Bear River Band of Rohnerville Rancheria –Erika Cooper, THPO
2. Wiyot Tribe –Ted Hernandez, Chairman and Cultural Director

Dear Tribal Representative,

William Rich and Associates is conducting a cultural resources investigation for a subdivision project in Fortuna, Humboldt County, California. Specifically, the project is located in Section 1 and 2, T2N, R1W, as shown on the USGS 7.5' Fortuna, CA Topographic Quadrangle. The project area is indicated on the accompanying map and is a Planned Unit Development (PUD) consisting of the subdivision of 13.35 acres into 59 residential parcels.

A formal consultation letter was previously sent to you on 12/14/2018 by Deputy Director of Community Development, Liz Shorey (707-725-7600; lshorey@ci.fortuna.ca.us). This letter is a follow-up to that outreach.

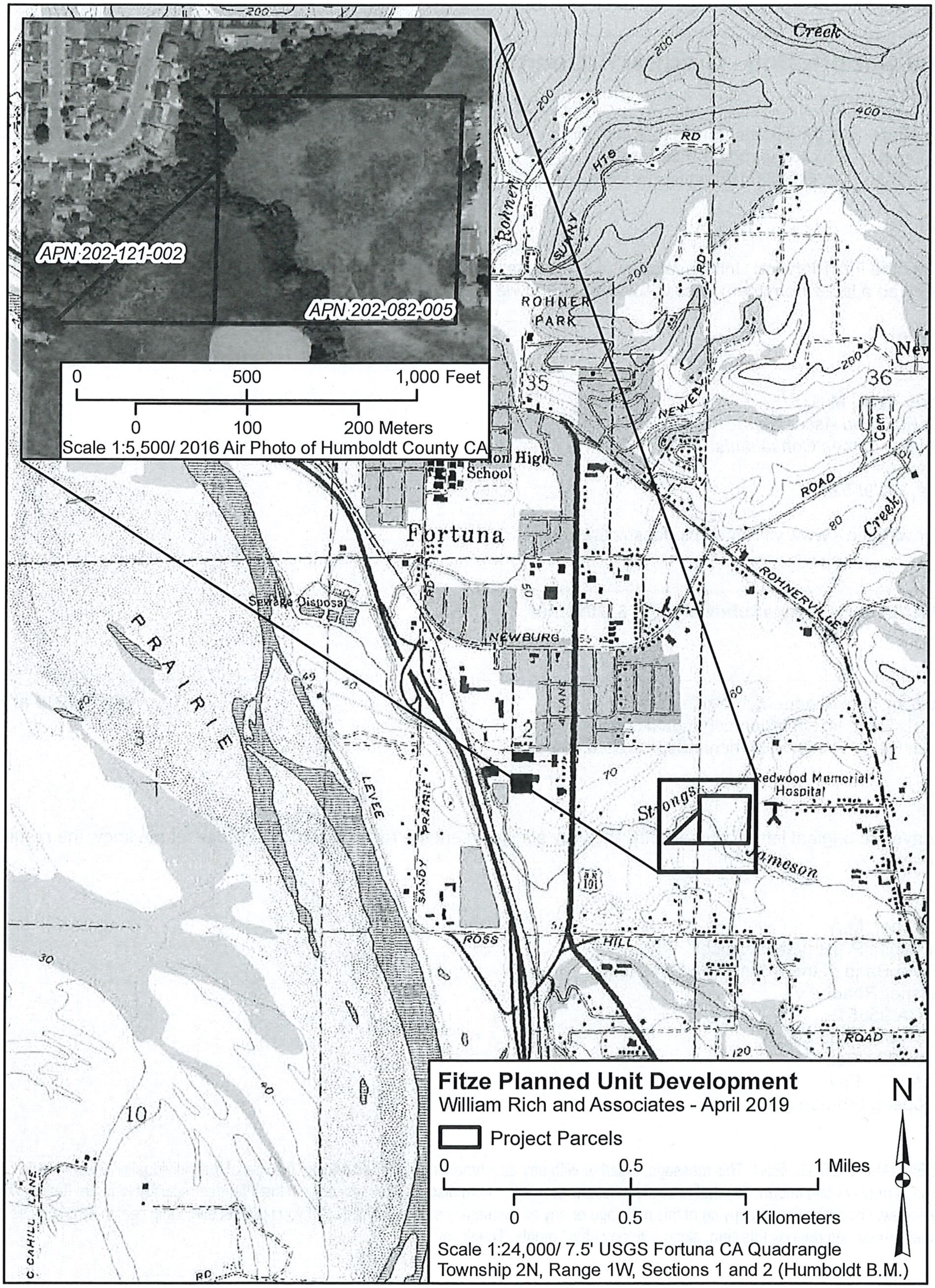
William Rich, M.A., RPA conducted a field survey of the entire project area on April 30, 2019. An isolated chert flake fragment was identified, and despite numerous exposures of mineral sediment, in the area of the artifact, no additional archaeological materials were identified. If you have any concerns or would like to share any information that would help identify cultural resources in the project area, feel free to contact me. Any culturally sensitive information that you may disclose to WRA will be held under strict confidentiality and will not be made available to the public. All cultural sites will be documented in accordance to the guidelines established by the State Office of Historic Preservation. A copy of the final report and any completed archaeological site records will be submitted to the California Historical Resources Information System's regional Northwest Information Center.

Thank you in advance for your assistance. If you have any information, concerns or questions please contact me at 834-5347 (cell).

Sincerely,

*William Rich*

William Rich, M.A., RPA
P.O. Box 184, Bayside, CA 95524
wcr@williamrichandassociates.com



APN 202-121-002
APN 202-082-005
0 500 1,000 Feet
0 100 200 Meters
Scale 1:5,500/ 2016 Air Photo of Humboldt County CA
Fortuna
School
ROHNER PARK
NEWELL
ROAD
ROHNERVILLE
Creek
Sewage Disposal
PRAIRIE
LEVEE
SANDY PRAIRIE
NEWBURG
LANE
Redwood Memorial Hospital
Strongs
Jameson
ROSS
HILL
RD
Cem
Fitze Planned Unit Development
William Rich and Associates - April 2019
Project Parcels
0 0.5 1 Miles
0 0.5 1 Kilometers
N
Scale 1:24,000/ 7.5' USGS Fortuna CA Quadrangle
Township 2N, Range 1W, Sections 1 and 2 (Humboldt B.M.)

Gmail by Google

**Kimberly Rich <ksr@williamrichandassociates.com>**

# Fortuna Subdivision - Cultural Resources Investigation

5 messages

**Kimberly Rich** <ksr@williamrichandassociates.com> Mon, May 6, 2019 at 3:37 PM
To: Erika Cooper <erikacooper@brb-nsn.gov>
Cc: William Rich <wcr@williamrichandassociates.com>

Hi Erika,

This is for the Fitz Planning Unit Development in Fortuna, near Redwood Memorial Hospital. The City has indicated that you received a letter from them back in December and we are just following up.

Thank you!
Kim

**Kimberly Rich, M.S.**
*William Rich and Associates*
*Cultural Resources Consultants*
*P.O. Box 184*
*Bayside, CA 95524*

Visit our website - www.williamrichandassociates.com-

**WRALetter_FortunaSubdvision_5_6_2019.pdf**
503K

**Erika Cooper** <erikacooper@brb-nsn.gov> Tue, May 7, 2019 at 3:41 PM
To: Kimberly Rich <ksr@williamrichandassociates.com>
Cc: William Rich <wcr@williamrichandassociates.com>

Hi Kim,

Yes, I have the original letter from the City and they also just sent the records search. Please let me know the results of the survey.

Erika Cooper, M.A.
Tribal Historic Preservation Officer
Bear River Band of the Rohnerville Rancheria
266 Keisner Road
Loleta, CA 95551
707-733-1900 x233 Office
707-502-5233 Cell
707-733-1727 Fax
erikacooper@brb-nsn.gov



[Quoted text hidden]

**Kimberly Rich** <ksr@williamrichandassociates.com> Tue, May 7, 2019 at 3:42 PM

To: Erika Cooper <erikacooper@brb-nsn.gov>

Hi Erika,

Bill found an isolate! It's described briefly in the letter.

Thanks!
Kim

[Quoted text hidden]
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[Quoted text hidden]

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[redacted] [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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[redacted] [redacted]

[redacted]

[redacted]

Appendix D
Site Record for WRA-Fitze Iso

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
# PRIMARY RECORD

Primary#
HRI#
Trinomial
**NRHP Status Code** 6z

Other Listings
Review Code | Reviewer | Date

**Page** 1 **of** 2 | ***Resource Name or #:** WRA-Fitze-Chert Flake

**P1. Other Identifier:**
***P2. Location:** ■ **Not for Publication** ☐ **Unrestricted**
***a. County** Humboldt
***b. USGS 7.5' Quad** Fortuna **Date** 1959 (PR 1972); **Township** 2 North; **Range** 1 West ; NW ¼ **of** SW ¼ **of Sec** 1; Humboldt **B.M.**
c. Address: 3415 Renner Drive City: Fortuna Zip:95540
d. UTM: Zone 10 (NAD 83) 403,657 mE/ 4,492,949 mN
e. Other Locational Data: One item of chert flakestone debitage was observed in rodent tailings at the edge of a terrace overlooking the confluence of Jameson Creek and Strongs Creek near Redwood Memorial Hospital in Fortuna, California.

***P3a. Description:** This item of flaked stone debitage was encountered in exposed rodent tailings along the edge and point of a terrace about 30 feet above an alluvial flood plain. The artifact measures 34 x 22 x 5 mm and is composed of reddish-brown Franciscan chert and is a secondary interior flake fragment from a large core. Despite an abundance of rodent tailings, horse trails and other exposures of mineral sediment at this location, no other artifacts were observed. Although the artifact appears to be isolated, there may be an association with the nearby stream confluence and this topographic rise.

***P3b. Resource Attributes:** AP2 (Lithic Scatter-Isolated)

***P4. Resources Present:** ☐Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ■Other (Isolates, etc.)


P5b. Description of Photo: Close-up of artifact.
***P6. Date Constructed/Age and Source**
☐Historic ■ Prehistoric ☐ Both

***P7. Owner and Address:**
Russell Gans
3415 Renner Dr.
Fortuna, CA 95540

***P8. Recorded by:**
William Rich and Associates
Cultural Resources Consultants
P.O. Box 184, Bayside, CA 95524

***P9. Date Recorded:** May 9, 2019
***P10. Survey Type:** Intensive pedestrian survey

***P11. Report Citation:** A Cultural Resources Investigation for the Fitze Planned Unit Development, Assessor's Parcel Numbers 202-082-005, 202-121-002, 202-082-004, Located in Fortuna, Humboldt County, California.

***Attachments:** ☐NONE ■Location Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

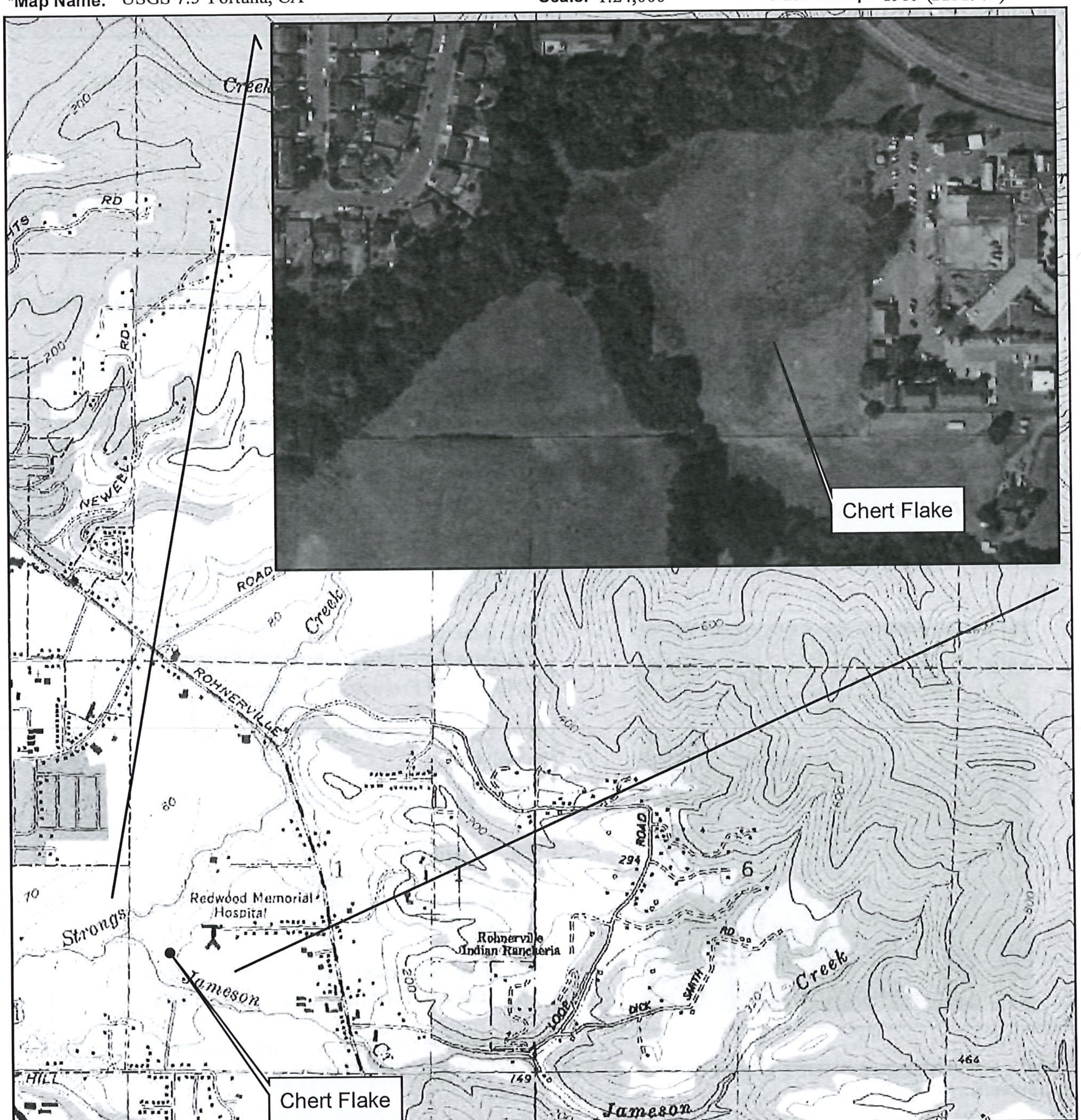
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
# LOCATION MAP

Primary #:
HRI #:
Trinomial:



*Resource Name or # WRA-Fitze-Chert Flake

*Map Name: USGS 7.5' Fortuna, CA *Scale: 1:24,000 *Date of Map: 1959 (PR 1972)




610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment F: Whitchurch Engineering Soils Report

WHITCHURCH
ENGINEERING

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

December 7, 2018

Dennis Fitze
1749 Alamar Way
Fortuna, CA 95540

RE: Soils Report
Proposed Residential Development
Redwood Way
Fortuna, CA
APN: 202-082-005/202-121-002

JN:FIT1801

Dear Mr. Fitze,

Per your request, on August 22, 2018, I visited the above referenced site in order to perform a site soils investigation for a planned unit development (PUD) to be constructed at this site. The two parcels are separate but border each other. The PUD will be built on both parcels, and will be combined to form a single parcel as a result of this development. The combined parcels are 13.35 acres in size. During our site visit, we observed the excavation of 9 test holes dug with a backhoe on the combined parcel.

The scope of this report is to supply recommendations for the construction of the PUD, access road, and driveways. I have not reviewed any construction plans for the proposed development. I have not performed an in-depth geologic stability study or overall geologic stability study of the property or the immediate surrounding area. The historic use of this parcel has been for agricultural purposes, including livestock grazing. Generally, the combined parcels are relatively flat (1%-5%), and naturally drain toward the creeks (Strongs and Jameson) on or near the project site. There is a slight knoll at the Southeast corner of the parcels, which is elevated approximately 25' above the rest of the property. The downhill slope of this section is approximately 20%-25% down toward the west. This building site is located off Redwood Way in Fortuna just west of Redwood Memorial Hospital and east of an elderly care facility. There are no existing access roads to these parcels as they were used for agriculture. However, there is gated access through neighboring parcels. Elevation at the building site (where the proposed development will take place) is approximately 60-80 feet above mean sea level.

During my site investigation I observed the excavation of nine test holes dug with a backhoe in the area where the proposed development may take place. In the southwest area, site soils generally consisted of a topsoil layer of brown, fine sandy silt to 7"-13" below grade. Below this was a bluish black silty clay, heavily mottled orange, dry, and dense. In the large central area, site soils generally consisted of a topsoil layer of brown sandy silt to 16"-20" below grade with medium density and dry. Below this to 29"-48"was a bluish brown silty clay with sand, mottled orange, dry, and dense. Below this varied between a moist orange mottled bluish black clayey silt or sandy clay, dry and dense. More sand was present in test holes in proximity to the creek. At test hole #6, large pockets of wet sand were encountered. The top soil layer consisted of brittle, fine, and brown sandy silt, dry and dense to 18". Below this to 31" was a silty sand, bluish brown with orange mottling, dry and dense. Below this layer is a bluish-brown clayey sand with orange mottling. With increasing depth, the moisture and sand content both increased to the bottom of the hole at 83". In the elevated southeast area, site soils generally consisted of a topsoil layer of fine, dry, and dense sandy silt to 14"-16" below grade. Below this to 38"-60" was yellow silty clay, heavily mottled orange and white, dry and dense. Below this was light yellow fine sandy silt with white mottling, dry, and dense.

The following information pertains to the seismic design loading for structural design:

1. Seismic importance factor I=1.0, occupancy category = II
2. Mapped spectral response acceleration $S_S$ = 2.332, $S_1$= 1.004
3. Site Class= D
4. $S_{DS}$= 1.555, $S_{D1}$= 1.004
5. Seismic design category = D
6. Site Latitude: 40.5821° N, Site Longitude: 124.1389° W

A peak ground acceleration of Ss/2.5 shall be used for seismic design.

Although we have not performed an in depth geologic study of this parcel or the surrounding area, the geologic nature of the property appears to be stable. There is no indication in the immediate surrounding area of any geologic instability, earthquake faults, or ground water that would be detrimental to the building site. According to the Humboldt County General Plan geologic maps, this parcel is classified as zone 1, low instability.

This site is located in the vicinity of several earthquake fault zones as defined by the Alquist-Priolo Earthquake Fault Zoning Act. Faults within these zones are considered to have been active during quaternary time. It should be noted that the attached maps may not show all potentially active faults, either within the special studies zones or outside their boundaries. However, the identification of these potentially active faults and the location of such fault traces are based upon the best available data to date.

The north coast area of California where this site is located is seismically very active and possibly subject to earthquakes of large magnitude which can produce significant ground shaking. This high to very high level of seismic hazards is typical for Northern California; residence and business owners routinely assume this risk. In general there are 5 sources of large magnitude earthquakes which could affect the project area. These sources include the Mendocino Fault Zone located some 34 miles northeast of Shelter Cove, the San Andreas Fault which leads out to the sea at Point Delgada, the subducted Gorda Oceanic Crustal Plate North of Shelter Cove, the complex northwesterly oriented systems surrounding the Humboldt Bay area (including the Little Salmon, Mad River and Gorda Fault Zones), and the Cascadia Subduction Zone, located off shore approximately 20 miles west of the site.

The Coastal Range Thrust Fault is located approximately 30 miles east of this site. The San Andreas Fault zone is approximately 24 miles southwest of this site. The Little Salmon Fault zone is located approximately 1.5 miles northeast of this site. The North Spit/Buhne Point/ Bay Entrance Fault Zone cluster is located approximately 11 miles northwest of the site. The Russ Fault zone is approximately 7 miles southwest of this site. The Goose Lake Fault zone is located approximately 4 miles south east of the site. These fault systems are considered to have been active during assumed Historic, Holocene, and Pleistocene times, and are expected to have a relatively high potential for surface rupture.

According to the state of California Department of Conservation Division of Mines and Geology Special Publication 115 (1995) planning scenario, this parcel is located in an area of moderate to low liquefaction potential.

## CONCLUSIONS AND RECOMMENDATIONS

In my opinion, soils at this site are capable of providing adequate support for the construction of a planned unit development, as well as the existing structures on site. However, you are still responsible for ensuring that this development conforms to all County, State, and local requirements.

The following construction considerations are presented to aid in project planning. They may not be comprehensive; other issues may arise which will require coordination of the owner's goals, the consultant's design assumptions, and the contractor's construction method and capabilities. Future proposed structures can be safely constructed at this site; provided the construction conforms to the 2016 California Building Code (CBC) and the following recommendations are complied with:

### 1. FOUNDATIONS

All foundations and footings should extend downwards through upper disturbed soils/fill/soft organic top soils, if any, to bear upon/into lower native undisturbed, competent native clayey silty sub-soils. The horizontal distance from the bottom of any footing to daylight of adjacent native soil/undisturbed banks (below any fill soil) shall not be less than 10 feet. Spread footings and any foundation walls should be reinforced, and constructed per chapter 18 of the CBC. The bottom of all foundation excavations shall be level. All footings should extend a minimum of 12" below competent finish grade. Foundations that support 2-story portions of structures should extend a minimum of 18" below competent finish grade. All foundation excavations shall be inspected and approved by the building official or engineer prior to placement of rebar or concrete, to assure that foundations are set in competent sub-soils.

Any concrete slabs that are proposed should be a minimum of 4 inches thick (nominal) with #4 reinforcing bar placed 18 inches on center each way in the center of the slab. Conventional floor section concrete slabs should bear upon a minimum of 2 inches of sand, over a 6 mil vapor barrier over a minimum 4 inch thick free draining capillary rock layer which bears on competent subgrade soil or fill soil as necessary (see recommendation #2) and serves as a capillary break between the slab and the subgrade. Capillary rock gradation shall require 100% passage of a 1" sieve and no passage of a #4 sieve. If gravels exceed 1 foot, they should be placed and compacted as engineered fill described in recommendation #2 below. The 6 mil vapor barrier should be lapped and sealed at the ends of the sheet per manufacturer specifications. No unsealed penetrations shall extend through the vapor barrier.

According to table 1806.2 of the CBC, the silty clay sub-soils at this site are assigned an allowable soils bearing pressure of 1500 psf (pounds per square foot). These values may be increased by 1/3 for a combination of loading which included wind and seismic loads.

2. CUT/FILL

If any fill banks or cut banks are to be installed, they should be in conformance with appendix J and chapter 18 of the CBC. Cut banks which are left exposed should not exceed a 2:1 slope. Based on visual observations of existing cut banks in the vicinity of this project, a 2:1 cut slope is expected to be practical in regards to slope stability. There may be a slight chance of localized slope failure for slopes that are cut this steep, especially in areas where sandy subsoils are encountered. If this occurs, additional engineering investigation/design may be required. Alternatively, slopes may be cut less steep than 2:1 so as to minimize the risk of localized slope failure.

All areas to receive fill, including areas beneath proposed concrete slabs, should be cleared of all organic top soil, trash material and soils which are not native soils as described above. The areas to receive fill should be "benched". This area should not slope more than 2%. Exposed soils should be scarified a minimum of 4 inches both ways prior to placement of first fill lift. All areas to receive fill should be observed by a registered civil engineer prior to placement of fill. Imported well graded river-run gravel should be used as a fill material. Engineered fill should be placed in thin lifts (±6") and compacted to a minimum relative compaction rate ninety percent as per ASTM Test Method D 1557. Any fill which is to be placed under driveways or sidewalk areas should be compacted to 95% relative compaction. Compaction testing should occur a minimum of every three vertical feet. An equal bearing value is assigned to engineered fill as was given to native undisturbed soils as designed above. Finished fill banks should not exceed a 2:1 slope.

3. CUT/FILL SLOPES

All existing and proposed cut slopes and fill slopes should be re-vegetated to prevent erosion from rainfall. Protection of slopes should be installed immediately after slopes are disturbed.

4. RETAINING WALLS

Cantilevered retaining walls are to be designed in accordance with chapter 18 of the CBC. A value of 0.25 times the dead load should be used to resist sliding forces. This value may be increased to 0.35 times the dead load if the bottom of the retaining wall is supported with concrete slab. Allowable bearing values should conform to the above recommendations. All retaining walls should be provided with adequate drainage including a continuous 4" diameter perforated drain pipe behind all retaining walls.

A minimum of two square feet of uncrushed drain rock encased in filter fabric should surround the perforated drain pipe. The drain should be directed away from the building into an approved drainage control facility by solid pipe once it is away from the retaining wall. Retaining walls which are horizontally braced at the top of the wall are to be designed to resist at-rest soil pressures as specified in table 1610.1 of the CBC.

5. EXCAVATIONS

There may be a potential for foundation excavations to encounter disturbed fill soils, root wads, or similar disturbances. Any disturbed or soft low density soils which are located in an area of proposed foundation placement should be removed, and excavations extended downwards to bear upon firm, undisturbed native soils. All areas to receive fill should be observed and approved by this office prior to placement of fill.

6. BUILDING DRAINAGE

Rain gutters are to extend along roof lines and leads to down spouts; these down spouts should lead to pipes or well established drainage ways, which carry drainage away from the building site and away from any areas of fill or foundations.

Any proposed "Low Impact Development" rainwater retention structures/systems must be designed and constructed in a manner that does not introduced groundwater into the soil in the vicinity of the foundations of the proposed structure, or paved areas. The introduction of additional groundwater in the vicinity of the building foundations or paved areas will potentially cause building moisture problems including mold growth, and will likely cause localized excessive building/pavement settlement resulting in cracking/movement/settlement, of the floors/walls/finish surfaces of the structures.

All proposed retaining wall structures should be well drained to prevent the buildup of water pressure and to lower the up-hill water table level. Roof and/or surface drains should not empty into retaining wall drains. All drainage must be controlled to flow away from the building site in a non-erosive manner, toward established drainage ways.

In accordance with CBC section 1804.3, I recommend that a minimum positive drainage gradient of 5% be established away from all foundations and footings for a minimum horizontal distance of 10 feet, with the remainder of the building pad grading, as well as the overall site, establishing a minimum horizontal positive drainage of 1% from foundations and footings approved drainage control/facilities.

7. SURFACE DRAINAGE

Surface water uphill of the building site should be controlled to flow around and away from the building site toward established drainage ways. Under no circumstances should uncontrolled surface water drainage be allowed to flow across the building site or over any cut or fill banks. Drainage improvements will need to be continually maintained and regularly inspected to assure their effectiveness in directing the surface water away from the building site.

8. PAVEMENTS

All top soil and incompetent fill/native soils are to be removed from underneath proposed roadway, parking lot, and driveway areas. Any proposed paving for this project shall consist of a minimum of 0.35' of type "B" asphalt concrete, underlain by 8" of class 2 aggregate base (R-78 min), and 8" of class 3 aggregate sub-base. The upper 8 inches of subgrade beneath aggregate base or sub-base shall be scarified; moisture conditioned as necessary and compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557-78. Prior to backfilling the base soil, the resulting excavation must be inspected by this office. A geotextile fabric (AMOCO 2002 or approved equivalent) shall be placed (per manufacturer's specifications) over the prepared native sub-base soil in order to prevent migration of fine soil between fill and sub-base soil, and to improve the structural section strength at the subgrade level.

The pavement section is based on an assumed R-value of 45 minimum, and a traffic index of 6.0. It shall be noted that if pavements are constructed prior to building construction, the traffic index value may be too low and need to be increased. If pavements are placed prior to construction, or if more frequent heavy truck traffic is anticipated, this office shall be contacted to re- evaluate the pavement section design.

## 9. UTILITY TRENCHES

It should be anticipated that based on field observations at the time of our site inspection, water could seep into excavations which extend below approximately 12" below existing grade. A design groundwater depth of 0 feet shall be used to compute hydrostatic pressures and buoyant forces.

Utility trench backfilling beneath areas to support improvements, including parking lot/traffic areas shall be completed prior to subgrade compaction. Utility trench backfill shall be compacted to a minimum of 90% of the maximum dry density per ASTM-D-1557, and a minimum of 95% in the upper six inches in area to receive base rock and finish surface.

The contractor shall use appropriate equipment and methods to avoid damage to utilities and/or structures during placement and compaction of backfill materials. Trench backfills shall be placed in 8 inch lifts; moisture conditioned to within 2 percent of optimum and compacted to achieve the minimum relative compaction. Lift thickness can be increased if the contractor can demonstrate that the minimum compaction requirements can be achieved. Approved imported engineered fill may be used as final backfill in trenches. Jetting of trench backfill is not recommended to compact the backfill soils.

## 10. SUBSURFACE CONSTRUCTION

All temporary and permanent earth retaining structures which placed greater than 12" below grade shall be designed to withstand the effects of hydrostatic pressure. Ground water levels can fluctuate with the seasons, storms (precipitation) events, runoff and other factors. Significant variations in ground water levels may occur from those observed during our investigation.

The active and at-rest pressure of the native soils saturated by ground water may assume to be equal to the pressures developed by a fluid with a density of 92 and 106 pounds per cubic foot, respectively. The at-rest pressure shall be used in determining lateral earth pressures against walls which are free to deflect; this includes temporary walls for trench shoring. For walls which are free to deflect at least one percent of the wall height at the top, the active earth pressure may be used.

## CLOSING:

The following is a summary of required special inspection and items to be reviewed/approved by Whitchurch Engineering prior to construction:

- Review of the site grading/ drainage plan
- Foundation design (prior to permit acquisition)

- Foundation excavations
- Subgrade, prior to placement of geotextile fabric
- Final placement of geotextile fabric

Provided footing design and dimensions are based upon given soil bearing values and recommendations given above, and if live loads are distributed uniformly across floor areas, differential settlement is not expected to exceed ½ inch for any 25 foot span for an assumed economic life of 50 years. Total uniform settlement is not expected to exceed 1 inch over the same economic life span under the same loading conditions. Initial construction settlement is not expected to exceed ¼ inch. Based upon site soils conditions observed during our site visit, as well as review of the State of California Department of Conservation Division of Mines and Geology Planning Scenario Special Publication 115 (1995) the potential for liquefaction at this site is considered to be negligible.

Based upon the State of California Special Studies Zone (Alquist-Priolo Special Studies Zones Act) official map for this area, the potential for ground surface displacement due to faulting or lateral spreading at this building site is considered to be negligible. It is assumed that the test holes that have been observed at the site are representative of subsurface conditions throughout the site. If it is found that subsoil conditions differ from those described, the conclusions and recommendations of this investigation shall be considered invalid until the project is again reviewed by this office. Further discussion is possible at that time. Based on my visual review of the site and the surrounding terrain, in my opinion no further geologic evaluation or geologic consultation is warranted.

Determination of any potential environmental hazards due to the possible presence of hazardous and/or toxic waste is not part of this report.

If you have any questions or comments regarding this soils report, feel free to contact me at your earliest convenience.

Sincerely,

Mr. Terry O'Reilly, P.E.
RCE # 49506
TOR/rao



www.whitchurchengineering.com
Fortuna: (707) 725-6926
Eureka: (707) 444-1420

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment G: Soil Exploration Logs

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 1 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|
| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |

| HOLE #: | HOLE TYPE: | LOGGED BY: | SAMPLE DATE: |
|---|---|---|---|
| TH-1 | BACKHOE | RAO | 8/22/2018 |

| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
|---|---|---|---|---|---|---|---|---|---|
| LAB DATA | | | | | | | | | SOIL DESCRIPTION |
| | | | | | | | | -- -- | FINE SANDY SILT, BROWN DRY, DENSE |
| | | | | | | | | --1-- | 14" |
| | | | | | | | | -- -- | 18" YELLOW CLAYEY SILT W/ ORANGE MOTTLING, DRY, DENSE |
| | | | | | | | | --2-- | SILTY CLAY, YELLOW W/ GRAY,WHITE,ORANGE MOTTLING, |
| | | | | | | | | -- -- | DRY, DENSE |
| | | | | | | | | --3-- | 38" |
| | | | | | | | | -- -- | |
| | | | | | | | | --4-- | SILTY FINE SAND, YELLOWISH TAN W/ GRAY, WHITE MOTTLING, |
| | | | | | | | | -- -- | DRY, DENSE |
| | | | | | | | | --5-- | |
| | | | | | | | | -- -- | 66" |
| | | | | | | | | -- -- | BOTTOM OF HOLE AT 66" |
| | | | | | | | | --6-- | NO GROUND WATER |
| | | | | | | | | -- -- | |
| | | | | | | | | --7-- | |
| | | | | | | | | -- -- | |
| | | | | | | | | --8-- | |
| | | | | | | | | -- -- | |
| | | | | | | | | --9-- | |
| | | | | | | | | -- -- | |
| | | | | | | | | --10-- | |
| | | | | | | | | -- -- | |
| | | | | | | | | --11-- | |

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 2 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|

| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |
|---|---|

| HOLE #: TH-2 | HOLE TYPE: BACKHOE | LOGGED BY: RAO | SAMPLE DATE: 8/22/2018 |
|---|---|---|---|

| LAB DATA | | | | | | | | | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
| | | | | | | | | 0 – 1 | CLAYEY SILT, BROWNISH BLACK, DRY, DENSE<br>13" |
| | | | | | | | | 1 – 2 | SLIGHTLY SILTY CLAY, BLUISH BLACK W/ HEAVY ORANGE,WHITE MOTTLING, DRY, DENSE, BRITTLE<br>27" |
| | | | | | | | | 2 – 6 | SLIGHTLY SILTY CLAY, BLUISH BLACK W/ HEAVY ORANGE,WHITE MOTTLING, DRY, DENSE. MORE CLAY AND MOISTURE W/ DEPTH<br>80" |
| | | | | | | | | 7 – 11 | BOTTOM OF HOLE AT 80"<br>NO GROUND WATER |

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 3 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|

| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |
|---|---|

| HOLE #: | HOLE TYPE: | LOGGED BY: | SAMPLE DATE: |
|---|---|---|---|
| TH-3 | BACKHOE | RAO | 8/22/2018 |

| LAB DATA | | | | | | | | | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
| | | 3 | | | | | | 0 – 1 | FINE SILTY SAND, OLIVE BROWN, DRY, MEDIUM DENSITY |
| | | | | | | | | | 20" |
| | | | | | | | | 2 – 3 | SLIGHTLY CLAYEY SILTY SAND, BLUISH BLACK W/ ORANGE MOTTLING, DRY, DENSE |
| | | | | | | | | | 48" |
| | | 3.5 | | | | | | 4 – 5 | CLAYEY SILT, BLUISH BLACK W/ HEAVY ORANGE MOTTLING, MOIST, MEDIUM DENSITY |
| | | | | | | | | | 62" |
| | | | | | | | | 6 | BOTTOM OF HOLE AT 62"<br>NO GROUND WATER |
| | | | | | | | | 7 | |
| | | | | | | | | 8 | |
| | | | | | | | | 9 | |
| | | | | | | | | 10 | |
| | | | | | | | | 11 | |

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 4 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|

| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |
|---|---|

| HOLE #: TH-4 | HOLE TYPE: BACKHOE | LOGGED BY: RAO | SAMPLE DATE: 8/22/2018 |
|---|---|---|---|

| LAB DATA | | | | | | | | | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
| | | 3.5 | | | | | | -- -- | FINE SANDY SILT, BROWN, DRY, MEDIUM DENSITY |
| | | | | | | | | --1-- | 16" |
| | | | | | | | | -- -- | SANDY SILT, BROWN W/ ORANGE MOTTLING, DENSE |
| | | | | | | | | --2-- | 26" |
| | | | | | | | | -- -- | SILTY CLAY, BLUISH BROWN, DENSE |
| | | | | | | | | --3-- | 38" |
| | | | | | | | | -- -- | CLAYEY SILT, BLUISH GRAY/BLACK, BRITTLE AND DRY, |
| | | | | | | | | --4-- | VERY DENSE, STIFFNESS INCREASES W/ DEPTH |
| | | | | | | | | -- -- | |
| | | | | | | | | --5-- | 65" |
| | | | | | | | | -- -- | BOTTOM OF HOLE AT 65" |
| | | | | | | | | --6-- | NO GROUND WATER |
| | | | | | | | | -- -- | |
| | | | | | | | | --7-- | |
| | | | | | | | | -- -- | |
| | | | | | | | | --8-- | |
| | | | | | | | | -- -- | |
| | | | | | | | | --9-- | |
| | | | | | | | | -- -- | |
| | | | | | | | | --10-- | |
| | | | | | | | | -- -- | |
| | | | | | | | | --11-- | |

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 5 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|
| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |

| HOLE #: | HOLE TYPE: | LOGGED BY: | SAMPLE DATE: |
|---|---|---|---|
| TH-5 | BACKHOE | RAO | 8/22/2018 |

| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | -- 1 -- | FINE SANDY SILT, BROWN W/ ORANCE MOTTLING, DRY |
| | | | | | | | | | 19" |
| | | | | | | | | -- 2 -- | SILTY CLAY, BLUISH GRAY W/ ORANGE MOTTLING, DRY, DENSE |
| | | | | | | | | | 29" |
| | | | | | | | | | SANDY CLAY, BLUE AND GRAY W/ ORANGE MOTTLING, DRY, VERY DENSE |
| | | | | | | | | -- 3 -- | 36" |
| | | | | | | | | | SANDY CLAY, BLUE AND GRAY W/ ORANGE MOTTLING, MOIST, DENSE |
| | | 3.5 | | | | | | -- 4 -- | 47" |
| | | 2.5 | | | | | | | SANDY CLAY, BLUE AND GRAY W/ ORANGE MOTTLING, WET, SOFT |
| | | | | | | | | -- 5 -- | |
| | | | | | | | | | 67" |
| | | | | | | | | -- 6 -- | BOTTOM OF HOLE AT 67" |
| | | | | | | | | | NO GROUND WATER |
| | | | | | | | | -- 7 -- | |
| | | | | | | | | -- 8 -- | |
| | | | | | | | | -- 9 -- | |
| | | | | | | | | -- 10 -- | |
| | | | | | | | | -- 11 -- | |

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 6 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|

| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |
|---|---|

| HOLE #: | HOLE TYPE: | LOGGED BY: | SAMPLE DATE: |
|---|---|---|---|
| TH-6 | BACKHOE | RAO | 8/22/2018 |

| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0 – 18" | FINE SANDY SILT, DARK BROWN/BLACK, DRY, BRITTLE, DENSE |
| | | | | | | | | 18" – 31" | SILTY SAND,BLUISH BROWN W/ ORANGE MOTTLING, DRY, DENSE |
| | | | | | | | | 31" – 41" | CLAYEY SAND, BLUISH BROWN W/ ORANGE MOTTLING, MOIST, DENSE |
| | | | | | | | | 41" – 83" | CLAYEY SAND, BLUISH BROWN W/ ORANGE MOTTLING, WET, MEDIUM DENSITY W/ POCKETS OF SAND |
| | | | | | | | | 83" | BOTTOM OF HOLE AT 83"<br>NO GROUND WATER |

Depth scale (feet): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 7 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|
| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |

| HOLE #: | HOLE TYPE: | LOGGED BY: | SAMPLE DATE |
|---|---|---|---|
| TH-7 | BACKHOE | RAO | 8/22/2018 |

| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL DESCRIPTION: SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 7" FINE SILT, OLIVE BROWN, DRY, MEDIUM DENSITY |
| | | | | | | | | 1 | |
| | | | | | | | | | SILTY CLAY, BLUE/GRAY W/ ORANGE MOTTLING, DRY, DENSE |
| | | | | | | | | 2 | 39" |
| | | | | | | | | | SANDY SILTY CLAY, BLUE/GRAY W/ ORANGE MOTTLING, DRY, DENSE |
| | | | | | | | | 3 | 38" |
| | | 3.5 | | | | | | 4 | SILTY CLAY, BLUE/GRAY W/ HEAVY ORANGE MOTTLING, MOIST, MEDIUM DENSITY |
| | | | | | | | | 5 | 66" |
| | | | | | | | | 6 | BOTTOM OF HOLE AT 66"<br>NO GROUND WATER |
| | | | | | | | | 7 | |
| | | | | | | | | 8 | |
| | | | | | | | | 9 | |
| | | | | | | | | 10 | |
| | | | | | | | | 11 | |

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 8 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|

| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |
|---|---|

| HOLE #: | HOLE TYPE: | LOGGED BY: | SAMPLE DATE |
|---|---|---|---|
| TH-8 | BACKHOE | RAO | 8/22/2018 |

| LAB DATA | | | | | | | | | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
| | | | | | | | | 0 – 1 | FINE SILT, OLIVE BROWN, DRY, MEDIUM DENSITY (to 12") |
| | | | | | | | | 1 – 3 | SILTY CLAY, BLUISH BLACK W/ ORANGE MOTTLING, DRY, VERY DENSE (12" to 36") |
| | | | | | | | | 3 – 4.5 | SANDY CLAY, BROWN AND BLUISH GRAY W/ HEAVY ORANGE MOTTLING, DRY, DENSE (36" to 54") |
| | | | | | | | | 4.5 – 11 | BOTTOM OF HOLE AT 54"<br>NO GROUND WATER |

| Whitchurch Engineering, Inc.<br>610 9th Street<br>Fortuna, CA 95540<br>(707) 725-1553 | SHEET 9 OF 9<br>**EXPLORATION TEST LOG**<br>APN: 202-082-005 |
|---|---|

| PROJECT NAME: FITZE - REDWOOD WAY | JOB NO: FIT1801 |
|---|---|

| HOLE #: | HOLE TYPE: | LOGGED BY: | SAMPLE DATE |
|---|---|---|---|
| TH-9 | BACKHOE | RAO | 8/22/2018 |

| LAB DATA | | | | | | | | | SOIL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| MOISTURE CONTENT (%) | DRY DENSITY (PCF) | UNCONFINED COMPRESSIVE STRENGTH (TONS/SF) | LIQUID LIMIT | PLASTICITY INDEX | RELATIVE COMPACTION | SAMPLE | SOIL TYPE | DEPTH (FEET) | SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM) |
| | | 4 | | | | | | 0–1 | FINE SILT, BROWN, DRY, MEDIUM DENSITY (to 16") |
| | | | | | | | | 1–2 | SANDY CLAY, YELLOWISH BROWN W/ ORANGE MOTTLING, DRY, DENSE (to 28") |
| | | | | | | | | 3–4 | SILTY CLAY, YELLOWISH BROWN W/ HEAVY ORANGE/WHITE MOTTLING, DRY, DENSE (to 49") |
| | | | | | | | | 4–5 | SILTY CLAY, YELLOWISH BROWN W/ HEAVY ORANGE/WHITE MOTTLING, MOIST, DENSE (to 60") |
| | | | | | | | | 5–11 | BOTTOM OF HOLE AT 60"<br>NO GROUND WATER |

WHITCHURCH ENGINEERING

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment H: Traffic Impact Study Report

# REDWOOD WAY– SENIOR HOUSING PLANNED UNIT DEVELOPMENT (PUD) TRAFFIC IMPACT STUDY REPORT



Final: December 2018

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

**TRAFFIC IMPACT STUDY REPORT**
**FOR REDWOOD WAY– SENIOR HOUSING PLANNED UNIT DEVELOPMENT (PUD)**

Project No. 111-86918

Prepared for: Dennis Fitze
1749 Alamar Way
Fortuna, CA 95540

Prepared by:

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. WARGULA
No. TR2749
Exp. 03/31/19
TRAFFIC
STATE OF CALIFORNIA

Matt Wargula, PE, TE
Project Engineer

December 19, 2018
Date

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
FRANK W. PENRY
No. TR2304
Exp. 06/30/19
TRAFFIC
STATE OF CALIFORNIA

Frank Penry, PE, TE, PTOE
Project Manager

December 19, 2018
Date

GHD Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407
(707) 523-1010

December 2018

# Contents

## Table Index



## Figure Index

## Appendices

# 1. Study Introduction & Analysis Summary

## 1.1 Study Introduction

This report presents an analysis of the traffic impacts that would be expected from the proposed development of Senior Housing on Redwood Way, a Planned Unit Development (PUD) within the City of Fortuna. The traffic study was completed in accordance with standard criteria, in coordination with City Staff, and is consistent with California Department of Transportation (Caltrans) *Guide for the Preparation of Traffic Impact Studies* and standard traffic engineering techniques. The traffic impact analysis provides an evaluation of operating conditions during the typical weekday morning and evening peak periods under Baseline, Baseline plus Project, Cumulative, and Cumulative plus Project Conditions. The Cumulative Condition scenarios represent the approximately 20-year growth in traffic to year 2039, utilizing traffic growth data and a corresponding uniform annual traffic growth rate.

## 1.2 Project Summary

The Redwood Way Senior Housing Project is proposing to construct 59 residences and a small community center on currently undeveloped parcels located between Strongs Creek and Redwood Memorial Hospital in the City of Fortuna. The proposed Planned Unit Development (PUD) will be developed on combined parcels for a total of 13.35 acres, and includes residences with 2 bedrooms, 1.5 bathrooms, and a garage. The development is proposed to be accessed via a bi-directional vehicular roadway connected to Redwood Way, approximately 575 feet west of St Joseph's Way. An additional all-weather road will be provided from the internal roadway, along the south side of Redwood Memorial Hospital, to St. Joseph's Way for emergency access only.

The project site plan is included in Appendix A.

## 1.3 Analysis Summary

Six (6) study intersections were selected for analysis as the locations most likely to experience impacts due to the project-generated trips. Study intersections were evaluated for four conditions: baseline, baseline plus project, cumulative, and cumulative plus project. Baseline conditions represent existing conditions with the development of the Open Door Community Health Center and McLean Community Center Projects. Anticipated operations and intersection levels of service were assessed for potential impacts using the measures of effectiveness and thresholds of significance established by the City of Fortuna (City). When evaluated using these criteria, all of the study intersections are expected to operate at acceptable levels during all study conditions and with proposed project improvements to the roadway network.

# 2. Study Parameters

## 2.1 Prelude

The purpose of this traffic impact study is to provide City staff and policy makers such as Planning Commissioners and Council members with data that they can use to make an informed decision regarding the potential traffic impacts of the 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 Fortuna General Plan 2030, or other applicable policies. The traffic impacts are typically evaluated by determining the number of trips the new use would be expected to generate, distributing the new trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to a proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections included in the study.

## 2.2 Study Intersections and Periods

The intersections analyzed in this study are listed below in Table 1. Intersections have been numbered for ease of reference in the remainder of this report.

**Table 1 Study Intersections**

| Intersection | Jurisdiction | Traffic Control |
|---|---|---|
| 1. South Fortuna Boulevard / Redwood Way | City | Signalized |
| 2. Rohnerville Road / Redwood Way | City | Two-Way (Unsignalized) |
| 3. South Fortuna Boulevard / Kenmar Road | City | Signalized |
| 4. Rohnerville Road / Kenwood Road | City | Two-Way (Unsignalized) |
| 5. South Fortuna Boulevard / Newburg Road | City | Signalized |
| 6. Rohnerville Road / Newburg Road | City | Two-Way (Unsignalized) |
| 7. Proposed Project Access on Redwood Way | New Intersection | Two-Way (Unsignalized) |

Traffic conditions at the study intersections were analyzed for the weekday a.m. and p.m. peak hours of traffic. The a.m. peak hour of traffic is generally between 7:00 and 9:00 a.m. and the p.m. peak hour is generally between 4:00 and 6:00 p.m. It is during the peak hour of traffic that the most congested traffic conditions generally occur on an average day.

## 2.3 Study Scenarios

Four scenarios were evaluated in this study, which are Baseline Conditions, Baseline plus Project Conditions, Cumulative Conditions, and Cumulative plus Project Conditions.

Scenario 1: Baseline Conditions. This scenario represents traffic operations based on data collected in the field in June 2015 and April 2016, with the addition of traffic generated by the Open Door Community Health Center and McLean Community Center Projects.

Scenario 2: Baseline plus Project Conditions. This scenario presents an evaluation of the potential traffic impacts that would be expected to occur with the addition of project-generated traffic to Scenario 1 – Baseline Conditions.

Scenario 3: Cumulative Conditions. This scenario represents traffic operations based on existing traffic volumes factored to the year 2039 utilizing traffic growth data and a corresponding uniform annual traffic growth rate.

Scenario 4: Cumulative plus Project Conditions. This scenario presents an evaluation of the potential impacts that would be expected to occur with the addition of project-generated traffic to Scenario 3 – Cumulative Conditions.

## 2.4 Data Requirements

The data requirements for the traffic impact analysis include:

- Existing traffic volumes; include turning movement counts collected in June 2015 and April 2016
  - Traffic data was collected at study locations 1-5 on Tuesday, June 2, 2015.
  - Traffic data was collected at study location 6 on Thursday, April 21, 2016.
  - These counts consisted of turning movement counts taken at all study intersections during each peak hour of typical traffic operations, while school is in session.
- Intersection geometry and configuration.

All intersection turning movement counts are included in Appendix B.

## 2.5 Measures of Effectiveness

Caltrans maintains jurisdiction over the operation of highways and intersections within Caltrans right-of-way (ROW). Caltrans uses measures of effectiveness (MOEs) to describe the measures best suited for analyzing State highway facilities. MOEs are calculated performance measures that reflect the operating conditions of a facility, given a set of roadway, traffic, and control conditions. These measures are also recommended for City facilities. The City has jurisdiction over streets and intersections within City limits and outside Caltrans ROW. Table 2 summarizes the MOEs by facility type recommended by Caltrans, and the MOEs used in this study.

**Table 2 Measures of Effectiveness (MOE) by Facility Type**

| Type of Facility | Caltrans MOE[1] | Study MOE |
|---|---|---|
| Signalized Intersections | Control Delay per Vehicle (sec/veh) | Control Delay per Vehicle (sec/veh) |
| Un-signalized Intersections | Control Delay per Vehicle (sec/veh) | Control Delay per Vehicle (sec/veh) |

[1]Source: (Caltrans, 2002).

## 2.6 Thresholds of Significance

Title 14, Chapter 3 Article 20 §§15382 of the California Code of Regulations defines a *significant effect on the environment* as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project. Thresholds of significance are principally used to determine whether a project may have a significant environmental effect. A threshold of significance is a quantitative or qualitative standard, or set of criteria from which the significance of a given environmental effect may be determined. In the context of traffic, levels of service based standards are typically used to establish thresholds of significance and qualify potential impacts.

### 2.6.1 City of Fortuna

The *Fortuna General Plan 2030* is intended, in part, to provide a basis for determining whether private development proposals and public projects are in harmony with the City's vision of the physical nature of Fortuna in the future. The document states that the minimum acceptable Level of Service (LOS) on all City streets shall be LOS "C", with the exception being Main Street, where LOS "D" is the minimum. The document further suggests that mitigation will be required in locations where the LOS is expected to drop below the standard. LOS shall be evaluated using the methodology described in the Section 2.7 "Level of Service Methodologies" of this report.

The *Fortuna General Plan 2030* also describes other goals, policies and programs relevant to transportation and circulation that could be affected by this project, and they are as follows:

> **Policy TC-1.1 Reducing Mode Conflicts.** The City shall seek to minimize conflicts between pedestrians, automobiles, and bicycles.
>
> **Policy TC-1.3 Balanced Transportation System.** The City shall strive to meet the level of service standard through a balanced transportation system that provides alternatives to the automobile and by promoting pedestrian, bicycle, and transit connections between employment areas and major residential and commercial areas.
>
> **Policy TC-1.10 Connectivity.** The City shall exercise its responsibility to ensure that new residential roads and streets connect with existing (or will connect with future) roads and streets to insure convenient traffic flow and improved emergency access.
>
> **Policy TC-1.13 Development Impacts.** The City shall consider the effects of new development on local streets in residential areas and require new development to mitigate significant impacts.
>
> **Policy TC-1.21 Development Fees.** The City shall assess fees on new development sufficient to cover the fair share portion of that development's impacts on the local and regional transportation system.
>
> **Program TC-7.** The City shall require that proposed new development provide circulation improvements that may include new roadways, islands, traffic controls, dedicated turn lanes, sidewalks, pedestrian/bicycle lanes/paths, transit stops, and signage.
>
> **Program TC-8.** The City shall require that new development provide its fair share of City-wide roadway and traffic improvements.
>
> **Policy TC-4.2 New Developments.** The City shall continue to require new development to finance and install sidewalks and pedestrian pathways connecting them to existing sidewalks or widening the right-of-way fronting the development to accommodate new sidewalks.
>
> **Policy TC-4.3 Specific Plans.** The City shall encourage specific development plans to include design continuity of pedestrian access that enables residents to walk from their homes to places of work, recreation, and shopping.

## 2.7 Level of Service Methodologies

Level of Service 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, LOS A represents free flow conditions and LOS F represents forced flow or breakdown conditions. The LOS designation for intersections is generally accompanied by a unit of measure which indicates a level of delay and/or volume to capacity ratios.

### 2.7.1 Intersection Level of Service Methodologies

The study intersections were analyzed using methodologies from the *Highway Capacity Manual (HCM) 6th* Edition – *Volume 3 Interrupted Flow* (HCM6) (Transportation Research Board, 2016). This source contains methodologies for various types of intersection control, including signalized intersections, two-way stop-controlled (TWSC) intersections and roundabouts.

The analysis level in this study is recognized as planning and preliminary engineering. The "analysis level" describes the level of detail used when the methodology is applied. The "planning and preliminary engineering level" of analysis requires only the most fundamental types of information. Default values are then used as substitutes for other input data.

The methodologies utilized in this study are for the automobile mode, although other modes are discussed.

Synchro 8 (Synchro) with SimTraffic software was used for the traffic analysis in this study.

### 2.7.2 Signalized Intersections

The signalized methodology for the automobile mode is based on input data requirements for traffic characteristics, geometric design, signal control and other factors including analysis period duration and approach speed limit.

Traffic characteristic inputs include (among others) demand flow rate, percent heavy vehicles, peak hour factors and base saturation flow rate.

Geometric design inputs include the number of lanes, average lane width, number of receiving lanes, turn bay (or pocket) lengths, presence of on-street parking and approach grade.

Signal control inputs include the type of signal control, phase sequence, protected for permissive left-turn operations, maximum green time, minimum green time, yellow change interval, red clearance, walk time, pedestrian clear time and phase recall.

Computed control delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology to describe the signalized intersection operation as a whole. The ranges of delay associated with the various signalized levels of service are summarized below in Table 3.

**Table 3 Signalized Level of Service**

| Level of Service | Description | Control Delay (Seconds Per Vehicle) |
|---|---|---|
| A | Operations with very low delay occurring with favorable progression and/or short cycle lengths. | < 10 |
| B | Operations with low delay occurring with good progression and/or short cycle lengths. | >10 to 20 |
| C | Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | >20 to 35 |
| D | Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable. | >35 to 55 |
| E | Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay. | >55 to 80 |
| F | Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths. | > 80 |

Source: Highway Capacity Manual 6th Edition (Transportation Research Board, 2016).

### 2.7.3 Unsignalized Intersections

The all-way or two-way stop-controlled (TWSC) (unsignalized) intersection methodology for motor vehicles is determined by the computed or measured control delay and the volume-to-capacity ratio. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns by using the criteria shown in Table 4. LOS for TWSC intersections is not defined for the intersection as a whole or for major-street approaches.

The input data required for evaluation of TWSC intersections includes the number and configuration of lanes on each approach; percent heavy vehicles for each movement; demand flow rate for each entering vehicular movement and each pedestrian crossing movement during the peak hour; peak hour factor; existence of a two-way left-turn lane (TWLTL) or raised or striped median storage (or both); approach grades; existence of flared approaches on the minor street; and existence of upstream traffic signals.

Computed control delay per vehicle in seconds and volume-to-capacity (v/c) ratio are used as the basis for evaluation in this LOS methodology to describe each minor-street movement and major-street left-turn movement. LOS F is assigned if the v/c ratio of a movement exceeds 1.0. The ranges of delay associated with the TWSC levels of service are indicated below in Table 4.

**Table 4 Unsignalized Intersection or Roundabout Level of Service**

| Level of Service | Description | Control Delay (Seconds Per Vehicle) | LOS by v/c Ratio ≤ 1.0 |
|---|---|---|---|
| A | Little or no delay | < 10 | A |
| B | Short traffic delays | >10 to 15 | B |
| C | Average traffic delays | >15 to 25 | C |
| D | Long traffic delays | >25 to 35 | D |
| E | Very long traffic delays | >35 to 50 | E |
| F | Extreme traffic delays with intersection capacity exceeded (for an all-way stop), or with approach/turn movement capacity exceeded (for a side street stop controlled intersection) | > 50.0 | ≥ 1.0 F |

Source: Highway Capacity Manual 6th Edition (Transportation Research Board, 2016).

## 2.8 Vehicle Queuing

Vehicle queuing analysis is completed for all signalized intersections to assess the capacity of intersections to accommodate the number of vehicles expected to wait at the intersections before being able to pass through or turn. This analysis is important because if there is not enough queuing space between intersections, in left-turn or right-turn pockets, the overflow of vehicles can obstruct the operations of the roadway.

The Synchro software program was used to determine the 50th percentile vehicle queue, which is the maximum back of queue on a typical cycle, and the 95th percentile queue which is the maximum back of queue with 95th percentile traffic volumes. The queue analysis will determine the 50th and 95th percentile movement queue lengths based on HCM6 methodology.

# 3. Baseline Conditions

This section describes the baseline conditions at the study intersections and roadways during the weekday a.m. and p.m. peak hours based on peak hour traffic conditions. Also included is a discussion of transportation facilities in the project area, including the roadway network, transit services, and bicycle and pedestrian facilities.

## 3.1 Study Area

The Redwood Way Senior Housing PUD Project is planned to consist of the elements and access points as described within Section 1.2 of this report. The study area and intersection locations are shown in Figure 1.

*Redwood Way* is a collector road with one lane in each direction that generally runs in the east-west direction and connects South Fortuna Boulevard to Rohnerville Road. Redwood Way ends at its intersections with South Fortuna Boulevard and Rohnerville Road, and features dedicated right and left turn pockets, with no through lane, at both of these intersections. The intersection with South Fortuna Boulevard is currently signalized, while the intersection with Rohnerville Road is unsignalized with stop control only in the eastbound direction. Although shoulders are provided on both sides of the road throughout the corridor, dedicated Class II bike lanes and intermittent sidewalk are only provided for short stretches to the west of Strongs Creek. Intermittent on-street parking is also allowed, but only to the west of Strongs Creek.

*Rohnerville Road*, is a minor arterial that runs in the north-south direction through the study area. This road features one lane in each direction, with a northbound left turn pocket at the intersection with Redwood Way. The *Fortuna General Plan 2030* identifies the Rohnerville Road corridor as an existing bicycle facility. There are some intermittent shoulders and on-street parking currently in place along the corridor, However the City recently utilized allocated State Transportation Improvement Program (STIP) funds and Highway Safety Improvement Program (HSIP) funds to construct improvements between Redwood Way and School Street. The improvements included asphalt overlay, widening of the roadway up to four feet, and the installation of Class II bike lanes, curb & gutter, concrete bulb-outs, and concrete sidewalks. Sidewalk is currently only provided intermittently along both sides of the corridor, and does not provide continuity with other pedestrian features throughout the corridor, such as marked crosswalks. The posted speed limit along Rohnerville Road is 35 miles per hour.

*South Fortuna Boulevard* is the only principal arterial within the City of Fortuna, and it runs in the north-south direction through the City. This roadway features two continuous lanes in each direction, with north- and southbound left turn pockets at the intersection with Newburg Road, and a southbound left turn pocket at the intersection with Redwood Way. At the intersection with Kenmar Road, South Fortuna Boulevard features north- and southbound left turn pockets, and a southbound channelized right turn lane that deviates from the through lanes approximately 250 feet north of the intersection. This roadway corridor provides access to several local businesses, and left turn access is generally provided through gaps in the existing continuous grass median. Although it is not recognized within the *Fortuna General Plan 2030*, the roadway corridor has some Class II bike lanes present. Bike lanes in both directions are generally intermittent, but they are currently more prevalent in the northbound direction. In the southbound direction, the implementation of bike lanes has been precluded by the allowance of on-street parking. Continuous sidewalk is generally provided in both directions along the corridor, but some gaps are present.

*Kenmar Road* is a collector road that generally runs in the east-west direction between U.S. Highway 101 and Rohnerville Road. Approximately halfway between South Fortuna Boulevard and Rohnerville Road, Kenmar Road turns to the south and then again to the east, where it extends and connects to Rohnerville Road. Where Kenmar Road turns southward, the east-west corridor extends straight as Kenwood Road. The most direct connection between U.S. Highway 101 and Rohnerville Road is the Kenmar/Kenwood Road corridor. At the intersection of South Fortuna Boulevard, the corridor is designated as Kenmar Road, while, at the intersection of Rohnerville Road, the corridor is designated as Kenwood Road. West of the intersection with South Fortuna Boulevard, Kenmar Road continues on through the U.S. Highway 101 underpass. This roadway corridor features one lane in each direction, with a right turn pockets in both the eastbound and westbound directions at the intersection of South Fortuna Boulevard. This roadway features continuous sidewalk along the north side of the corridor, and some intermittent sidewalk on the south side. The *Fortuna General Plan 2030* indicates that there is an existing bike route along Kenmar Road between South Fortuna Boulevard and South Rohnerville Road, but currently there are only intermittent Class II bike lanes within the corridor. Kenmar/Kenwood Road has a posted speed limit of 25 miles per hour.

*Newburg Road* is a collector road that also connects South Fortuna Boulevard and South Rohnerville Road. Newburg Road runs in the east-west direction at the intersection with South Fortuna Boulevard, but the alignment shifts to the northeast/southwest direction at its intersection with South Rohnerville Road. This roadway features one lane in each direction, with an eastbound right turn pocket at the intersection with South Fortuna Boulevard. The Newburg Road corridor has continuous sidewalk on both sides of the roadway, and a mid-block crosswalk approximately 525 feet east of the South Fortuna Boulevard intersection. This crosswalk serves South Fortuna Elementary School, which is on the northeast corner of the intersection. Newburg Road has no designated bicycle facilities, and has a posted speed limit of 25 miles per hour.

### 3.1.1 Transit Service

The Humboldt Transit Authority (HTA) operates two transit services within the City of Fortuna. The principal transit service within the study area roadway network is the Redwood Transit Service (RTS) mainline, while HTA also operates the RTS Southern Humboldt Intercity transit line in the southbound direction within the study area. The RTS provides fixed route services between Scotia, Fortuna, Loleta, Fields Landing, Eureka, Arcata, McKinleyville, Westhaven, and Trinidad seven days per week. These routes both travel along South Fortuna Boulevard, Redwood Way, Rohnerville Road, and Kenmar Road. There are currently transit stops for these routes adjacent to Redwood Village Shopping Center along both South Fortuna Boulevard and Redwood Way, and another adjacent to St. Joseph's Drive and Redwood Memorial Hospital.

### 3.1.2 Bicycle and Pedestrian Facilities

Bicycle facilities are classified into three categories:

- Class I (Multi-Use Trails) – A Class I facility is a multi-use trail for the exclusive use of bicycles and pedestrians, separate from the auto traveled way.
- Class II (Bike Lanes) – A Class II facility is an on-street bicycle lane, with painted markings and signs designating the lane's bicycle-only use. The bicycle lane is separated from vehicle and pedestrian traffic, but the route may be interrupted by vehicle turning movements at intersections.

- Class III (Bike Routes) – A Class III bicycle facility is a route for bicyclists in which the available traveled way is shared with vehicles. The facility is designated by signs or other markings and is usually provided when a Class I or Class II facility cannot be provided.

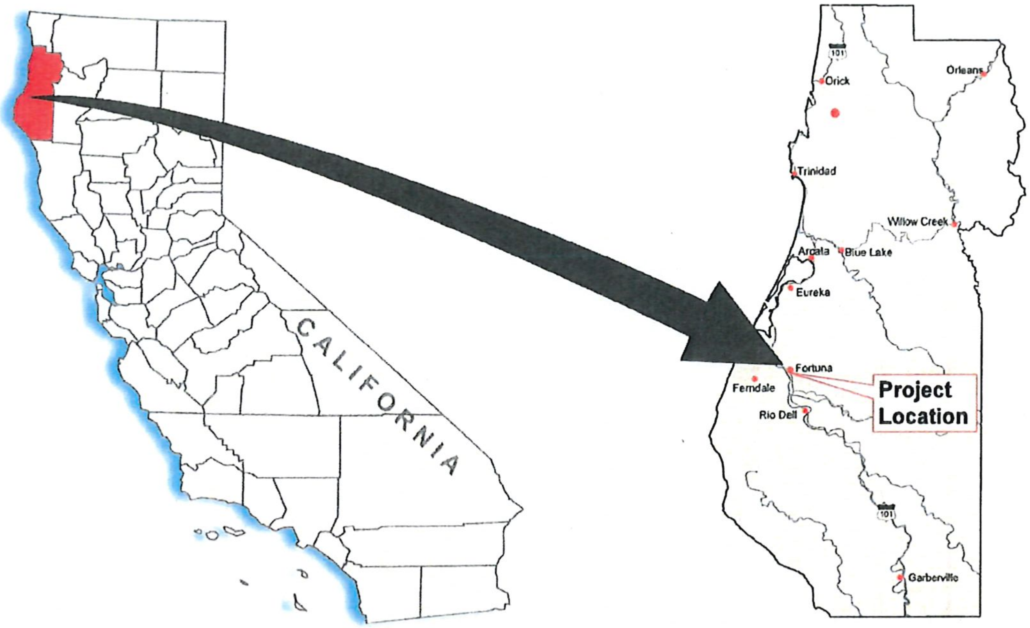
As mentioned with the discussion of the study area, bicycle facilities are provided intermittently throughout the study area roadway network. In particular, Class II bike lanes are present along Redwood Way, South Fortuna Boulevard, and Kenmar Road, but, in most cases, these routes are not continuous throughout the corridors. The *Fortuna General Plan 2030* indicates that Fortuna's existing bicycle transportation system also consists of a limited number of bicycle racks, some of which are located at area elementary schools. The document further explains that the City desires a comprehensive network of bicycle paths, lanes, and routes along with long and short term parking supplies to meet regional demand for bicycle access.

Pedestrian facilities in the study area consist primarily of sidewalks, which are present within each of the corridors covered by the study area. Marked crosswalks are present in all directions at each of the signalized study area intersections, although curb ramps are not always present to work in conjunction with these crosswalks. Marked crosswalks in the north-south direction are currently present on Redwood Way at the intersections of South Rohnerville Road and Maxwell Street, near the intersection of St. Joseph Drive, and near the Redwood Village Shopping Center. Curb ramps in compliance with Americans with Disabilities Act (ADA) requirements are not consistently provided at all of these crossings. The *Fortuna General Plan 2030* acknowledges that South Fortuna Boulevard, Redwood Way, and Rohnerville Road all have significant sidewalk gaps, driveway interruptions, missing curb cuts, and missing crossing facilities that impede pedestrian travel to destinations such as shopping, work, schools, and transit.

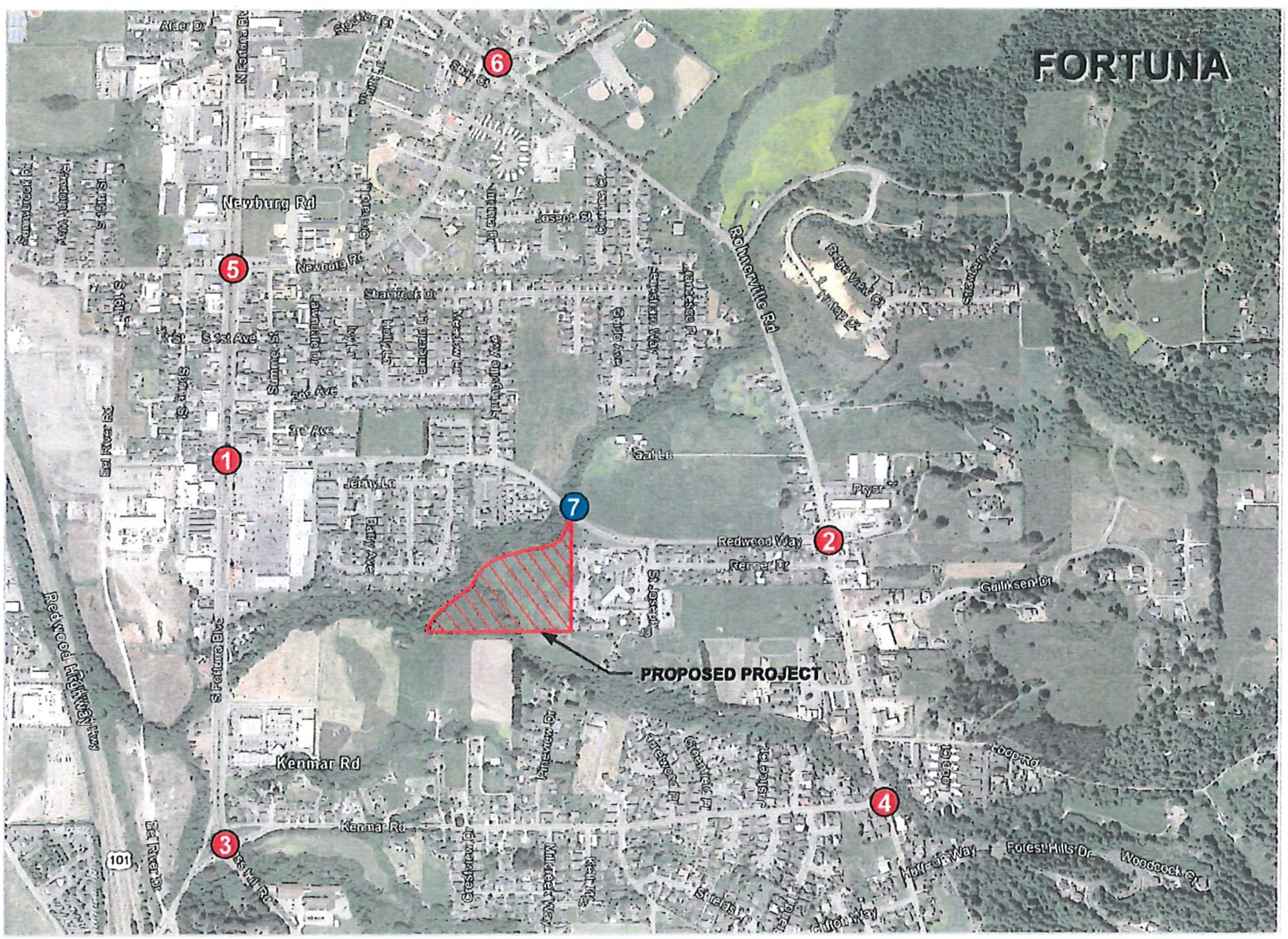
## 3.2 Study Intersections

The study intersections (including traffic control type) were identified for analysis as the locations most likely to experience impacts due to the project-generated traffic. The intersections are provided in Table 1 and study area context map are provided in Figure 1.

Baseline intersection lane geometry and traffic controls are shown on Figure 2.




HUMBOLDT COUNTY




**Legend:**

1 Study Intersection-Existing Conditions

1 Study Intersection-Proposed Conditions

Project Area

N

N.T.S.

GHD

REDWOOD WAY SENIOR HOUSING PLANNED UNIT DEVELOPMENT

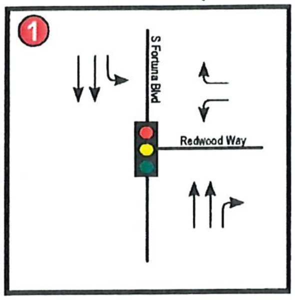
**Project Vicinity & Location Map**

| | |
|---|---|
| Project No. | 11186918 |
| Revision No. | - |
| Date | 12/14/2018 |

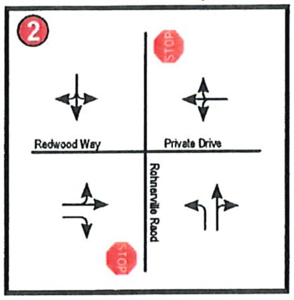
**FIGURE 1**

\\ghdnet\ghd\US\Santa Rosa\Projects\111\11186918 SENIOR HOUSING DEVELOPMENT\04-Technical Work\Figures\Indesign\Vicinity + Location Map.indd
December 12, 2018 4:56 PM

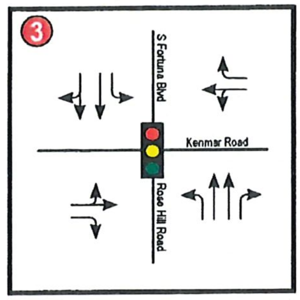
South Fortuna Blvd/
Redwood Way



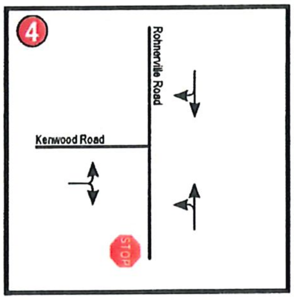

Rohnerville Road/
Redwood Way



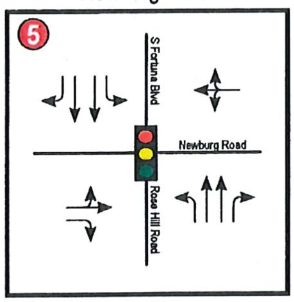

South Fortuna Blvd/
Kenmar Road



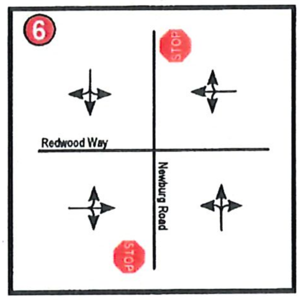

Rohnerville Road/
Kenwood Road



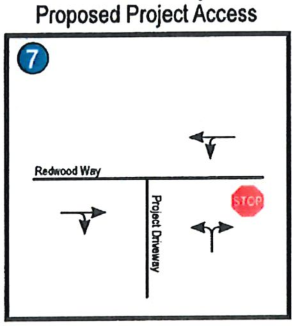

South Fortuna Blvd/
Newburg Road




Rohnerville Road/
Newburg Road




Redwood Way/
Proposed Project Access




**Legend:**

1 Study Intersection – Existing Conditions

1 Study Intersection – Proposed Conditions

Signalized Intersection

STOP Stop Sign

N

REDWOOD WAY SENIOR HOUSING
PLANNED UNIT DEVELOPMENT

**Intersection Lane Geometry & Traffic Controls**

Project No. 11186918
Revision No. -
Date 12/14/2018

**FIGURE 2**

\\ghdnet\ghd\US\Santa Rosa\Projects\111\11186918 SENIOR HOUSING DEVELOPMENT\04-Technical Work\Figures\Indesign\Existing Lane Geometry + TC.indd
December 14, 2018 11:57 AM

## 3.3 Traffic Volumes

Peak weekday a.m. and p.m. traffic counts were collected as part of this study in June 2015 and April 2016 and adjusted to a Baseline Condition with the addition of traffic generated by the Open Door Community Health Center and McLean Community Center Projects. The traffic count data is included in Appendix B.

### 3.3.1 Intersection Turning Movement Volumes

Peak weekday a.m. and p.m. intersection turning movement volumes are indicated in Figure 3.

## 3.4 Baseline Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis based on baseline turning movement traffic volumes are summarized in Table 5. The analysis finds that, based on the City of Fortuna significance thresholds, all but one movement within all of the study intersections are operating acceptably. At the intersection of Rohnerville Road at Newburg Road, the westbound approach operates at LOS D during the p.m. peak hour.

The signalized intersections within the study area were evaluated assuming optimized signal cycle lengths, as well as appropriate pedestrian crossing time considerations. The Baseline Conditions Scenario Level of Service calculations are provided in Appendix C.

**Table 5 Baseline Conditions Scenario Intersection Level of Service**

| No. | Intersection | Weekday Peak Hour | | | |
|---|---|---|---|---|---|
| | | a.m. | | p.m. | |
| | | Delay (sec) | LOS | Delay (sec) | LOS |
| 1 | South Fortuna Boulevard / Redwood Way [1] | 9.7 | A | 11.6 | B |
| 2 | Rohnerville Road / Redwood Way [2] | | | | |
| | *Northbound left* | *8.0* | *A* | *8.2* | *A* |
| | *Eastbound left* | *17.1* | *C* | *19.5* | *C* |
| | *Eastbound right* | *10.3* | *B* | *11.3* | *B* |
| | *Westbound right / left* | *20.1* | *C* | *0.0* | *A* |
| | *Southbound thru / left* | *7.8* | *A* | *7.8* | *A* |
| 3 | South Fortuna Boulevard / Kenmar Road [1] | 33.2 | C | 28.5 | C |
| 4 | Rohnerville Road / Kenwood Road [2] | | | | |
| | *Northbound left* | *7.8* | *A* | *8.0* | *A* |
| | *Eastbound right / left* | *12.9* | *B* | *12.9* | *B* |
| 5 | South Fortuna Boulevard / Newburg Road [1] | 14.8 | B | 12.9 | B |
| 6 | Rohnerville Road / Newburg Road [2] | | | | |
| | *Northbound left* | *8.0* | *A* | *7.9* | *A* |
| | *Eastbound right / left* | *18.1* | *C* | *24.4* | *C* |
| | *Westbound right / left* | *16.9* | *C* | ***26.3*** | ***D*** |
| | *Southbound left* | *7.8* | *A* | *8.1* | *A* |

Notes: Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
**Bold** = results exceed acceptable LOS
[1]LOS based on HCM6 method of analysis for Signalized intersections.
[2]LOS based on HCM6 method of analysis for TWSC intersections.

## 3.5 Baseline Conditions Signalized Intersections Queue Analysis

Baseline traffic volumes were applied to signalized study intersections and the peak hour demand 50th and 95th percentile queue lengths were reviewed against the existing lane storage capacity at the intersections. The Baseline Peak Hour Intersection Queue Analysis is summarized in Table 6. Detailed results are provided in Appendix C.

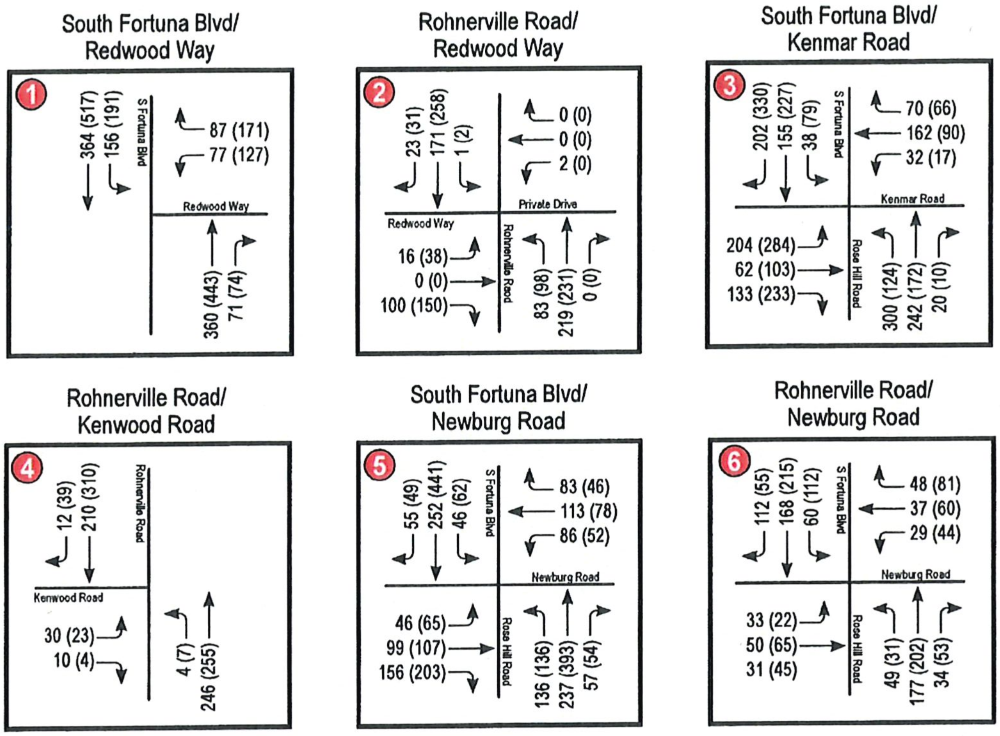
Peak hour 95th percentile queue lengths exceed existing storage lane capacity at the northbound left turn at South Fortuna Boulevard and Newburg Road in both peak hours. It is important to note that there is excess capacity in the through lanes, so the intersection as a whole is only minimally affected by this congestion.

**Table 6 Summary of Baseline Peak Hour Intersection Queue Analysis**

| Movement | Lanes / Avail. Storage | Queue Length - 50th / 95th (feet/feet) | | | |
|---|---|---|---|---|---|
| | | a.m. | | p.m. | |
| **Intersection No. 1 – South Fortuna Boulevard / Redwood Way** | | | | | |
| NBT | 2 / 1,700 ft | 31 | 60 | 38 | 74 |
| NBR | 1 / 75 ft | 0 | 18 | 0 | 19 |
| SBT | 2 / 1,350 ft | 15 | 32 | 23 | 50 |
| SBL | 1 / 150 ft | 39 | 115 | 47 | 142 |
| WBL | 1 / 550 ft | 17 | 44 | 28 | 62 |
| WBR | 1 / 60 ft | 0 | 26 | 0 | 34 |
| **Intersection No. 3 - South Fortuna Boulevard / Kenmar Road** | | | | | |
| NBL | 1 / 500 ft | 158 | 317 | 49 | 139 |
| NBT | 1 / 200 ft<br>1 / 3,300 ft | 48 | 79 | 28 | 54 |
| NBR | 1 / 50 ft | 0 | 0 | 0 | 0 |
| SBL | 1 / 85 ft | 20 | 52 | 31 | 81 |
| SBT / R | 2 / 1,000 ft | 36 | 77 | 38 | 85 |
| EBT / L | 1 / 2,750 ft | 136 | 268 | 148 | 318 |
| EBR | 1 / 150 ft | 0 | 31 | 0 | 50 |
| WBT / L | 1 / 770 ft | 97 | 166 | 40 | 82 |
| WBR | 1 / 100 ft | 0 | 0 | 0 | 0 |
| **Intersection No. 5 – South Fortuna Boulevard / Newburg Road** | | | | | |
| NBL | 1 / 70 ft | 41 | **#118** | 35 | **#109** |
| NBT | 2 / 1,350 ft | 15 | 47 | 34 | 71 |
| NBR | 1 / 120 ft | 0 | 9 | 0 | 6 |
| SBL | 1 / 70 ft | 14 | 41 | 16 | 57 |
| SBT | 2 / 275 ft | 28 | 54 | 42 | 86 |
| SBR | 1 / 110 ft | 0 | 9 | 0 | 5 |
| EBT / L | 1 / 275 ft | 35 | 74 | 39 | 81 |
| EBR | 1 / 100 ft | 0 | 32 | 0 | 35 |
| WBR / T / L | 1 / 525 ft | 63 | 130 | 31 | 72 |

Notes: Queue shown is maximum after two cycles

~ - Volume exceeds capacity, queue is theoretically infinite
# - 95th percentile volume exceeds capacity, queue may be longer
M – Volume for 95th percentile queue is metered by upstream signal
**Bold** = results where available storage is exceeded by more than one standard vehicle, 25 ft.




**Legend:**

1 Study Intersection – Baseline Conditions

xxx Weekday AM Peak Hour Volume

(xxx) Weekday PM Peak Hour Volume

N

GHD

REDWOOD WAY SENIOR HOUSING
PLANNED UNIT DEVELOPMENT

**Baseline Conditions Intersection Traffic Volumes**

Project No. 11186918
Revision No. -
Date 12/14/2018

**FIGURE 3**

\\ghdnet\ghd\US\Santa Rosa\Projects\111\11186918 SENIOR HOUSING DEVELOPMENT\04-Technical Work\Figures\Indesign\Baseline Intersection TV.indd
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# 4. Project Trip Generation, Distribution and Assignment

This section discusses the methods and analysis conducted in selecting trip generation rates and assigning Project trips to the existing roadway network. The magnitude of traffic produced by the proposed project and the locations where that traffic would appear is estimated using the three step process of trip generation, trip distribution and trip assignment. The number of project trips generated during the weekday a.m. and p.m. peak hour were estimated using standard Institute of Transportation Engineers (ITE) *Trip Generation Manual 10th Edition* (ITE, 2017) rates for the associated land use type. This standard reference is used by jurisdictions throughout the country, and is based on actual trip generation studies performed at numerous locations in areas of various populations. The range of rates suggested by the *Trip Generation Manual* and the associated project samples used to formulate the rates were compared to the anticipated project size and scope of work.

The proposed Senior Housing development site plan involves construction of 59 detached dwelling units and a community center, parking for 36 vehicles on private streets, and dedication of right-of-way for a trail associated with the John Campbell Memorial Greenway and Strongs Creek Trail Final Master Plan. The proposed development site plan is included in Appendix A.

## 4.1 Trip Generation

For the analysis of potential Project-related traffic impacts a trip generation rate was selected for the project based on ITE trip generation rates. Several potential trip generation rates were reviewed for the proposed Senior Housing development. The *Guidelines for Estimating Trip Generation* from ITE *Trip Generation Manual 10th Edition* (ITE, 2017) were utilized in selecting the appropriate trip generation rates. *Trip Generation Manual* land use classifications are based on specific sites and data collected over years of study for the purpose of estimating trip generation for specific land usages.

The ITE trip generation rates under the "Residential" land use category (and ITE land use code) selected for evaluation is as follows:

- Senior Adult Housing - Detached (251) – "*Senior adult housing consists of detached independent living developments*, including retirement communities, age-restricted housing, and active adult communities. These developments may include amenities such as golf courses, swimming pools, 24-hour security, transportation, *and common recreational facilities.* However, they generally lack centralized dining and on-site health facilities. Detached senior adult housing communities may or may not be gated. Residents in these communities are typically active (requiring little to no medical supervision). The percentage of retired residents varies by development. Senior adult housing—attached (Land Use 252), congregate care facility (Land Use 253), assisted living (Land Use 254), and continuing care retirement community (Land Use 255) are related land uses."

Table 7 shows the trip generation rates and corresponding trips generated by the land use associated with the proposed Senior Housing development plan for the weekday a.m. and p.m. peak hours. The total number of additional trips in the a.m. peak hour would be 28, while the total number of additional trips in the p.m. peak hour would be 33. Appendix D includes the full trip generation calculation.

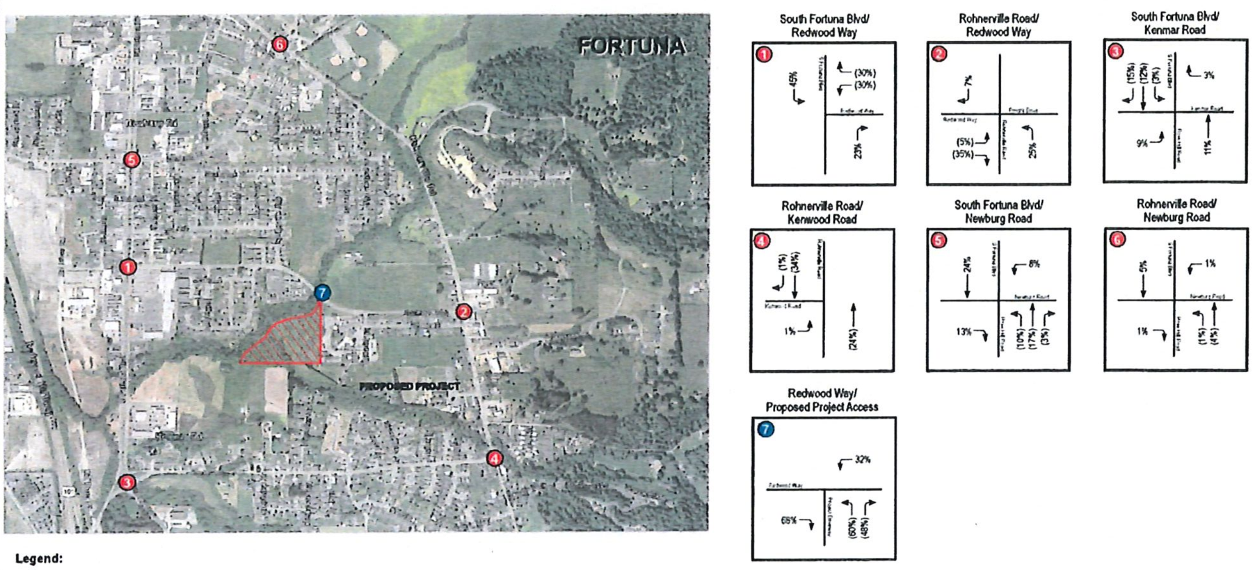
Table 7 Project Trip Generation

| Land Use (#) | Units (Dwellings) | a.m. Peak Hour | | p.m. Peak Hour | |
|---|---|---|---|---|---|
| | | Rate | Trips | Rate | Trip s |
| Senior Adult Housing - Detached (251) | 59 | 0.46 | 28 | .54 | 33 |
| **Total Project Trips** | | | **28** | | **33** |

## 4.2 Trip Distribution and Assignment

Trip distribution was based on existing traffic patterns established from the intersection turning movement counts, along with consideration of residential land use.

The numbers of entering and exiting trips were factored from the number of peak hour project-generated trips tabulated above, based on directional distribution rates suggested by the ITE *Trip Generation Manual*. These entering and exiting trips were further distributed to the surrounding roadway system based on probable origins and destinations together with existing traffic patterns in the study area. The trip assignment was based on an existing distribution of approximately 33 percent, or 9, of the site-generated trips in the a.m. peak hour entering the site, while approximately 67 percent, or 19, of site-generated trips exit the site. Likewise, existing traffic count data shows approximately 39 percent, or 13, of the site-generated trips in the p.m. peak hour exiting the site, while approximately 61 percent, or 20, of site-generated trips enter the site. These additional entering/exiting trips were further distributed onto the existing roadway network, based on patterns exhibited by existing turning movement volumes. Trip distribution percentages are shown in Figures 4a and 4b. Numbers shown with Figures 4a and 4b represent percentages applicable to entering traffic or baseline peak hour traffic volumes as shown above.




**Legend:**

Study Intersection – Existing Conditions

Study Intersection – Proposed Conditions

XX% → Percentage of Entering Traffic

(XX%) → Percentage of Exiting Traffic

REDWOOD WAY SENIOR HOUSING
PLANNED UNIT DEVELOPMENT

Project No. 11186918
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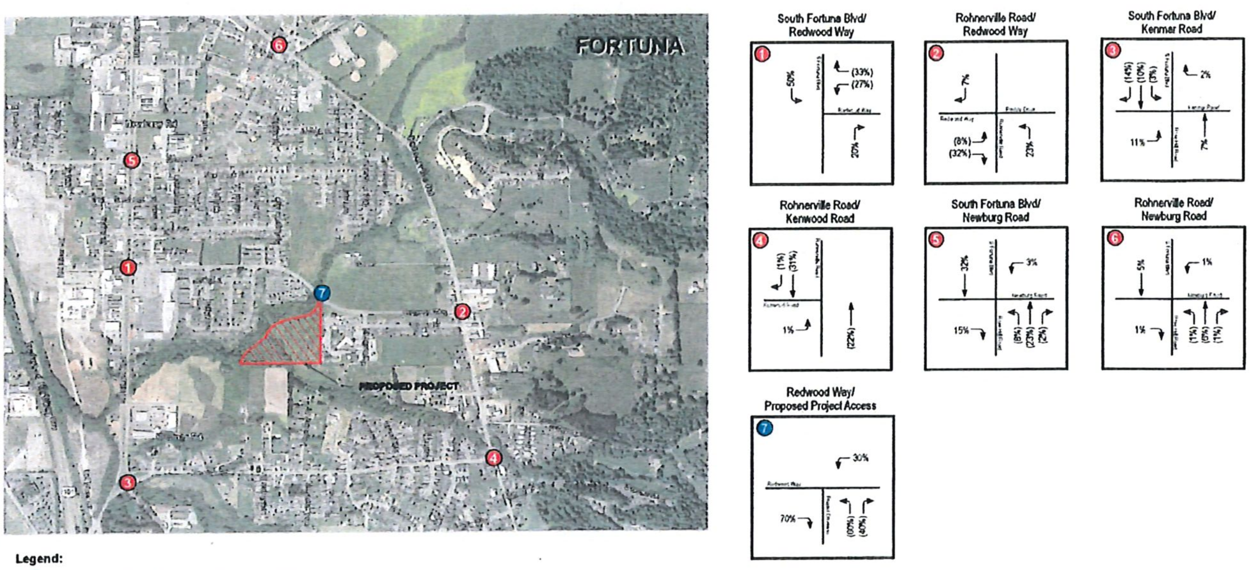
PROJECT TRIP DISTRIBUTION – AM

FIGURE 4a




**Legend:**

- Study Intersection – Existing Conditions
- Study Intersection – Proposed Conditions
- XX% → Percentage of Entering Traffic
- (XX%) → Percentage of Exiting Traffic

REDWOOD WAY SENIOR HOUSING
PLANNED UNIT DEVELOPMENT

Project No. 11106910
Revision No. -
Date 12/14/2010

PROJECT TRIP DISTRIBUTION – PM

FIGURE 4b

# 5. Baseline plus Project Conditions

This section describes the Baseline plus Project Conditions Scenario, potential impacts and recommended mitigation measures, if any, at the study intersections during the weekday a.m. and p.m. peak hour.

## 5.1 Baseline Plus Project Conditions Traffic Volumes

Baseline plus Project Conditions traffic volumes are shown in Figure 5. Baseline plus project traffic volumes are represented by baseline traffic volumes with the addition of project related trips assigned to the roadway network, as discussed in Section 4.

## 5.2 Baseline Plus Project Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis based on baseline plus project turning movement traffic volumes are summarized in Table 8. Based on the analyses of the Project trip distribution added to the study area, all but one movement within all of the study intersections are operating acceptably. As with the Baseline Conditions at the intersection of Rohnerville Road at Newburg Road, the westbound approach operates at LOS D during the p.m. peak hour. This is insignificant with regard to thresholds as the conditions exists under the Baseline Conditions, and there is no change in LOS from conditions without the Project.

With the exception of the proposed project access to Redwood Way (intersection No. 7), the study area intersections were evaluated assuming no planned geometric changes to the associated roadway network. The signalized intersections within the study area were evaluated assuming the same optimized signal cycle lengths as were modeled with the Baseline Conditions scenario. The Baseline plus Project Conditions Scenario Level of Service calculations are provided in Appendix E.

**Table 8 Baseline plus Project Conditions Scenario Intersection Level of Service**

| No. | Intersection | Weekday Peak Hour | | | |
|---|---|---|---|---|---|
| | | a.m. | | p.m. | |
| | | Delay (sec) | LOS | Delay (sec) | LOS |
| 1 | South Fortuna Boulevard / Redwood Way [1] | 10.1 | B | 11.9 | B |
| 2 | Rohnerville Road / Redwood Way [2] | | | | |
| | *Northbound left* | *8* | *A* | *8.2* | *A* |
| | *Eastbound left* | *17.4* | *C* | *20.0* | *C* |
| | *Eastbound right* | *10.4* | *B* | *11.4* | *B* |
| | *Westbound right / left* | *20.6* | *C* | *0.0* | *A* |
| | *Southbound thru / left* | *7.8* | *A* | *7.8* | *A* |
| 3 | South Fortuna Boulevard / Kenmar Road [1] | 33.3 | C | 28.7 | C |
| 4 | Rohnerville Road / Kenwood Road [2] | | | | |
| | *Northbound left* | *7.9* | *A* | *8.1* | *A* |
| | *Eastbound right / left* | *13.1* | *B* | *13.0* | *B* |
| 5 | South Fortuna Boulevard / Newburg Road [1] | 14.9 | B | 12.9 | B |
| 6 | Rohnerville Road / Newburg Road [2] | | | | |
| | *Northbound left* | *8.0* | *A* | *7.9* | *A* |
| | *Eastbound right / left* | *18.2* | *C* | *24.6* | *C* |
| | *Westbound right / left* | *17.0* | *C* | ***26.7*** | ***D*** |
| | *Southbound left* | *7.8* | *A* | *8.1* | *A* |
| 7 | Proposed Project Driveway at Redwood Way [1] | | | | |
| | *Northbound right / left* | *10.4* | *B* | 10.6 | B |
| | *Westbound left* | *7.7* | *A* | 7.7 | A |

Notes: Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
**Bold** = results exceed acceptable LOS
[1]LOS based on HCM6 method of analysis for Signalized intersections.
[2]LOS based on HCM6 method of analysis for TWSC intersections.

## 5.3 Baseline Plus Project Conditions Signalized Intersections Queue Analysis

Baseline plus Project traffic volumes were applied to signalized study intersections and the peak hour demand 50th and 95th percentile queue lengths were reviewed against the existing lane storage capacity at the intersections. The queue analysis is summarized in Table 9, and also included in Appendix E.

Peak hour 95th percentile queue lengths exceed existing storage lane capacity at the northbound left turn at South Fortuna Boulevard and Newburg Road in both peak hours. It is important to note that this is the same movement that was reported as exceeding existing storage lengths with the Baseline Conditions scenario. With the proposed Project queue lengths are projected to extend by 2 feet, which is less than an additional vehicle. This is assumed to be insignificant with regard to City's thresholds.

Table 9 Summary of Baseline plus Project Peak Hour Intersection Queue Analysis

| Movement | Lanes / Avail. Storage | Queue Length - 50th / 95th (feet/feet) | | | |
|---|---|---|---|---|---|
| | | a.m. | | p.m. | |
| **Intersection No. 1 – South Fortuna Boulevard / Redwood Way** | | | | | |
| NBT | 2 / 1,700 ft | 31 | 60 | 38 | 74 |
| NBR | 1 / 75 ft | 0 | 18 | 0 | 20 |
| SBT | 2 / 1,350 ft | 15 | 33 | 23 | 50 |
| SBL | 1 / 150 ft | 40 | 121 | 49 | 149 |
| WBL | 1 / 550 ft | 19 | 46 | 28 | 63 |
| WBR | 1 / 60 ft | 0 | 26 | 0 | 34 |
| **Intersection No. 3 - South Fortuna Boulevard / Kenmar Road** | | | | | |
| NBL | 1 / 500 ft | 158 | 317 | 49 | 139 |
| NBT | 1 / 200 ft<br>1 / 3,300 ft | 48 | 79 | 28 | 55 |
| NBR | 1 / 50 ft | 0 | 0 | 0 | 0 |
| SBL | 1 / 85 ft | 20 | 52 | 31 | 81 |
| SBT / R | 2 / 1,000 ft | 37 | 78 | 38 | 85 |
| EBT / L | 1 / 2,750 ft | 136 | 269 | 150 | 323 |
| EBR | 1 / 150 ft | 0 | 31 | 0 | 50 |
| WBT / L | 1 / 770 ft | 97 | 166 | 40 | 82 |
| WBR | 1 / 100 ft | 0 | 0 | 0 | 5 |
| **Intersection No. 5 – South Fortuna Boulevard / Newburg Road** | | | | | |
| NBL | 1 / 70 ft | 41 | **#120** | 35 | **#111** |
| NBT | 2 / 1,350 ft | 16 | 50 | 34 | 72 |
| NBR | 1 / 120 ft | 0 | 10 | 0 | 6 |
| SBL | 1 / 70 ft | 13 | 40 | 16 | 57 |
| SBT | 2 / 275 ft | 28 | 54 | 43 | 87 |
| SBR | 1 / 110 ft | 0 | 9 | 0 | 5 |
| EBT / L | 1 / 275 ft | 35 | 74 | 39 | 81 |
| EBR | 1 / 100 ft | 0 | 32 | 0 | 35 |
| WBR / T / L | 1 / 525 ft | 64 | 132 | 32 | 73 |

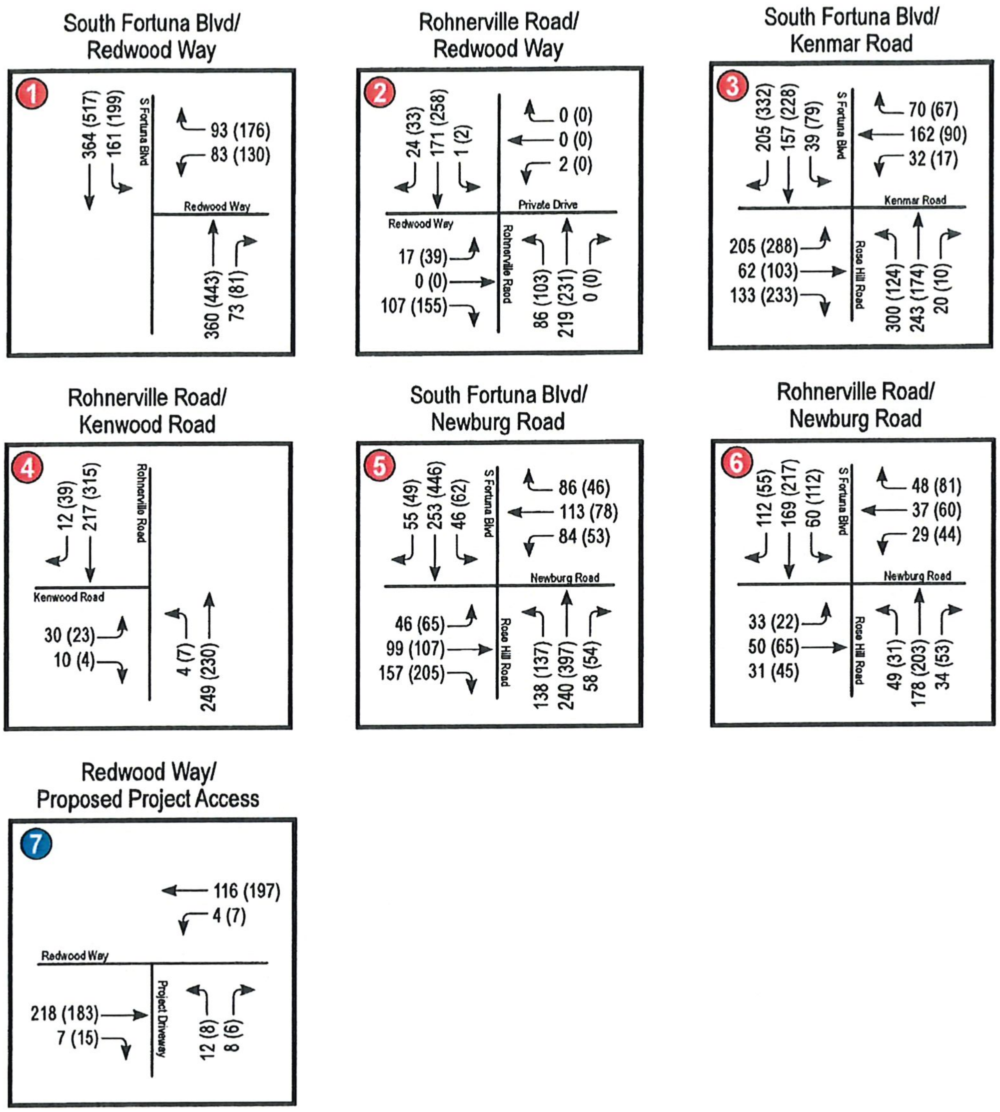
Notes: Queue shown is maximum after two cycles

~ - Volume exceeds capacity, queue is theoretically infinite;

# - 95th percentile volume exceeds capacity, queue may be longer

M – Volume for 95th percentile queue is metered by upstream signal

**Bold** = results where available storage is exceeded by more than one standard vehicle, 25 ft.




**Legend:**

| | |
|---|---|
| 1 (red) | Study Intersection – Baseline Conditions |
| 1 (blue) | Study Intersection – Proposed Conditions |
| xxx | Weekday AM Peak Hour Volume |
| (xxx) | Weekday PM Peak Hour Volume |

N

GHD

REDWOOD WAY SENIOR HOUSING
PLANNED UNIT DEVELOPMENT

**Baseline Plus Project Conditions Intersection Traffic Volumes**

Project No. 11186918
Revision No. -
Date 12/14/2018

**FIGURE 5**

# 6. Cumulative Conditions

The potential cumulative impacts of 20-year regional growth to the transportation network were evaluated under the Cumulative Conditions Scenario. The forecasted traffic volumes at each of the study intersections for year 2039 were estimated by applying population-based growth factors to existing (2015/16) traffic turning movement counts. A uniform annual growth rate of 1.60%, which was estimated through discussions with the City and review of population growth trends in the vicinity of the study area roadway network, was applied to each approach of each of the study area intersections to forecast 20-year regional growth.

## 6.1 Cumulative Conditions Intersection Controls

With the exception of Rohnerville Road at Redwood Way and Rohnerville Road at Newburg Road, all study intersection geometric and traffic controls are assumed to remain as analyzed under Baseline Conditions, with the exception of both Rohnerville Road at Newburg Road and Rohnerville Road at Redwood Way. For the purposes of this analysis, based on knowledge of past studies and development projects, the intersection control of both Redwood Way and Newburg Road at Rohnerville Road are assumed to have all-way stop controls installed with existing geometry at some point within the next 20 years. As mentioned, there have been discussions of this change to traffic controls, however the intersections would be expected to operate with moderate delay on the westbound approach until such time that safety, traffic volumes, or other concerns warranted the installation of all-way stop controls. It is therefore reasonably foreseeable that this would occur within the Project's 20 year cumulative horizon.

In order to verify the intersection needs, the future mitigation measures recommended within the *Fortuna General Plan 2030* were not initially modeled with this condition.

Cumulative intersection lane configurations and traffic controls are shown on Figure 6.

## 6.2 Cumulative Conditions Traffic Volumes

Cumulative traffic volumes are shown in Figure 7. These traffic volumes are represented by the projected future traffic volumes in the year 2039 applied to the cumulative roadway network and geometry.

## 6.3 Cumulative Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis based on cumulative turning movement traffic volumes are summarized in Table 10. Based on this analysis, the study intersections are operating acceptably with respect to the City of Fortuna thresholds of significance, with the exception of the signalized intersection of South Fortuna Boulevard and Kenmar Road during both peak hours.

The signalized intersections within the study area were evaluated assuming optimized signal cycle lengths, as well as appropriate pedestrian crossing time considerations. The Cumulative Conditions Scenario Level of Service calculations are provided in Appendix F.

**Table 10 Cumulative Conditions Scenario Intersection Level of Service**

| No. | Intersection | Weekday Peak Hour | | | |
|---|---|---|---|---|---|
| | | a.m. | | p.m. | |
| | | Delay (sec) | LOS | Delay (sec) | LOS |
| 1 | South Fortuna Boulevard / Redwood Way [1] | 10.1 | B | 13.2 | B |
| 2 | Rohnerville Road / Redwood Way [3] | 10.9 | B | 14.2 | B |
| 3 | South Fortuna Boulevard / Kenmar Road [1] | **50.0** | **D** | **57.5** | **E** |
| 4 | Rohnerville Road / Kenwood Road [2] | | | | |
| | *Northbound left* | *7.9* | *A* | *8.2* | *A* |
| | *Eastbound right / left* | *11.2* | *B* | *13.7* | *B* |
| 5 | South Fortuna Boulevard / Newburg Road [1] | 18.2 | B | 16.2 | B |
| 6 | Rohnerville Road / Newburg Road [3] | 12.0 | B | 16.3 | C |

Notes: Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
**Bold** = results exceed acceptable LOS
[1]LOS based on HCM6 method of analysis for Signalized intersections.
[2]LOS based on HCM6 method of analysis for TWSC intersections.
[3]LOS based on HCM6 method of analysis for AWSC intersections.

## 6.4 Cumulative Conditions Intersection Queue Analysis

Cumulative Conditions traffic volumes were applied to signalized study intersections and the peak hour demand 50th and 95th percentile queue lengths were reviewed against the existing lane storage capacity at the intersections. The Cumulative Conditions Peak Hour Intersection Queue Analysis is summarized in Table 11, and copies are provided in Appendix F.

Peak hour 95th percentile queue lengths exceed existing storage lane capacity at some movements at signalized intersections within the study area, including the southbound left turn at the intersections of South Fortuna Boulevard at Redwood Way and at Kenmar Road, during the p.m. peak hour. Like the Baseline Conditions, the 95th percentile queue lengths exceed existing storage lane capacity at the northbound left turn at South Fortuna Boulevard and Newburg Road in both peak hours. This congestion does not significantly affect the intersections as a whole because of the excess capacity in the adjacent through lanes.

The *Fortuna General Plan 2030* identifies some mitigation measures to be considered for the future for the study area intersections. These include the addition of east and westbound left turn pockets and associated protected left turn phasing at intersection South Fortuna Boulevard and Newburg Road, and the implementation of overlap phasing in the east and westbound directions at intersection South Fortuna Boulevard and Kenmar Road. Additionally, the intersection of Rohnerville Road at Newburg Road and Redwood Way would be improved to either roundabout or traffic signals. Traffic models prepared as a part of this study do not indicate that these measures would change the Cumulative queuing described above and tabulated with Table 11 below.

**Table 11 Summary of Cumulative Peak Hour Intersection Queue Analysis**

| Movement | Lanes / Avail. Storage | Queue Length - 50th / 95th (feet/feet) | | | |
|---|---|---|---|---|---|
| | | a.m. | | p.m. | |
| **Intersection No. 1 – South Fortuna Boulevard / Redwood Way** | | | | | |
| NBT | 2 / 1,700 ft | 53 | 96 | 60 | 114 |
| NBR | 1 / 75 ft | 0 | 25 | 0 | 25 |
| SBT | 2 / 1,350 ft | 23 | 47 | 40 | 87 |
| SBL | 1 / 150 ft | 50 | 107 | 81 | **#213** |
| WBL | 1 / 550 ft | 27 | 62 | 40 | 82 |
| WBR | 1 / 60 ft | 0 | 31 | 0 | 37 |
| **Intersection No. 3 - South Fortuna Boulevard / Kenmar Road** | | | | | |
| NBL | 1 / 500 ft | 247 | 435 | 80 | 201 |
| NBT | 1 / 200 ft<br>1 / 3,300 ft | 71 | 104 | 38 | 71 |
| NBR | 1 / 50 ft | 0 | 0 | 0 | 0 |
| SBL | 1 / 85 ft | 30 | 67 | 42 | **#119** |
| SBT / R | 2 / 1,000 ft | 59 | 111 | 55 | 118 |
| EBT / L | 1 / 2,750 ft | 203 | 379 | 256 | 456 |
| EBR | 1 / 150 ft | 1 | 56 | 14 | 79 |
| WBT / L | 1 / 770 ft | 153 | 285 | 41 | 83 |
| WBR | 1 / 100 ft | 0 | 13 | 0 | 18 |
| **Intersection No. 5 – South Fortuna Boulevard / Newburg Road** | | | | | |
| NBL | 1 / 70 ft | 67 | **#148** | 55 | **#160** |
| NBT | 2 / 1,350 ft | 42 | 69 | 58 | 101 |
| NBR | 1 / 120 ft | 0 | 12 | 0 | 6 |
| SBL | 1 / 70 ft | 16 | 43 | 17 | 55 |
| SBT | 2 / 275 ft | 51 | 83 | 73 | 123 |
| SBR | 1 / 110 ft | 0 | 3 | 0 | 13 |
| EBT / L | 1 / 275 ft | 59 | 113 | 59 | 115 |
| EBR | 1 / 100 ft | 0 | 39 | 4 | 46 |
| WBR / T / L | 1 / 525 ft | 112 | 246 | 36 | 81 |

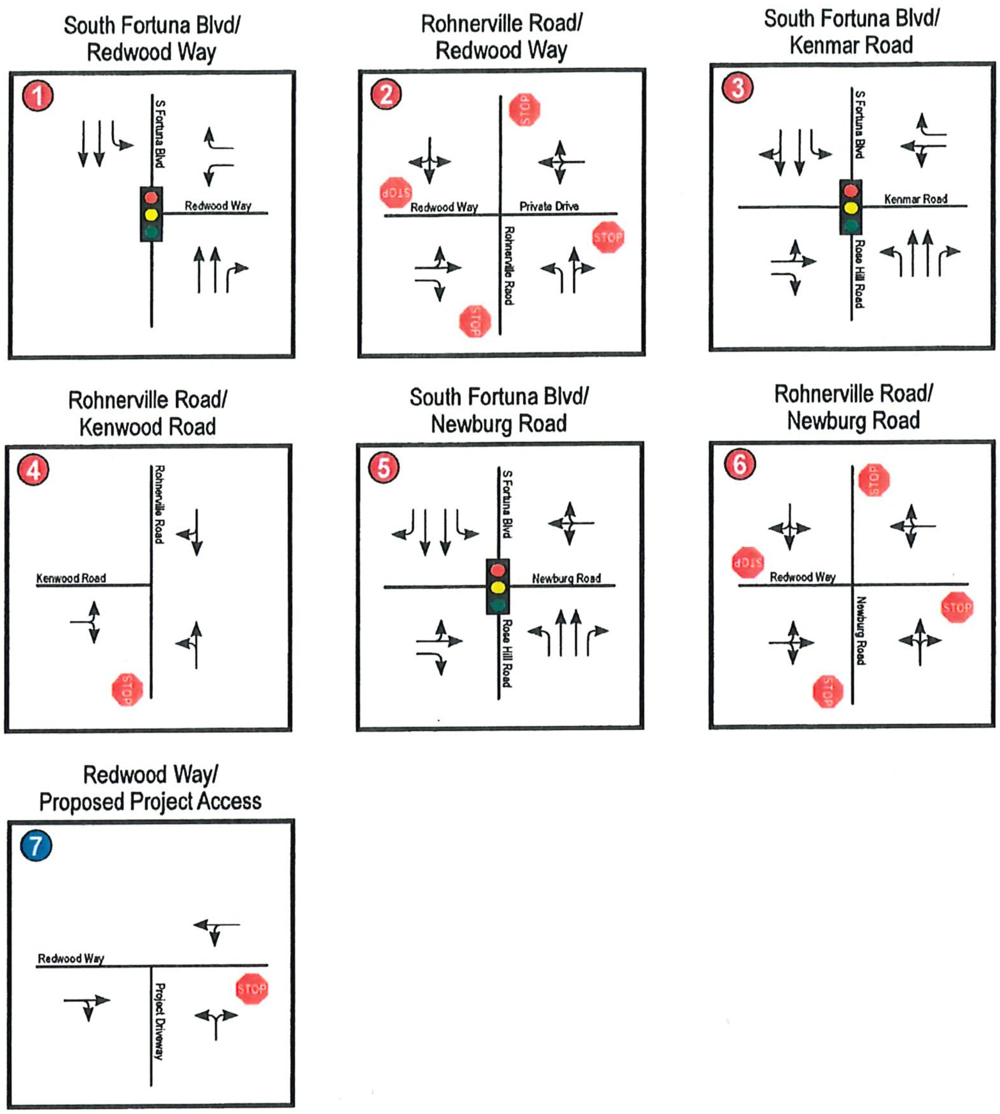
Notes: Queue shown is maximum after two cycles

~ - Volume exceeds capacity, queue is theoretically infinite

# - 95th percentile volume exceeds capacity, queue may be longer

M – Volume for 95th percentile queue is metered by upstream signal

**Bold** = results where available storage is exceeded by more than one standard vehicle, 25 ft.




**Legend:**

1 Study Intersection – Existing Conditions

1 Study Intersection – Proposed Conditions

Signalized Intersection

STOP Stop Sign

N

REDWOOD WAY SENIOR HOUSING
PLANNED UNIT DEVELOPMENT

**Cumulative**
**Intersection Lane Geometry**
**& Traffic Controls**

| | |
|---|---|
| Project No. | 11186918 |
| Revision No. | - |
| Date | 12/14/2018 |

**FIGURE 6**

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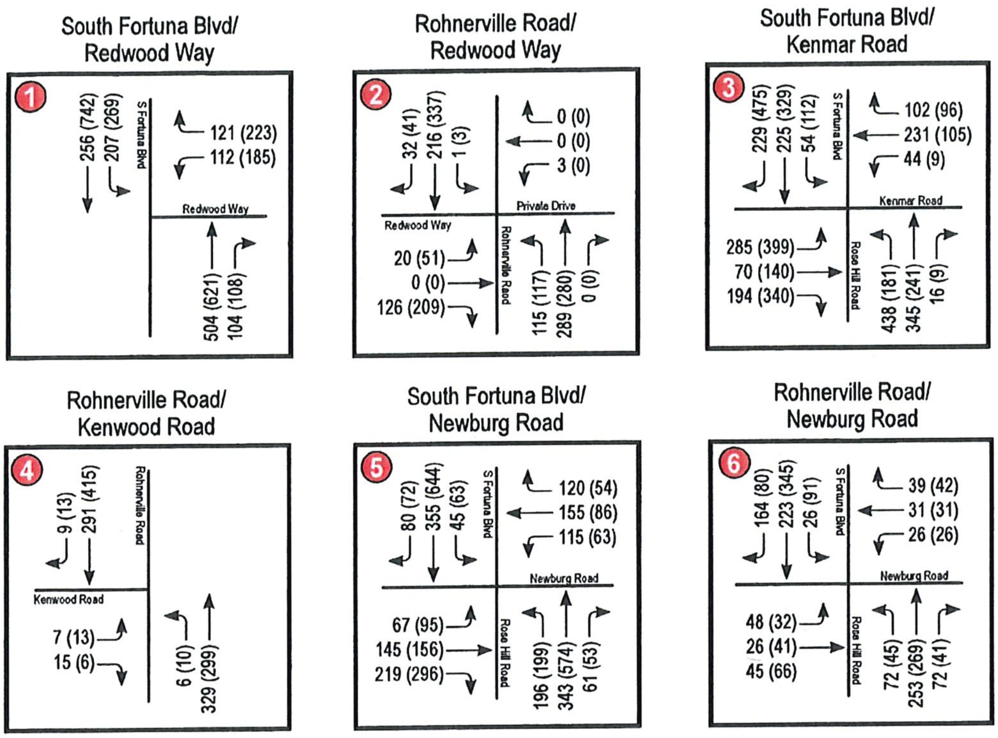



**Legend:**

| | |
|---|---|
| 1 (red) | Study Intersection – Baseline Conditions |
| 1 (blue) | Study Intersection – Proposed Conditions |
| xxx | Weekday AM Peak Hour Volume |
| (xxx) | Weekday PM Peak Hour Volume |

N

GHD

REDWOOD WAY SENIOR HOUSING
PLANNED UNIT DEVELOPMENT

**Cumulative Conditions**
**Intersection Traffic Volumes**

Project No. 11186918
Revision No. -
Date 12/14/2018

**FIGURE 7**

\\ghdnet\ghd\US\Santa Rosa\Projects\111\11186918 SENIOR HOUSING DEVELOPMENT\04-Technical Work\Figures\Indesign\Cumulative Intersection TV.indd
December 14, 2018 11:59 AM

# 7. Cumulative Plus Project Conditions

This section describes the Cumulative plus Project Conditions Scenario, potential significant impacts and recommended mitigation measures, if any, at the study intersections during the weekday a.m. and p.m. peak hours.

## 7.1 Cumulative Plus Project Conditions Traffic Volumes

Cumulative plus Project Conditions traffic volumes are shown in Figure 8. Cumulative plus project traffic volumes are represented by the cumulative traffic volumes, with annual growth rate factors discussed in Section 6, with the addition of project related trips assigned to the roadway network, as discussed in Section 4.

## 7.2 Cumulative Plus Project Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis based on Cumulative plus Project turning movement traffic volumes are summarized in Table 12. Based on this analysis, the study intersections are operating acceptably with respect to the City of Fortuna thresholds of significance, with the exception of the signalized intersection South Fortuna Boulevard and Kenmar Road, during both peak hours. It is important to note that the exceedance of the significance threshold is largely due to surrounding traffic growth, as this movement also exceeded the threshold in the Cumulative Conditions scenario. The Cumulative Plus Project Conditions Scenario Level of Service calculations are provided in Appendix G.

**Table 12 Cumulative Plus Project Conditions Scenario Intersection Level of Service**

| No. | Intersection | Weekday Peak Hour | | | |
|---|---|---|---|---|---|
| | | a.m. | | p.m. | |
| | | Delay (sec) | LOS | Delay (sec) | LOS |
| 1 | South Fortuna Boulevard / Redwood Way [1] | 10.3 | B | 13.5 | B |
| 2 | Rohnerville Road / Redwood Way [3] | 11.0 | B | 14.4 | B |
| 3 | South Fortuna Boulevard / Kenmar Road [1] | **50.2** | **D** | **58.5** | **E** |
| 4 | Rohnerville Road / Kenwood Road [2] | | | | |
| | *Northbound left* | *7.9* | *A* | *8.2* | *A* |
| | *Eastbound right / left* | *11.2* | *B* | *13.8* | *B* |
| 5 | South Fortuna Boulevard / Newburg Road [1] | 18.3 | B | 16.3 | B |
| 6 | Rohnerville Road / Newburg Road [3] | 12.1 | B | 16.5 | C |
| 7 | Redwood Way / Project Driveway | | | | |
| | *Northbound right / left* | *10.8* | *B* | 11.3 | B |
| | *Westbound left* | *7.8* | *A* | 7.8 | A |

Notes: Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
**Bold** = results exceed acceptable LOS
[1]LOS based on HCM6 method of analysis for Signalized intersections.

## 7.3 Cumulative Plus Project Conditions Intersection Queue Analysis

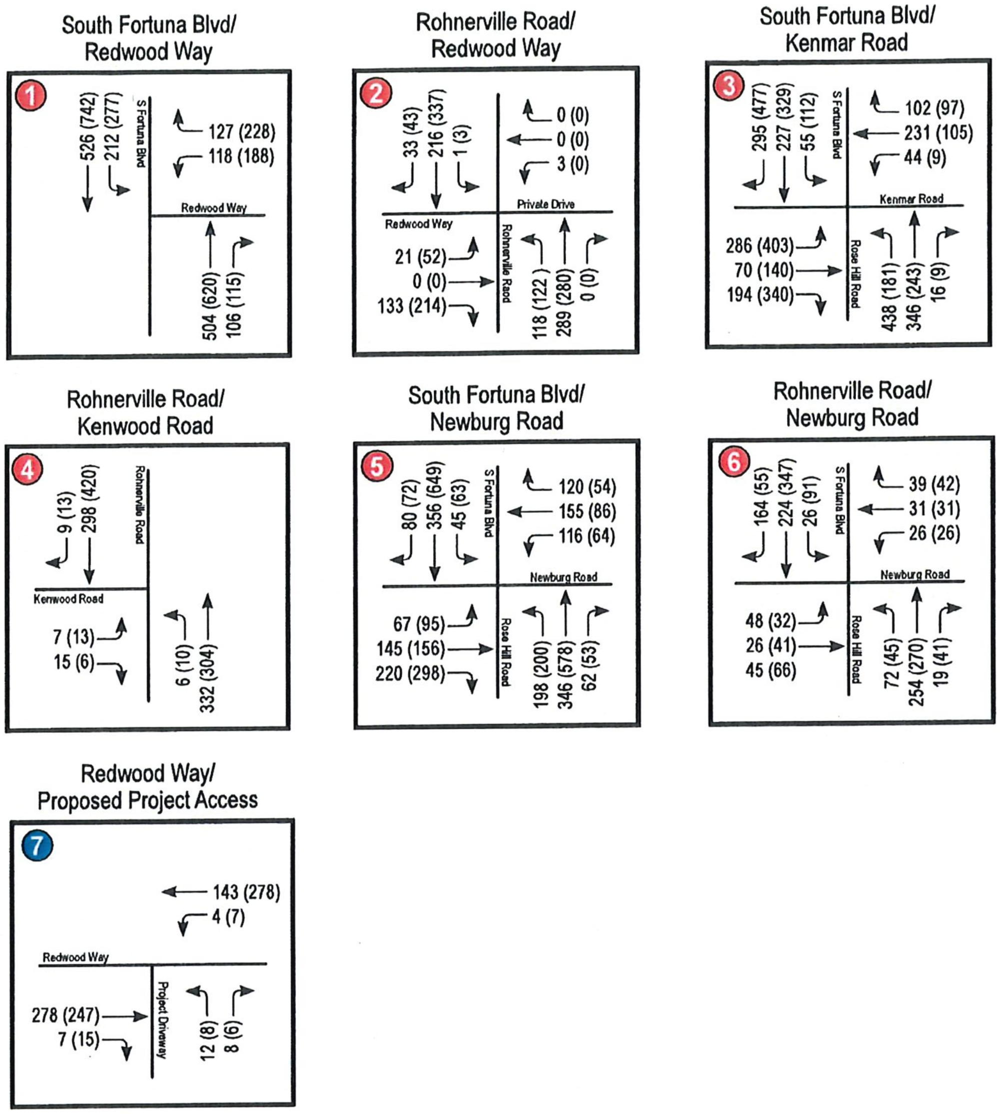
Cumulative plus Project Conditions traffic volumes were applied to signalized study intersections and the peak hour demand 50th and 95th percentile queue lengths were reviewed against the existing lane storage capacity at the intersections. The Cumulative Conditions Peak Hour Intersection Queue Analysis is summarized in Table 13, and copies are provided in Appendix G.

Peak hour 95th percentile queue lengths exceed existing storage lane capacity at some movements at signalized intersections within the study area, including the southbound left turn at the intersections of South Fortuna Boulevard at Redwood Way and at Kenmar Road, during the p.m. peak hour. The 95th percentile queue lengths exceed existing storage lane capacity at the northbound left turn at South Fortuna Boulevard and Newburg Road in both peak hours. The movements that exceed thresholds in the Cumulative plus Project Conditions scenario are the same as those in the Cumulative Conditions analysis. Furthermore, like the Baseline plus Project condition queue analysis, the queue lengths reported are very similar. This congestion does not significantly affect the intersections as a whole because of the excess capacity in the adjacent through lanes.

**Table 13 Summary of Cumulative Plus Project Peak Hour Intersection Queue Analysis**

| Movement | Lanes / Avail. Storage | Queue Length - 50th / 95th (feet/feet) | | | |
|---|---|---|---|---|---|
| | | a.m. | | p.m. | |
| **Intersection No. 1 – South Fortuna Boulevard / Redwood Way** | | | | | |
| NBT | 2 / 1,700 ft | 54 | 97 | 75 | 136 |
| NBR | 1 / 75 ft | 0 | 25 | 0 | 29 |
| SBT | 2 / 1,350 ft | 23 | 48 | 42 | 91 |
| SBL | 1 / 150 ft | 51 | 111 | 74 | **#193** |
| WBL | 1 / 550 ft | 29 | 64 | 48 | 94 |
| WBR | 1 / 60 ft | 0 | 32 | 0 | 40 |
| **Intersection No. 3 - South Fortuna Boulevard / Kenmar Road** | | | | | |
| NBL | 1 / 500 ft | 247 | 435 | 80 | 201 |
| NBT | 1 / 200 ft<br>1 / 3,300 ft | 71 | 105 | 39 | 71 |
| NBR | 1 / 50 ft | 0 | 0 | 0 | 0 |
| SBL | 1 / 85 ft | 30 | 68 | 42 | **#119** |
| SBT / R | 2 / 1,000 ft | 60 | 112 | 55 | 118 |
| EBT / L | 1 / 2,750 ft | 204 | 380 | 259 | 460 |
| EBR | 1 / 150 ft | 1 | 56 | 14 | 80 |
| WBT / L | 1 / 770 ft | 153 | 285 | 41 | 83 |
| WBR | 1 / 100 ft | 0 | 13 | 0 | 19 |
| **Intersection No. 5 – South Fortuna Boulevard / Newburg Road** | | | | | |
| NBL | 1 / 70 ft | 68 | **#149** | 55 | **#160** |
| NBT | 2 / 1,350 ft | 43 | 70 | 64 | 110 |
| NBR | 1 / 120 ft | 0 | 12 | 0 | 6 |
| SBL | 1 / 70 ft | 16 | 43 | 16 | 45 |
| SBT | 2 / 275 ft | 51 | 83 | 73 | 124 |
| SBR | 1 / 110 ft | 0 | 3 | 0 | 13 |
| EBT / L | 1 / 275 ft | 59 | 113 | 59 | 115 |
| EBR | 1 / 100 ft | 0 | 39 | 0 | 41 |
| WBR / T / L | 1 / 525 ft | 112 | 247 | 36 | 82 |

Notes: Queue shown is maximum after two cycles
~ - Volume exceeds capacity, queue is theoretically infinite
# - $95^{th}$ percentile volume exceeds capacity, queue may be longer
M – Volume for $95^{th}$ percentile queue is metered by upstream signal
**Bold** = results where available storage is exceeded by more than one standard vehicle, 25 ft.




**Legend:**

1 Study Intersection – Baseline Conditions

1 Study Intersection – Proposed Conditions

xxx Weekday AM Peak Hour Volume

(xxx) Weekday PM Peak Hour Volume

N

GHD

REDWOOD WAY SENIOR HOUSING
PLANNED UNIT DEVELOPMENT

**Cumulative Plus Project Conditions Intersection Traffic Volumes**

Project No. 11186918
Revision No. -
Date 12/14/2018

**FIGURE 8**

\\ghdnet\ghd\US\Santa Rosa\Projects\111\11186918 SENIOR HOUSING DEVELOPMENT\04-Technical Work\Figures\Indesign\Cumulative + Project Intersection TV.indd
December 14, 2018 11:59 AM

# 8. Conclusions

This section summarizes the conclusions regarding the proposed project and any possible potential traffic impacts.

## 8.1 Baseline plus Project

### 8.1.1 Intersection Operations

Under the proposed Senior Housing Project site trip distribution analyzed with this report, the study intersections are operating at similar LOS to conditions without the proposed Project. All intersections operate acceptably with respect to the City of Fortuna's thresholds of significance, with exception of westbound approach of Newburg Road at intersection with Rohnerville Road. There is no indication that the proposed project would cause any of the existing unsignalized intersections within the study area roadway network to meet requirements justifying the installation of traffic signals with the trip distribution analyzed with this report.

### 8.1.2 Intersection Vehicle Queuing

The movements with peak hour demand 95$^{th}$ percentile queue lengths identified as exceeding the storage lane capacities under the Baseline plus Project Conditions scenario, specifically, the northbound left turn at Rohnerville Road and Newburg Road in both peak hours, were the same as those indicated with the Baseline Conditions scenario. The trip distribution analyzed with this report did not produce a discernable difference in terms of the anticipated length of vehicular queueing in the Baseline plus Project Conditions scenarios.

## 8.2 Cumulative plus Project

### 8.2.1 Intersection Operations

Under the proposed project site trip distribution analyzed with this report, the study intersections are operating acceptably with respect to the City of Fortuna's thresholds of significance, with the exception of the signalized intersection of South Fortuna Boulevard and Kenmar Road. However, the exceedance of the significance threshold is largely due to surrounding traffic growth, and this intersection exceeds the threshold in the Cumulative Conditions scenario.

Furthermore, with the additional of improvements listed for the intersection of South Fortuna Boulevard and Kenmar Road under mitigation of *Fortuna General Plan 2030,* the intersection would operate at LOS D or better with or without the addition of Project trips. This specifically includes the addition of right-turn overlap phases in the eastbound and westbound direction. These intersections specific Level of Service calculations are provided in Appendix G

### 8.2.2 Intersection Vehicle Queuing

The movements with peak hour demand 95$^{th}$ percentile queue lengths identified as exceeding the storage lane capacities under the Cumulative plus Project Conditions scenario, including the southbound left turn at the intersections of South Fortuna Boulevard at Redwood Way and at Kenmar Road, during the p.m. peak hour and the 95$^{th}$ percentile queue of the northbound left turn at South Fortuna Boulevard and Newburg Road in both peak hours, were the same as those indicated with the Cumulative Conditions scenario. The two trip distribution options analyzed with this report do not produce a discernable difference in terms of the anticipated length of vehicular queueing.

### 8.3 Recommendations

As the Strongs Creek trail is noted along the project frontage of the creek, as dedicated to the future development of the overall trail, consideration of access to the trail between each of the adjacent cul-de-sacs should be provided. The trail would provide additional amenity to the project, allowing internal circulation and access to commercial services adjacent neighborhoods. Additionally, the sidewalk gap created between the proposed Project access to Redwood Way and Strongs Creek Bridge should be connected by the proposed Project to further connect the Project development to adjacent services.

Further, the City of Fortuna should consider future development of sidewalk facilities along Redwood Way to provide connection of a southerly sidewalk along from the Project Driveway to St. Joseph's Way for access to medical facilities and transit stops. Access to transit would be provided from the proposed Project driveway to transit facilities via the existing oversized bike lane/shoulder along the southerly side of Redwood Way.

### 8.4 Summary

The study demonstrates that the proposed project improvements at the project development site will have minimal effect on the study roadway network because of the additional trips generated. In review of the Baseline Conditions, this study confirms that the levels of service encountered with the addition of project-generated trips would be the same as those encountered without the addition of project-generated trips. In review of the Cumulative Conditions, this study confirms that the levels of service encountered with the addition of project-generated trips would be the same as those encountered without the addition of project-generated trips.

The planned intersection of the proposed project and Redwood Way will require minimal roadway modifications. For consistency with CAMUTCD recommendations for the appropriate treatment of a minor intersection, it would appropriate to provide a "gap" in the centerline markings at the location of the proposed Project entrance. However, with the trip distribution analyzed with this report, construction of the entrance should not require stop control or significant geometric improvements along Redwood Way.

In conclusion, without the addition of trips generated by the proposed Senior Housing development, the study area roadway network mostly operates and continues to operate adequately in the near term (Baseline), with regards to traffic operations and queuing levels. The lone exception to this is the westbound movement at the intersection of Rohnerville Road and Newburg Road, which exceeds the City's significance threshold in the p.m. peak hour of the Baseline Conditions scenario. Under Cumulative conditions (2039), beyond buildout of the City's current General Plan (2030), all study intersections would be expected to operate acceptably with the addition of improvements noted as mitigation of *Fortuna General Plan 2030.* With the exception of South Fortuna Boulevard and Kenmar Road, which would operate at LOS D during the a.m. peak hour. This exceedance of the significance threshold is largely due to surrounding traffic growth, beyond that covered under the mitigation measures.

# References

Caltrans (2002). *Guide for the Preparation of Traffic Impact Studies*. State of California, Department of Transportation, Sacramento, CA. December 2002.

Caltrans (2012a). *California Manual on Uniform Traffic Control Devices*. State of California, Department of Transportation, Publication Distribution Unit, Sacramento, CA. January 13, 2012.

Caltrans (2012b). Highway Design Manual, State of California, Department of Transportation, Sacramento, CA. May 7, 2012.

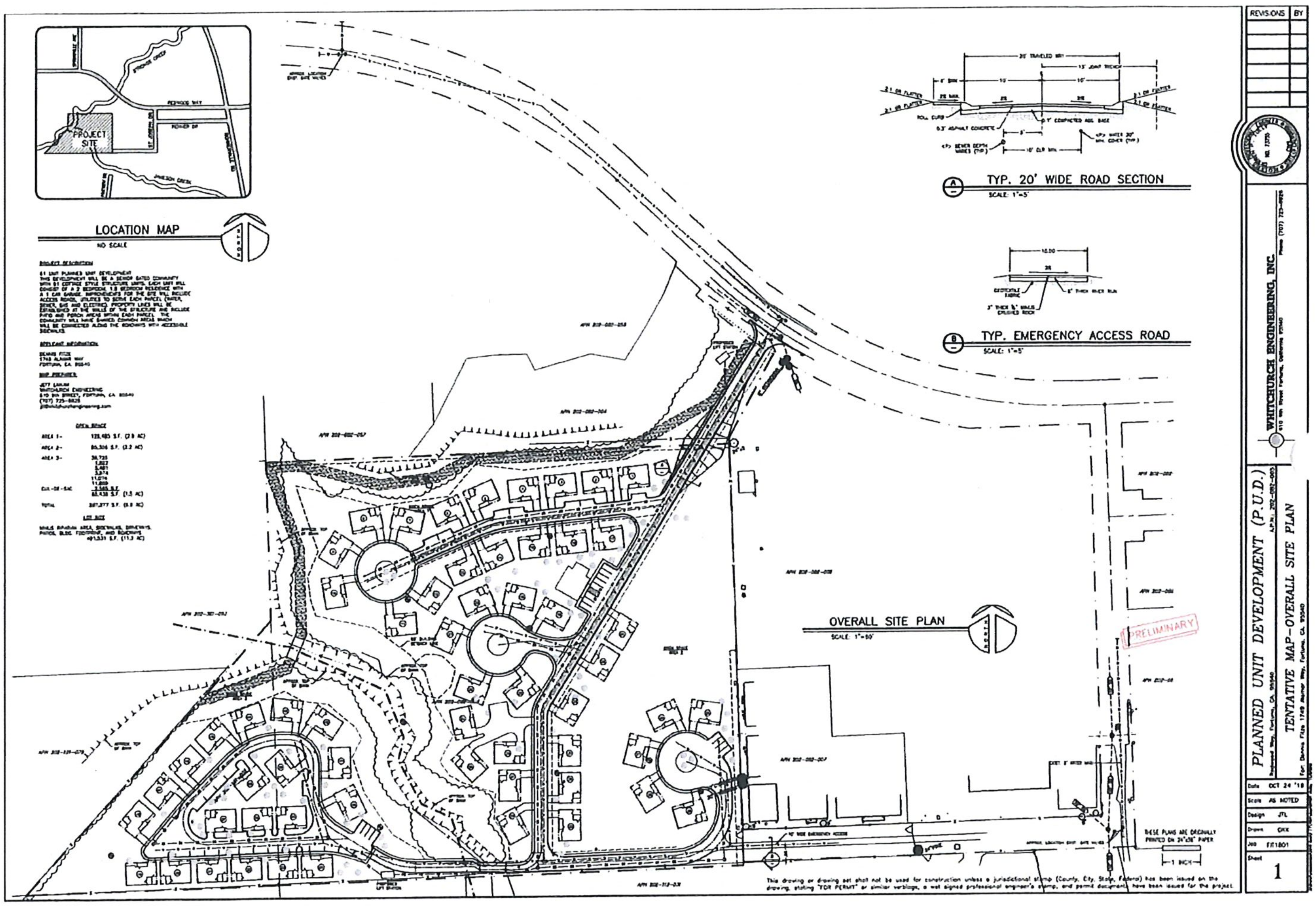
City of Fortuna (2010) *City of Fortuna General Plan 2030,* City of Fortuna – Community Development Planning Division, Fortuna, CA, October 2010

ITE (2017). *Trip Generation Manual, 10th Edition*, Institute of Transportation Engineers, Washington, DC. 2017.

HCM6 (2016). *Highway Capacity Manual 6th Edition*, Transportation Research Board, Washington, DC. December 2016.

# Appendices

# **Appendix A** - Project Site Plan



PROJECT SITE
LOCATION MAP
NO SCALE
TYP. 20' WIDE ROAD SECTION
SCALE: 1"=5'
TYP. EMERGENCY ACCESS ROAD
SCALE: 1"=5'
OVERALL SITE PLAN
SCALE: 1"=80'
PRELIMINARY
REVISIONS
BY
WHITCHURCH ENGINEERING, INC.
PLANNED UNIT DEVELOPMENT (P.U.D.)
TENTATIVE MAP-OVERALL SITE PLAN
Date OCT 24 '18
Scale AS NOTED
Design JTL
Drawn CKK
Job FR1801
Sheet
1

## **Appendix B** - Intersection Turning Movement Counts and 24-hour ADT Counts

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

City of Fortuna
N/S: Rohnerville Road
E/W: Kenmar Road
Weather: Clear

File Name : FORROKEAM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | Rohnerville Road Southbound | | | Rohnerville Road Northbound | | | Kenmar Road Eastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Thru | Right | App. Total | Left | Thru | App. Total | Left | Right | App. Total | Int. Total |
| 07:00 AM | 7 | 2 | 9 | 2 | 27 | 29 | 0 | 1 | 1 | 39 |
| 07:15 AM | 19 | 0 | 19 | 0 | 26 | 26 | 0 | 0 | 0 | 45 |
| 07:30 AM | 20 | 0 | 20 | 1 | 42 | 43 | 2 | 0 | 2 | 65 |
| 07:45 AM | 53 | 2 | 55 | 1 | 69 | 70 | 2 | 3 | 5 | 130 |
| Total | 99 | 4 | 103 | 4 | 164 | 168 | 4 | 4 | 8 | 279 |
| 08:00 AM | 65 | 2 | 67 | 0 | 71 | 71 | 3 | 5 | 8 | 146 |
| 08:15 AM | 54 | 1 | 55 | 2 | 41 | 43 | 0 | 2 | 2 | 100 |
| 08:30 AM | 27 | 1 | 28 | 1 | 44 | 45 | 0 | 0 | 0 | 73 |
| 08:45 AM | 24 | 1 | 25 | 2 | 47 | 49 | 3 | 2 | 5 | 79 |
| Total | 170 | 5 | 175 | 5 | 203 | 208 | 6 | 9 | 15 | 398 |
| Grand Total | 269 | 9 | 278 | 9 | 367 | 376 | 10 | 13 | 23 | 677 |
| Apprch % | 96.8 | 3.2 | | 2.4 | 97.6 | | 43.5 | 56.5 | | |
| Total % | 39.7 | 1.3 | 41.1 | 1.3 | 54.2 | 55.5 | 1.5 | 1.9 | 3.4 | |

| | Rohnerville Road Southbound | | | Rohnerville Road Northbound | | | Kenmar Road Eastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Thru | Right | App. Total | Left | Thru | App. Total | Left | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | |
| 07:45 AM | 53 | 2 | 55 | 1 | 69 | 70 | 2 | 3 | 5 | 130 |
| 08:00 AM | 65 | 2 | 67 | 0 | 71 | 71 | 3 | 5 | 8 | 146 |
| 08:15 AM | 54 | 1 | 55 | 2 | 41 | 43 | 0 | 2 | 2 | 100 |
| 08:30 AM | 27 | 1 | 28 | 1 | 44 | 45 | 0 | 0 | 0 | 73 |
| Total Volume | 199 | 6 | 205 | 4 | 225 | 229 | 5 | 10 | 15 | 449 |
| % App. Total | 97.1 | 2.9 | | 1.7 | 98.3 | | 33.3 | 66.7 | | |
| PHF | .765 | .750 | .765 | .500 | .792 | .806 | .417 | .500 | .469 | .769 |

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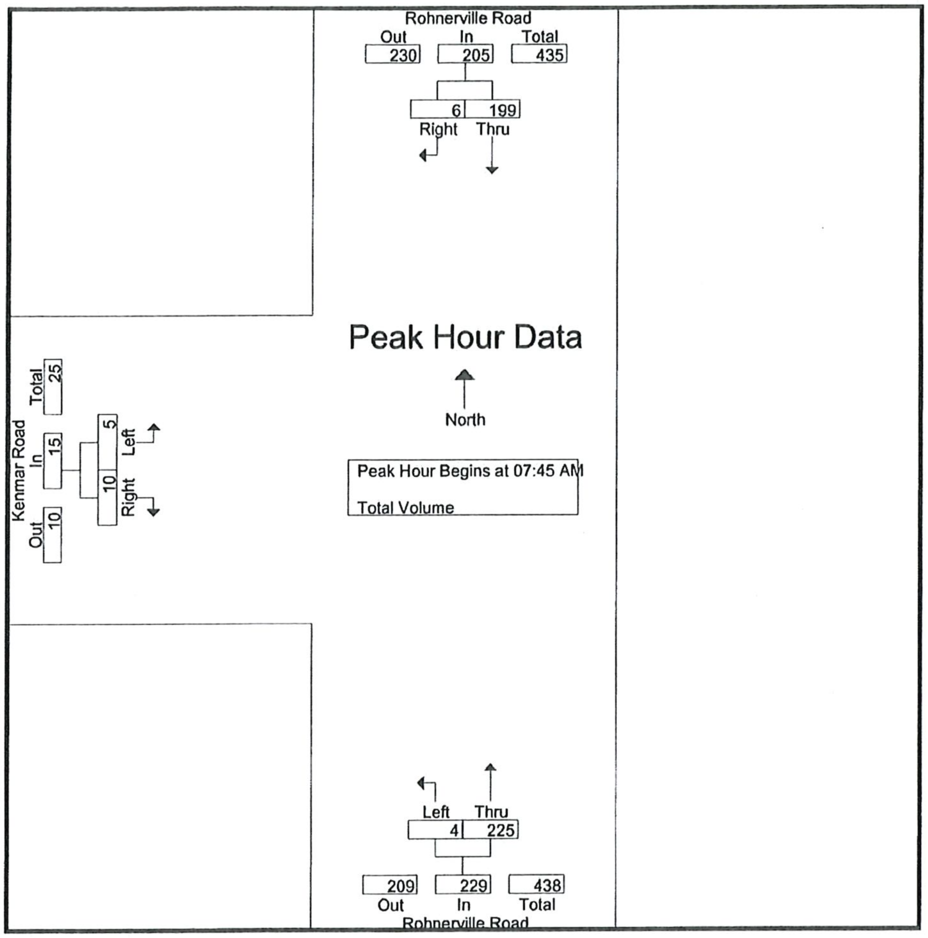
Weather: Clear

File Name : FORROKEAM
Site Code : 001
Start Date : 6/2/2015
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:45 AM | | | 07:45 AM | | | 07:30 AM | | |
|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 53 | 2 | 55 | 1 | 69 | 70 | 2 | 0 | 2 |
| +15 mins. | 65 | 2 | 67 | 0 | 71 | 71 | 2 | 3 | 5 |
| +30 mins. | 54 | 1 | 55 | 2 | 41 | 43 | 3 | 5 | 8 |
| +45 mins. | 27 | 1 | 28 | 1 | 44 | 45 | 0 | 2 | 2 |
| Total Volume | 199 | 6 | 205 | 4 | 225 | 229 | 7 | 10 | 17 |
| % App. Total | 97.1 | 2.9 | | 1.7 | 98.3 | | 41.2 | 58.8 | |
| PHF | .765 | .750 | .765 | .500 | .792 | .806 | .583 | .500 | .531 |

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File Name : FORROKEPM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | Rohnerville Road Southbound | | | Rohnerville Road Northbound | | | Kenmar Road Eastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Thru | Right | App. Total | Left | Thru | App. Total | Left | Right | App. Total | Int. Total |
| 04:00 PM | 53 | 2 | 55 | 0 | 39 | 39 | 3 | 0 | 3 | 97 |
| 04:15 PM | 74 | 2 | 76 | 1 | 53 | 54 | 3 | 0 | 3 | 133 |
| 04:30 PM | 63 | 2 | 65 | 3 | 53 | 56 | 4 | 1 | 5 | 126 |
| 04:45 PM | 69 | 2 | 71 | 1 | 48 | 49 | 2 | 0 | 2 | 122 |
| Total | 259 | 8 | 267 | 5 | 193 | 198 | 12 | 1 | 13 | 478 |
| 05:00 PM | 78 | 3 | 81 | 2 | 51 | 53 | 0 | 3 | 3 | 137 |
| 05:15 PM | 60 | 3 | 63 | 0 | 47 | 47 | 2 | 1 | 3 | 113 |
| 05:30 PM | 66 | 2 | 68 | 0 | 48 | 48 | 2 | 2 | 4 | 120 |
| 05:45 PM | 50 | 2 | 52 | 0 | 56 | 56 | 2 | 1 | 3 | 111 |
| Total | 254 | 10 | 264 | 2 | 202 | 204 | 6 | 7 | 13 | 481 |
| Grand Total | 513 | 18 | 531 | 7 | 395 | 402 | 18 | 8 | 26 | 959 |
| Apprch % | 96.6 | 3.4 | | 1.7 | 98.3 | | 69.2 | 30.8 | | |
| Total % | 53.5 | 1.9 | 55.4 | 0.7 | 41.2 | 41.9 | 1.9 | 0.8 | 2.7 | |

| | Rohnerville Road Southbound | | | Rohnerville Road Northbound | | | Kenmar Road Eastbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Thru | Right | App. Total | Left | Thru | App. Total | Left | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | |
| 04:15 PM | 74 | 2 | 76 | 1 | 53 | 54 | 3 | 0 | 3 | 133 |
| 04:30 PM | 63 | 2 | 65 | 3 | 53 | 56 | 4 | 1 | 5 | 126 |
| 04:45 PM | 69 | 2 | 71 | 1 | 48 | 49 | 2 | 0 | 2 | 122 |
| 05:00 PM | 78 | 3 | 81 | 2 | 51 | 53 | 0 | 3 | 3 | 137 |
| Total Volume | 284 | 9 | 293 | 7 | 205 | 212 | 9 | 4 | 13 | 518 |
| % App. Total | 96.9 | 3.1 | | 3.3 | 96.7 | | 69.2 | 30.8 | | |
| PHF | .910 | .750 | .904 | .583 | .967 | .946 | .563 | .333 | .650 | .945 |

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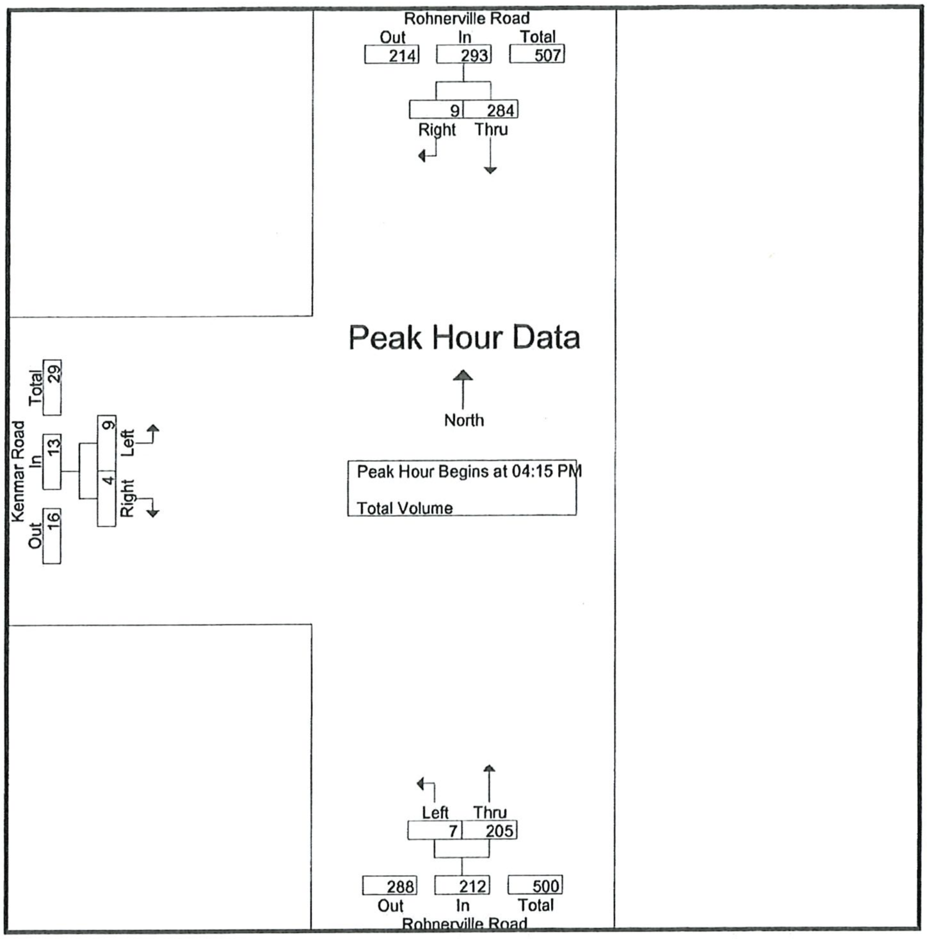
Weather: Clear

File Name : FORROKEPM
Site Code : 001
Start Date : 6/2/2015


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:15 PM | | | 04:15 PM | | | 04:00 PM | | |
|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 74 | 2 | 76 | 1 | 53 | 54 | 3 | 0 | 3 |
| +15 mins. | 63 | 2 | 65 | 3 | 53 | 56 | 3 | 0 | 3 |
| +30 mins. | 69 | 2 | 71 | 1 | 48 | 49 | 4 | 1 | 5 |
| +45 mins. | 78 | 3 | 81 | 2 | 51 | 53 | 2 | 0 | 2 |
| Total Volume | 284 | 9 | 293 | 7 | 205 | 212 | 12 | 1 | 13 |
| % App. Total | 96.9 | 3.1 | | 3.3 | 96.7 | | 92.3 | 7.7 | |
| PHF | .910 | .750 | .904 | .583 | .967 | .946 | .750 | .250 | .650 |

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E/W: Redwood Way
Weather: Clear

File Name : FORROREAM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | Rohnerville Road Southbound | | | | Redwood Way Westbound | | | | Rohnerville Road Northbound | | | | Redwood Way Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 0 | 13 | 4 | 17 | 0 | 0 | 0 | 0 | 8 | 15 | 0 | 23 | 3 | 0 | 10 | 13 | 53 |
| 07:15 AM | 0 | 14 | 4 | 18 | 0 | 0 | 0 | 0 | 10 | 21 | 0 | 31 | 7 | 0 | 10 | 17 | 66 |
| 07:30 AM | 0 | 18 | 4 | 22 | 1 | 0 | 0 | 1 | 11 | 36 | 0 | 47 | 2 | 0 | 13 | 15 | 85 |
| 07:45 AM | 1 | 41 | 7 | 49 | 1 | 0 | 0 | 1 | 19 | 52 | 0 | 71 | 2 | 0 | 37 | 39 | 160 |
| Total | 1 | 86 | 19 | 106 | 2 | 0 | 0 | 2 | 48 | 124 | 0 | 172 | 14 | 0 | 70 | 84 | 364 |
| | | | | | | | | | | | | | | | | | |
| 08:00 AM | 0 | 47 | 4 | 51 | 0 | 0 | 0 | 0 | 22 | 76 | 0 | 98 | 9 | 0 | 18 | 27 | 176 |
| 08:15 AM | 0 | 42 | 7 | 49 | 0 | 0 | 0 | 0 | 27 | 34 | 0 | 61 | 1 | 0 | 18 | 19 | 129 |
| 08:30 AM | 0 | 14 | 4 | 18 | 0 | 0 | 0 | 0 | 20 | 27 | 0 | 47 | 2 | 0 | 9 | 11 | 76 |
| 08:45 AM | 0 | 17 | 5 | 22 | 0 | 0 | 0 | 0 | 26 | 41 | 0 | 67 | 2 | 0 | 13 | 15 | 104 |
| Total | 0 | 120 | 20 | 140 | 0 | 0 | 0 | 0 | 95 | 178 | 0 | 273 | 14 | 0 | 58 | 72 | 485 |
| | | | | | | | | | | | | | | | | | |
| Grand Total | 1 | 206 | 39 | 246 | 2 | 0 | 0 | 2 | 143 | 302 | 0 | 445 | 28 | 0 | 128 | 156 | 849 |
| Apprch % | 0.4 | 83.7 | 15.9 | | 100 | 0 | 0 | | 32.1 | 67.9 | 0 | | 17.9 | 0 | 82.1 | | |
| Total % | 0.1 | 24.3 | 4.6 | 29 | 0.2 | 0 | 0 | 0.2 | 16.8 | 35.6 | 0 | 52.4 | 3.3 | 0 | 15.1 | 18.4 | |

| | Rohnerville Road Southbound | | | | Redwood Way Westbound | | | | Rohnerville Road Northbound | | | | Redwood Way Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | 0 | 18 | 4 | 22 | 1 | 0 | 0 | 1 | 11 | 36 | 0 | 47 | 2 | 0 | 13 | 15 | 85 |
| 07:45 AM | 1 | 41 | 7 | 49 | 1 | 0 | 0 | 1 | 19 | 52 | 0 | 71 | 2 | 0 | 37 | 39 | 160 |
| 08:00 AM | 0 | 47 | 4 | 51 | 0 | 0 | 0 | 0 | 22 | 76 | 0 | 98 | 9 | 0 | 18 | 27 | 176 |
| 08:15 AM | 0 | 42 | 7 | 49 | 0 | 0 | 0 | 0 | 27 | 34 | 0 | 61 | 1 | 0 | 18 | 19 | 129 |
| Total Volume | 1 | 148 | 22 | 171 | 2 | 0 | 0 | 2 | 79 | 198 | 0 | 277 | 14 | 0 | 86 | 100 | 550 |
| % App. Total | 0.6 | 86.5 | 12.9 | | 100 | 0 | 0 | | 28.5 | 71.5 | 0 | | 14 | 0 | 86 | | |
| PHF | .250 | .787 | .786 | .838 | .500 | .000 | .000 | .500 | .731 | .651 | .000 | .707 | .389 | .000 | .581 | .641 | .781 |

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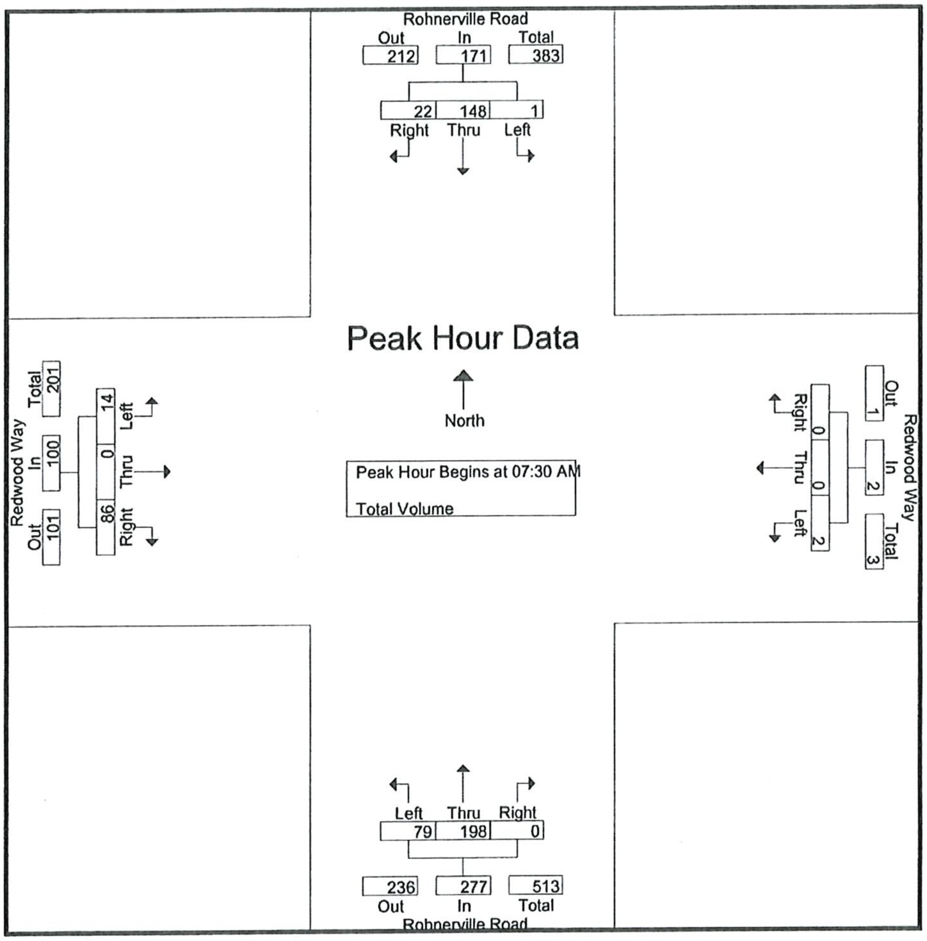
N/S: Rohnerville Road
E/W: Redwood Way
Weather: Clear

File Name : FORROREAM
Site Code : 001
Start Date : 6/2/2015
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:30 AM | | | | 07:00 AM | | | | 07:30 AM | | | | 07:30 AM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 0 | 18 | 4 | 22 | 0 | 0 | 0 | 0 | 11 | 36 | 0 | 47 | 2 | 0 | 13 | 15 |
| +15 mins. | 1 | 41 | 7 | 49 | 0 | 0 | 0 | 0 | 19 | 52 | 0 | 71 | 2 | 0 | 37 | 39 |
| +30 mins. | 0 | 47 | 4 | 51 | 1 | 0 | 0 | 1 | 22 | 76 | 0 | 98 | 9 | 0 | 18 | 27 |
| +45 mins. | 0 | 42 | 7 | 49 | 1 | 0 | 0 | 1 | 27 | 34 | 0 | 61 | 1 | 0 | 18 | 19 |
| Total Volume | 1 | 148 | 22 | 171 | 2 | 0 | 0 | 2 | 79 | 198 | 0 | 277 | 14 | 0 | 86 | 100 |
| % App. Total | 0.6 | 86.5 | 12.9 | | 100 | 0 | 0 | | 28.5 | 71.5 | 0 | | 14 | 0 | 86 | |
| PHF | .250 | .787 | .786 | .838 | .500 | .000 | .000 | .500 | .731 | .651 | .000 | .707 | .389 | .000 | .581 | .641 |

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City of Fortuna
N/S: Rohnerville Road
E/W: Redwood Way
Weather: Clear

File Name : FORROREPM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | Rohnerville Road Southbound | | | | Redwood Way Westbound | | | | Rohnerville Road Northbound | | | | Redwood Way Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 0 | 45 | 2 | 47 | 0 | 0 | 0 | 0 | 15 | 43 | 0 | 58 | 14 | 0 | 24 | 38 | 143 |
| 04:15 PM | 0 | 60 | 7 | 67 | 0 | 0 | 0 | 0 | 17 | 38 | 0 | 55 | 8 | 0 | 33 | 41 | 163 |
| 04:30 PM | 0 | 52 | 11 | 63 | 0 | 0 | 0 | 0 | 15 | 51 | 0 | 66 | 7 | 0 | 29 | 36 | 165 |
| 04:45 PM | 0 | 65 | 10 | 75 | 0 | 0 | 0 | 0 | 24 | 55 | 0 | 79 | 8 | 0 | 36 | 44 | 198 |
| Total | 0 | 222 | 30 | 252 | 0 | 0 | 0 | 0 | 71 | 187 | 0 | 258 | 37 | 0 | 122 | 159 | 669 |
| 05:00 PM | 1 | 61 | 9 | 71 | 0 | 0 | 0 | 0 | 18 | 40 | 0 | 58 | 10 | 0 | 41 | 51 | 180 |
| 05:15 PM | 0 | 50 | 5 | 55 | 0 | 0 | 0 | 0 | 17 | 50 | 0 | 67 | 7 | 0 | 33 | 40 | 162 |
| 05:30 PM | 1 | 55 | 4 | 60 | 0 | 0 | 0 | 0 | 21 | 48 | 0 | 69 | 10 | 0 | 33 | 43 | 172 |
| 05:45 PM | 1 | 47 | 4 | 52 | 0 | 0 | 0 | 0 | 17 | 65 | 0 | 82 | 12 | 0 | 21 | 33 | 167 |
| Total | 3 | 213 | 22 | 238 | 0 | 0 | 0 | 0 | 73 | 203 | 0 | 276 | 39 | 0 | 128 | 167 | 681 |
| Grand Total | 3 | 435 | 52 | 490 | 0 | 0 | 0 | 0 | 144 | 390 | 0 | 534 | 76 | 0 | 250 | 326 | 1350 |
| Apprch % | 0.6 | 88.8 | 10.6 | | 0 | 0 | 0 | | 27 | 73 | 0 | | 23.3 | 0 | 76.7 | | |
| Total % | 0.2 | 32.2 | 3.9 | 36.3 | 0 | 0 | 0 | 0 | 10.7 | 28.9 | 0 | 39.6 | 5.6 | 0 | 18.5 | 24.1 | |

| | Rohnerville Road Southbound | | | | Redwood Way Westbound | | | | Rohnerville Road Northbound | | | | Redwood Way Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 0 | 65 | 10 | 75 | 0 | 0 | 0 | 0 | 24 | 55 | 0 | 79 | 8 | 0 | 36 | 44 | 198 |
| 05:00 PM | 1 | 61 | 9 | 71 | 0 | 0 | 0 | 0 | 18 | 40 | 0 | 58 | 10 | 0 | 41 | 51 | 180 |
| 05:15 PM | 0 | 50 | 5 | 55 | 0 | 0 | 0 | 0 | 17 | 50 | 0 | 67 | 7 | 0 | 33 | 40 | 162 |
| 05:30 PM | 1 | 55 | 4 | 60 | 0 | 0 | 0 | 0 | 21 | 48 | 0 | 69 | 10 | 0 | 33 | 43 | 172 |
| Total Volume | 2 | 231 | 28 | 261 | 0 | 0 | 0 | 0 | 80 | 193 | 0 | 273 | 35 | 0 | 143 | 178 | 712 |
| % App. Total | 0.8 | 88.5 | 10.7 | | 0 | 0 | 0 | | 29.3 | 70.7 | 0 | | 19.7 | 0 | 80.3 | | |
| PHF | .500 | .888 | .700 | .870 | .000 | .000 | .000 | .000 | .833 | .877 | .000 | .864 | .875 | .000 | .872 | .873 | .899 |

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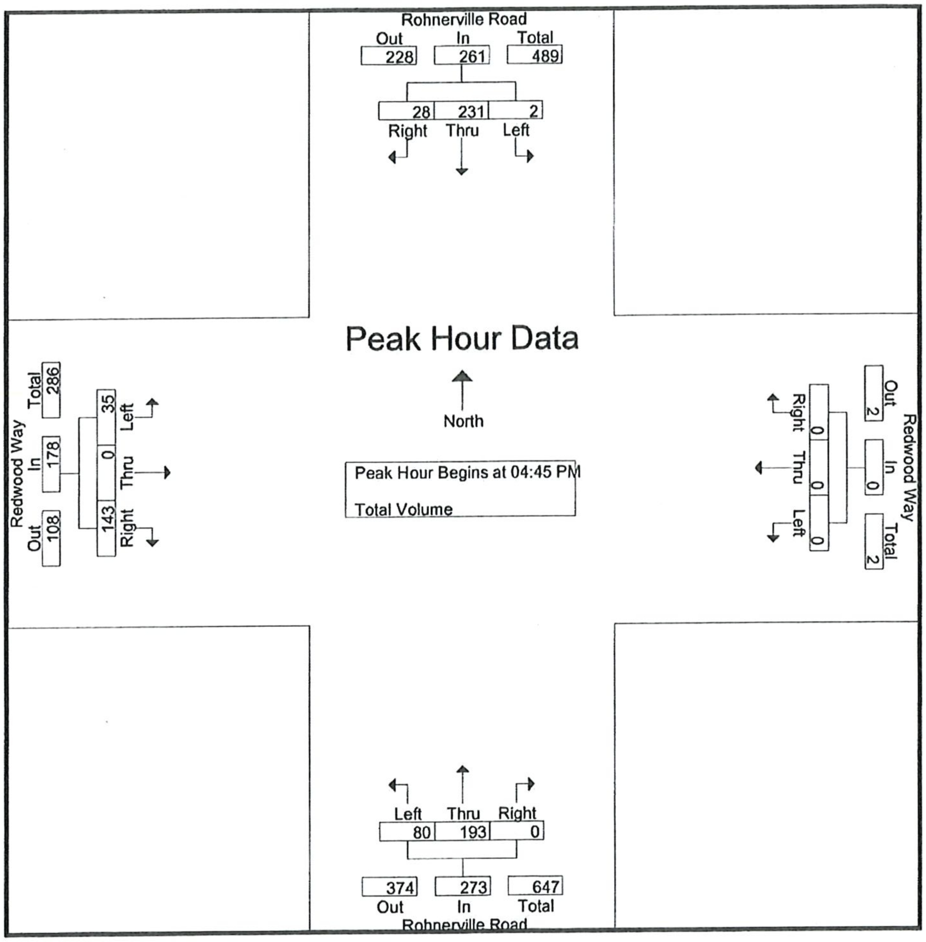
City of Fortuna
N/S: Rohnerville Road
E/W: Redwood Way
Weather: Clear

File Name : FORROREPM
Site Code : 001
Start Date : 6/2/2015
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:15 PM | | | | 04:00 PM | | | | 05:00 PM | | | | 04:45 PM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 0 | 60 | 7 | 67 | 0 | 0 | 0 | 0 | 18 | 40 | 0 | 58 | 8 | 0 | 36 | 44 |
| +15 mins. | 0 | 52 | 11 | 63 | 0 | 0 | 0 | 0 | 17 | 50 | 0 | 67 | 10 | 0 | 41 | 51 |
| +30 mins. | 0 | 65 | 10 | 75 | 0 | 0 | 0 | 0 | 21 | 48 | 0 | 69 | 7 | 0 | 33 | 40 |
| +45 mins. | 1 | 61 | 9 | 71 | 0 | 0 | 0 | 0 | 17 | 65 | 0 | 82 | 10 | 0 | 33 | 43 |
| Total Volume | 1 | 238 | 37 | 276 | 0 | 0 | 0 | 0 | 73 | 203 | 0 | 276 | 35 | 0 | 143 | 178 |
| % App. Total | 0.4 | 86.2 | 13.4 | | 0 | 0 | 0 | | 26.4 | 73.6 | 0 | | 19.7 | 0 | 80.3 | |
| PHF | .250 | .915 | .841 | .920 | .000 | .000 | .000 | .000 | .869 | .781 | .000 | .841 | .875 | .000 | .872 | .873 |

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City of Fortuna
N/S: South Fortuna Boulevard
E/W: Kenmar Road
Weather: Clear

File Name : FORFOKEAM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | South Fortuna Boulevard Southbound | | | | Kenmar Road Westbound | | | | South Fortuna Boulevard Northbound | | | | Kenmar Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 2 | 11 | 27 | 40 | 0 | 21 | 8 | 29 | 40 | 16 | 1 | 57 | 29 | 5 | 6 | 40 | 166 |
| 07:15 AM | 6 | 14 | 44 | 64 | 1 | 29 | 9 | 39 | 50 | 30 | 0 | 80 | 33 | 8 | 9 | 50 | 233 |
| 07:30 AM | 7 | 30 | 50 | 87 | 5 | 43 | 9 | 57 | 78 | 48 | 1 | 127 | 50 | 15 | 25 | 90 | 361 |
| 07:45 AM | 7 | 45 | 48 | 100 | 12 | 43 | 17 | 72 | 64 | 58 | 2 | 124 | 49 | 16 | 27 | 92 | 388 |
| Total | 22 | 100 | 169 | 291 | 18 | 136 | 43 | 197 | 232 | 152 | 4 | 388 | 161 | 44 | 67 | 272 | 1148 |
| | | | | | | | | | | | | | | | | | |
| 08:00 AM | 8 | 42 | 50 | 100 | 9 | 42 | 29 | 80 | 87 | 69 | 7 | 163 | 41 | 10 | 37 | 88 | 431 |
| 08:15 AM | 15 | 37 | 52 | 104 | 4 | 30 | 15 | 49 | 71 | 61 | 1 | 133 | 55 | 7 | 44 | 106 | 392 |
| 08:30 AM | 12 | 33 | 79 | 124 | 0 | 22 | 13 | 35 | 38 | 37 | 1 | 76 | 60 | 4 | 20 | 84 | 319 |
| 08:45 AM | 7 | 14 | 51 | 72 | 0 | 15 | 15 | 30 | 24 | 32 | 1 | 57 | 45 | 12 | 15 | 72 | 231 |
| Total | 42 | 126 | 232 | 400 | 13 | 109 | 72 | 194 | 220 | 199 | 10 | 429 | 201 | 33 | 116 | 350 | 1373 |
| | | | | | | | | | | | | | | | | | |
| Grand Total | 64 | 226 | 401 | 691 | 31 | 245 | 115 | 391 | 452 | 351 | 14 | 817 | 362 | 77 | 183 | 622 | 2521 |
| Apprch % | 9.3 | 32.7 | 58 | | 7.9 | 62.7 | 29.4 | | 55.3 | 43 | 1.7 | | 58.2 | 12.4 | 29.4 | | |
| Total % | 2.5 | 9 | 15.9 | 27.4 | 1.2 | 9.7 | 4.6 | 15.5 | 17.9 | 13.9 | 0.6 | 32.4 | 14.4 | 3.1 | 7.3 | 24.7 | |

| | South Fortuna Boulevard Southbound | | | | Kenmar Road Westbound | | | | South Fortuna Boulevard Northbound | | | | Kenmar Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | 7 | 30 | 50 | 87 | 5 | 43 | 9 | 57 | 78 | 48 | 1 | 127 | 50 | 15 | 25 | 90 | 361 |
| 07:45 AM | 7 | 45 | 48 | 100 | 12 | 43 | 17 | 72 | 64 | 58 | 2 | 124 | 49 | 16 | 27 | 92 | 388 |
| 08:00 AM | 8 | 42 | 50 | 100 | 9 | 42 | 29 | 80 | 87 | 69 | 7 | 163 | 41 | 10 | 37 | 88 | 431 |
| 08:15 AM | 15 | 37 | 52 | 104 | 4 | 30 | 15 | 49 | 71 | 61 | 1 | 133 | 55 | 7 | 44 | 106 | 392 |
| Total Volume | 37 | 154 | 200 | 391 | 30 | 158 | 70 | 258 | 300 | 236 | 11 | 547 | 195 | 48 | 133 | 376 | 1572 |
| % App. Total | 9.5 | 39.4 | 51.2 | | 11.6 | 61.2 | 27.1 | | 54.8 | 43.1 | 2 | | 51.9 | 12.8 | 35.4 | | |
| PHF | .617 | .856 | .962 | .940 | .625 | .919 | .603 | .806 | .862 | .855 | .393 | .839 | .886 | .750 | .756 | .887 | .912 |

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Corona, CA 92878
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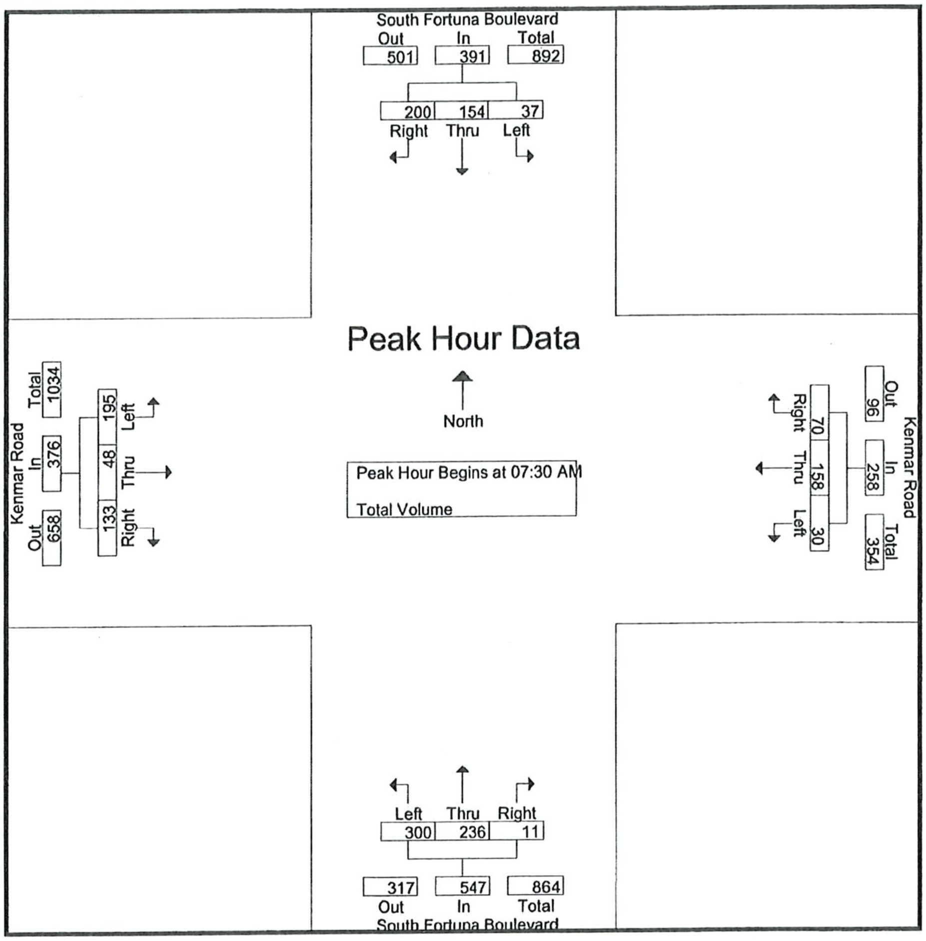
City of Fortuna
N/S: South Fortuna Boulevard
E/W: Kenmar Road
Weather: Clear

File Name : FORFOKEAM
Site Code : 001
Start Date : 6/2/2015
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:45 AM | | | | 07:30 AM | | | | 07:30 AM | | | | 07:30 AM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 7 | 45 | 48 | 100 | 5 | 43 | 9 | 57 | 78 | 48 | 1 | 127 | 50 | 15 | 25 | 90 |
| +15 mins. | 8 | 42 | 50 | 100 | 12 | 43 | 17 | 72 | 64 | 58 | 2 | 124 | 49 | 16 | 27 | 92 |
| +30 mins. | 15 | 37 | 52 | 104 | 9 | 42 | 29 | 80 | 87 | 69 | 7 | 163 | 41 | 10 | 37 | 88 |
| +45 mins. | 12 | 33 | 79 | 124 | 4 | 30 | 15 | 49 | 71 | 61 | 1 | 133 | 55 | 7 | 44 | 106 |
| Total Volume | 42 | 157 | 229 | 428 | 30 | 158 | 70 | 258 | 300 | 236 | 11 | 547 | 195 | 48 | 133 | 376 |
| % App. Total | 9.8 | 36.7 | 53.5 | | 11.6 | 61.2 | 27.1 | | 54.8 | 43.1 | 2 | | 51.9 | 12.8 | 35.4 | |
| PHF | .700 | .872 | .725 | .863 | .625 | .919 | .603 | .806 | .862 | .855 | .393 | .839 | .886 | .750 | .756 | .887 |

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City of Fortuna
N/S: South Fortuna Boulevard
E/W: Kenmar Road
Weather: Clear

File Name : FORFOKEPM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | South Fortuna Boulevard Southbound | | | | Kenmar Road Westbound | | | | South Fortuna Boulevard Northbound | | | | Kenmar Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 13 | 52 | 82 | 147 | 0 | 13 | 7 | 20 | 26 | 41 | 2 | 69 | 72 | 19 | 56 | 147 | 383 |
| 04:15 PM | 20 | 49 | 84 | 153 | 2 | 21 | 22 | 45 | 41 | 44 | 3 | 88 | 64 | 28 | 55 | 147 | 433 |
| 04:30 PM | 11 | 51 | 89 | 151 | 0 | 17 | 21 | 38 | 27 | 44 | 0 | 71 | 76 | 24 | 38 | 138 | 398 |
| 04:45 PM | 22 | 62 | 74 | 158 | 1 | 18 | 8 | 27 | 22 | 43 | 2 | 67 | 68 | 19 | 66 | 153 | 405 |
| Total | 66 | 214 | 329 | 609 | 3 | 69 | 58 | 130 | 116 | 172 | 7 | 295 | 280 | 90 | 215 | 585 | 1619 |
| 05:00 PM | 24 | 63 | 78 | 165 | 3 | 16 | 15 | 34 | 34 | 34 | 1 | 69 | 65 | 25 | 74 | 164 | 432 |
| 05:15 PM | 19 | 57 | 83 | 159 | 0 | 15 | 16 | 31 | 30 | 43 | 4 | 77 | 59 | 30 | 39 | 128 | 395 |
| 05:30 PM | 22 | 47 | 85 | 154 | 0 | 19 | 14 | 33 | 28 | 25 | 1 | 54 | 78 | 24 | 62 | 164 | 405 |
| 05:45 PM | 14 | 57 | 70 | 141 | 2 | 11 | 11 | 24 | 18 | 36 | 3 | 57 | 64 | 34 | 44 | 142 | 364 |
| Total | 79 | 224 | 316 | 619 | 5 | 61 | 56 | 122 | 110 | 138 | 9 | 257 | 266 | 113 | 219 | 598 | 1596 |
| Grand Total | 145 | 438 | 645 | 1228 | 8 | 130 | 114 | 252 | 226 | 310 | 16 | 552 | 546 | 203 | 434 | 1183 | 3215 |
| Apprch % | 11.8 | 35.7 | 52.5 | | 3.2 | 51.6 | 45.2 | | 40.9 | 56.2 | 2.9 | | 46.2 | 17.2 | 36.7 | | |
| Total % | 4.5 | 13.6 | 20.1 | 38.2 | 0.2 | 4 | 3.5 | 7.8 | 7 | 9.6 | 0.5 | 17.2 | 17 | 6.3 | 13.5 | 36.8 | |

| | South Fortuna Boulevard Southbound | | | | Kenmar Road Westbound | | | | South Fortuna Boulevard Northbound | | | | Kenmar Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 20 | 49 | 84 | 153 | 2 | 21 | 22 | 45 | 41 | 44 | 3 | 88 | 64 | 28 | 55 | 147 | 433 |
| 04:30 PM | 11 | 51 | 89 | 151 | 0 | 17 | 21 | 38 | 27 | 44 | 0 | 71 | 76 | 24 | 38 | 138 | 398 |
| 04:45 PM | 22 | 62 | 74 | 158 | 1 | 18 | 8 | 27 | 22 | 43 | 2 | 67 | 68 | 19 | 66 | 153 | 405 |
| 05:00 PM | 24 | 63 | 78 | 165 | 3 | 16 | 15 | 34 | 34 | 34 | 1 | 69 | 65 | 25 | 74 | 164 | 432 |
| Total Volume | 77 | 225 | 325 | 627 | 6 | 72 | 66 | 144 | 124 | 165 | 6 | 295 | 273 | 96 | 233 | 602 | 1668 |
| % App. Total | 12.3 | 35.9 | 51.8 | | 4.2 | 50 | 45.8 | | 42 | 55.9 | 2 | | 45.3 | 15.9 | 38.7 | | |
| PHF | .802 | .893 | .913 | .950 | .500 | .857 | .750 | .800 | .756 | .938 | .500 | .838 | .898 | .857 | .787 | .918 | .963 |

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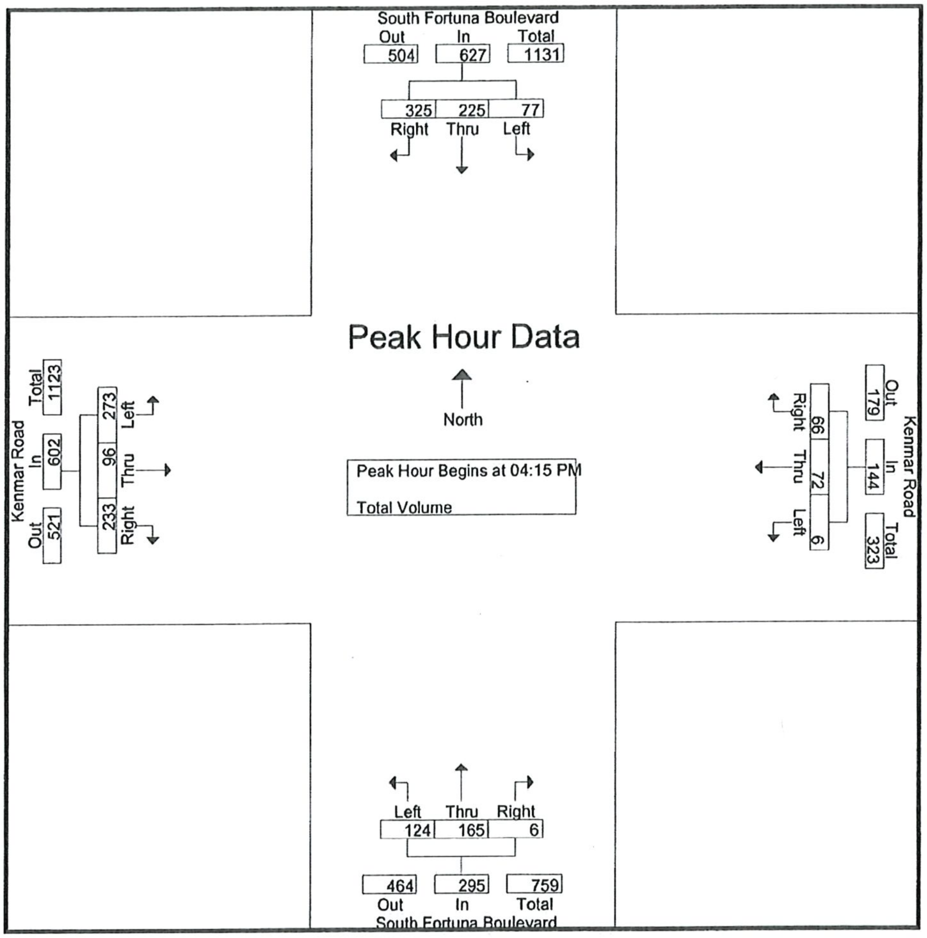
City of Fortuna
N/S: South Fortuna Boulevard
E/W: Kenmar Road
Weather: Clear

File Name : FORFOKEPM
Site Code : 001
Start Date : 6/2/2015
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

| | 04:45 PM | | | | 04:15 PM | | | | 04:00 PM | | | | 04:45 PM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 22 | 62 | 74 | 158 | 2 | 21 | 22 | 45 | 26 | 41 | 2 | 69 | 68 | 19 | 66 | 153 |
| +15 mins. | 24 | 63 | 78 | 165 | 0 | 17 | 21 | 38 | 41 | 44 | 3 | 88 | 65 | 25 | 74 | 164 |
| +30 mins. | 19 | 57 | 83 | 159 | 1 | 18 | 8 | 27 | 27 | 44 | 0 | 71 | 59 | 30 | 39 | 128 |
| +45 mins. | 22 | 47 | 85 | 154 | 3 | 16 | 15 | 34 | 22 | 43 | 2 | 67 | 78 | 24 | 62 | 164 |
| Total Volume | 87 | 229 | 320 | 636 | 6 | 72 | 66 | 144 | 116 | 172 | 7 | 295 | 270 | 98 | 241 | 609 |
| % App. Total | 13.7 | 36 | 50.3 | | 4.2 | 50 | 45.8 | | 39.3 | 58.3 | 2.4 | | 44.3 | 16.1 | 39.6 | |
| PHF | .906 | .909 | .941 | .964 | .500 | .857 | .750 | .800 | .707 | .977 | .583 | .838 | .865 | .817 | .814 | .928 |

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City of Fortuna
N/S: South Fortuna Boulevard
E/W: Newburg Road
Weather: Clear

File Name : FORFONEAM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | South Fortuna Boulevard Southbound | | | | Newburg Road Westbound | | | | South Fortuna Boulevard Northbound | | | | Newburg Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 3 | 11 | 5 | 19 | 5 | 18 | 3 | 26 | 9 | 21 | 4 | 34 | 6 | 5 | 11 | 22 | 101 |
| 07:15 AM | 3 | 21 | 3 | 27 | 7 | 23 | 3 | 33 | 24 | 37 | 2 | 63 | 2 | 11 | 16 | 29 | 152 |
| 07:30 AM | 3 | 36 | 12 | 51 | 13 | 36 | 7 | 56 | 21 | 47 | 6 | 74 | 6 | 13 | 28 | 47 | 228 |
| 07:45 AM | 6 | 58 | 12 | 76 | 28 | 34 | 18 | 80 | 33 | 63 | 5 | 101 | 9 | 31 | 33 | 73 | 330 |
| Total | 15 | 126 | 32 | 173 | 53 | 111 | 31 | 195 | 87 | 168 | 17 | 272 | 23 | 60 | 88 | 171 | 811 |
| 08:00 AM | 6 | 46 | 13 | 65 | 23 | 32 | 33 | 88 | 43 | 58 | 15 | 116 | 18 | 32 | 38 | 88 | 357 |
| 08:15 AM | 8 | 81 | 17 | 106 | 17 | 24 | 25 | 66 | 34 | 65 | 12 | 111 | 12 | 24 | 42 | 78 | 361 |
| 08:30 AM | 11 | 58 | 13 | 82 | 11 | 16 | 6 | 33 | 24 | 49 | 10 | 83 | 7 | 12 | 37 | 56 | 254 |
| 08:45 AM | 8 | 37 | 9 | 54 | 7 | 17 | 11 | 35 | 18 | 64 | 14 | 96 | 11 | 14 | 20 | 45 | 230 |
| Total | 33 | 222 | 52 | 307 | 58 | 89 | 75 | 222 | 119 | 236 | 51 | 406 | 48 | 82 | 137 | 267 | 1202 |
| Grand Total | 48 | 348 | 84 | 480 | 111 | 200 | 106 | 417 | 206 | 404 | 68 | 678 | 71 | 142 | 225 | 438 | 2013 |
| Apprch % | 10 | 72.5 | 17.5 | | 26.6 | 48 | 25.4 | | 30.4 | 59.6 | 10 | | 16.2 | 32.4 | 51.4 | | |
| Total % | 2.4 | 17.3 | 4.2 | 23.8 | 5.5 | 9.9 | 5.3 | 20.7 | 10.2 | 20.1 | 3.4 | 33.7 | 3.5 | 7.1 | 11.2 | 21.8 | |

| | South Fortuna Boulevard Southbound | | | | Newburg Road Westbound | | | | South Fortuna Boulevard Northbound | | | | Newburg Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 6 | 58 | 12 | 76 | 28 | 34 | 18 | 80 | 33 | 63 | 5 | 101 | 9 | 31 | 33 | 73 | 330 |
| 08:00 AM | 6 | 46 | 13 | 65 | 23 | 32 | 33 | 88 | 43 | 58 | 15 | 116 | 18 | 32 | 38 | 88 | 357 |
| 08:15 AM | 8 | 81 | 17 | 106 | 17 | 24 | 25 | 66 | 34 | 65 | 12 | 111 | 12 | 24 | 42 | 78 | 361 |
| 08:30 AM | 11 | 58 | 13 | 82 | 11 | 16 | 6 | 33 | 24 | 49 | 10 | 83 | 7 | 12 | 37 | 56 | 254 |
| Total Volume | 31 | 243 | 55 | 329 | 79 | 106 | 82 | 267 | 134 | 235 | 42 | 411 | 46 | 99 | 150 | 295 | 1302 |
| % App. Total | 9.4 | 73.9 | 16.7 | | 29.6 | 39.7 | 30.7 | | 32.6 | 57.2 | 10.2 | | 15.6 | 33.6 | 50.8 | | |
| PHF | .705 | .750 | .809 | .776 | .705 | .779 | .621 | .759 | .779 | .904 | .700 | .886 | .639 | .773 | .893 | .838 | .902 |

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City of Fortuna
N/S: South Fortuna Boulevard
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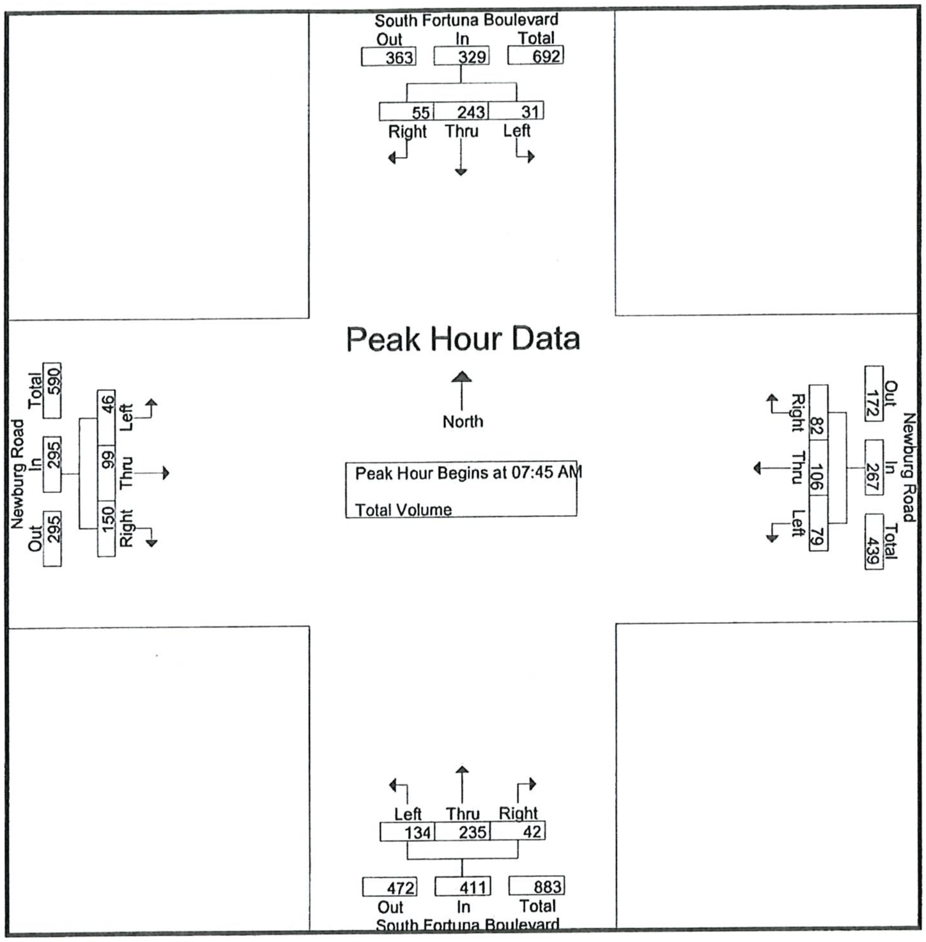
File Name : FORFONEAM
Site Code : 001
Start Date : 6/2/2015
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 07:45 AM | | | | 07:30 AM | | | | 07:45 AM | | | | 07:45 AM | | | |
| +0 mins. | 6 | 58 | 12 | 76 | 13 | 36 | 7 | 56 | 33 | 63 | 5 | 101 | 9 | 31 | 33 | 73 |
| +15 mins. | 6 | 46 | 13 | 65 | 28 | 34 | 18 | 80 | 43 | 58 | 15 | 116 | 18 | 32 | 38 | 88 |
| +30 mins. | 8 | 81 | 17 | 106 | 23 | 32 | 33 | 88 | 34 | 65 | 12 | 111 | 12 | 24 | 42 | 78 |
| +45 mins. | 11 | 58 | 13 | 82 | 17 | 24 | 25 | 66 | 24 | 49 | 10 | 83 | 7 | 12 | 37 | 56 |
| Total Volume | 31 | 243 | 55 | 329 | 81 | 126 | 83 | 290 | 134 | 235 | 42 | 411 | 46 | 99 | 150 | 295 |
| % App. Total | 9.4 | 73.9 | 16.7 | | 27.9 | 43.4 | 28.6 | | 32.6 | 57.2 | 10.2 | | 15.6 | 33.6 | 50.8 | |
| PHF | .705 | .750 | .809 | .776 | .723 | .875 | .629 | .824 | .779 | .904 | .700 | .886 | .639 | .773 | .893 | .838 |

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City of Fortuna
N/S: South Fortuna Boulevard
E/W: Newburg Road
Weather: Clear

File Name : FORFONEPM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | South Fortuna Boulevard Southbound | | | | Newburg Road Westbound | | | | South Fortuna Boulevard Northbound | | | | Newburg Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 5 | 108 | 16 | 129 | 12 | 11 | 12 | 35 | 23 | 87 | 7 | 117 | 11 | 16 | 61 | 88 | 369 |
| 04:15 PM | 8 | 109 | 19 | 136 | 14 | 21 | 9 | 44 | 33 | 112 | 4 | 149 | 26 | 20 | 43 | 89 | 418 |
| 04:30 PM | 15 | 95 | 10 | 120 | 9 | 12 | 7 | 28 | 31 | 93 | 7 | 131 | 16 | 29 | 61 | 106 | 385 |
| 04:45 PM | 10 | 115 | 13 | 138 | 7 | 14 | 14 | 35 | 42 | 90 | 9 | 141 | 9 | 27 | 52 | 88 | 402 |
| Total | 38 | 427 | 58 | 523 | 42 | 58 | 42 | 142 | 129 | 382 | 27 | 538 | 62 | 92 | 217 | 371 | 1574 |
| | | | | | | | | | | | | | | | | | |
| 05:00 PM | 10 | 122 | 7 | 139 | 13 | 12 | 7 | 32 | 30 | 98 | 16 | 144 | 14 | 31 | 47 | 92 | 407 |
| 05:15 PM | 8 | 93 | 15 | 116 | 11 | 17 | 8 | 36 | 43 | 63 | 10 | 116 | 12 | 32 | 51 | 95 | 363 |
| 05:30 PM | 11 | 72 | 9 | 92 | 19 | 12 | 11 | 42 | 31 | 77 | 16 | 124 | 20 | 30 | 50 | 100 | 358 |
| 05:45 PM | 9 | 82 | 13 | 104 | 13 | 12 | 5 | 30 | 38 | 65 | 19 | 122 | 17 | 33 | 37 | 87 | 343 |
| Total | 38 | 369 | 44 | 451 | 56 | 53 | 31 | 140 | 142 | 303 | 61 | 506 | 63 | 126 | 185 | 374 | 1471 |
| | | | | | | | | | | | | | | | | | |
| Grand Total | 76 | 796 | 102 | 974 | 98 | 111 | 73 | 282 | 271 | 685 | 88 | 1044 | 125 | 218 | 402 | 745 | 3045 |
| Apprch % | 7.8 | 81.7 | 10.5 | | 34.8 | 39.4 | 25.9 | | 26 | 65.6 | 8.4 | | 16.8 | 29.3 | 54 | | |
| Total % | 2.5 | 26.1 | 3.3 | 32 | 3.2 | 3.6 | 2.4 | 9.3 | 8.9 | 22.5 | 2.9 | 34.3 | 4.1 | 7.2 | 13.2 | 24.5 | |

| | South Fortuna Boulevard Southbound | | | | Newburg Road Westbound | | | | South Fortuna Boulevard Northbound | | | | Newburg Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 8 | 109 | 19 | 136 | 14 | 21 | 9 | 44 | 33 | 112 | 4 | 149 | 26 | 20 | 43 | 89 | 418 |
| 04:30 PM | 15 | 95 | 10 | 120 | 9 | 12 | 7 | 28 | 31 | 93 | 7 | 131 | 16 | 29 | 61 | 106 | 385 |
| 04:45 PM | 10 | 115 | 13 | 138 | 7 | 14 | 14 | 35 | 42 | 90 | 9 | 141 | 9 | 27 | 52 | 88 | 402 |
| 05:00 PM | 10 | 122 | 7 | 139 | 13 | 12 | 7 | 32 | 30 | 98 | 16 | 144 | 14 | 31 | 47 | 92 | 407 |
| Total Volume | 43 | 441 | 49 | 533 | 43 | 59 | 37 | 139 | 136 | 393 | 36 | 565 | 65 | 107 | 203 | 375 | 1612 |
| % App. Total | 8.1 | 82.7 | 9.2 | | 30.9 | 42.4 | 26.6 | | 24.1 | 69.6 | 6.4 | | 17.3 | 28.5 | 54.1 | | |
| PHF | .717 | .904 | .645 | .959 | .768 | .702 | .661 | .790 | .810 | .877 | .563 | .948 | .625 | .863 | .832 | .884 | .964 |

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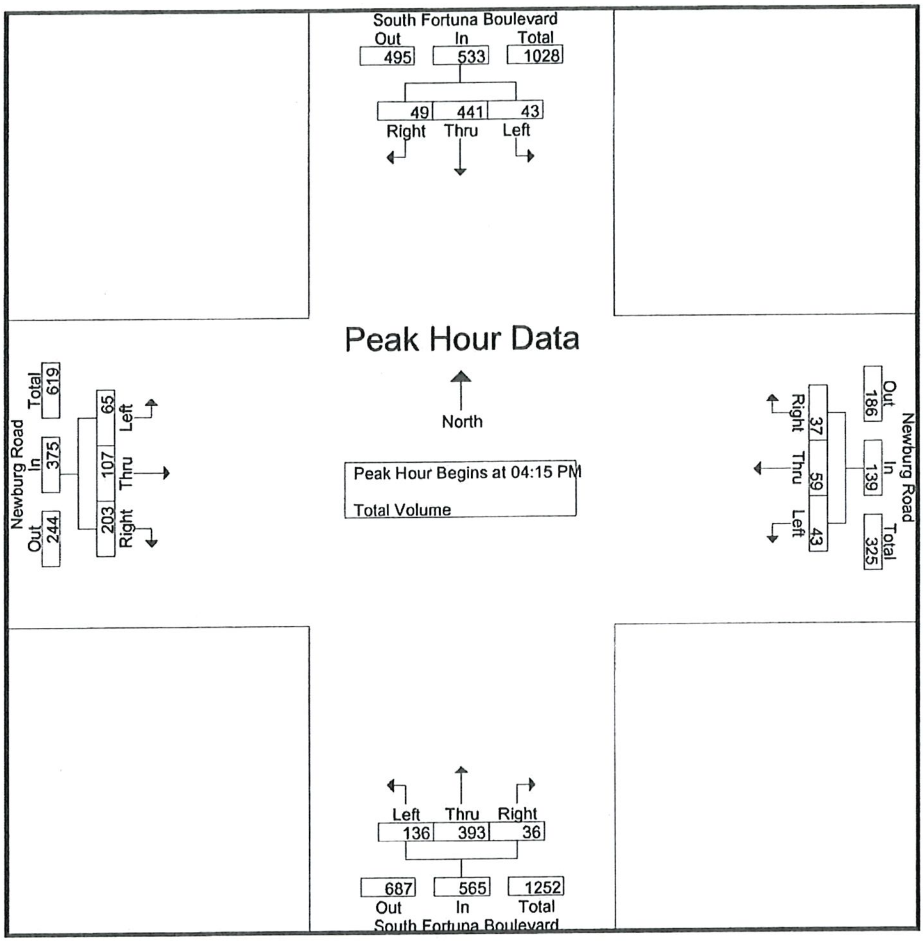
City of Fortuna
N/S: South Fortuna Boulevard
E/W: Newburg Road
Weather: Clear

File Name : FORFONEPM
Site Code : 001
Start Date : 6/2/2015


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:15 PM | | | | 04:45 PM | | | | 04:15 PM | | | | 04:30 PM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 8 | 109 | 19 | 136 | 7 | 14 | 14 | 35 | 33 | 112 | 4 | 149 | 16 | 29 | 61 | 106 |
| +15 mins. | 15 | 95 | 10 | 120 | 13 | 12 | 7 | 32 | 31 | 93 | 7 | 131 | 9 | 27 | 52 | 88 |
| +30 mins. | 10 | 115 | 13 | 138 | 11 | 17 | 8 | 36 | 42 | 90 | 9 | 141 | 14 | 31 | 47 | 92 |
| +45 mins. | 10 | 122 | 7 | 139 | 19 | 12 | 11 | 42 | 30 | 98 | 16 | 144 | 12 | 32 | 51 | 95 |
| Total Volume | 43 | 441 | 49 | 533 | 50 | 55 | 40 | 145 | 136 | 393 | 36 | 565 | 51 | 119 | 211 | 381 |
| % App. Total | 8.1 | 82.7 | 9.2 | | 34.5 | 37.9 | 27.6 | | 24.1 | 69.6 | 6.4 | | 13.4 | 31.2 | 55.4 | |
| PHF | .717 | .904 | .645 | .959 | .658 | .809 | .714 | .863 | .810 | .877 | .563 | .948 | .797 | .930 | .865 | .899 |

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City of Fortuna
N/S: South Fortuna Boulevard
E/W: Redwood Way
Weather: Clear

File Name : FORFOREAM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | South Fortuna Boulevard Southbound | | | Redwood Way Westbound | | | South Fortuna Boulevard Northbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | App. Total | Left | Right | App. Total | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 9 | 22 | 31 | 8 | 15 | 23 | 25 | 9 | 34 | 88 |
| 07:15 AM | 17 | 33 | 50 | 21 | 21 | 42 | 39 | 7 | 46 | 138 |
| 07:30 AM | 25 | 49 | 74 | 12 | 20 | 32 | 62 | 12 | 74 | 180 |
| 07:45 AM | 50 | 85 | 135 | 27 | 26 | 53 | 82 | 26 | 108 | 296 |
| Total | 101 | 189 | 290 | 68 | 82 | 150 | 208 | 54 | 262 | 702 |
| 08:00 AM | 31 | 78 | 109 | 18 | 21 | 39 | 91 | 17 | 108 | 256 |
| 08:15 AM | 33 | 106 | 139 | 16 | 20 | 36 | 93 | 9 | 102 | 277 |
| 08:30 AM | 28 | 91 | 119 | 16 | 16 | 32 | 79 | 19 | 98 | 249 |
| 08:45 AM | 15 | 48 | 63 | 13 | 30 | 43 | 63 | 7 | 70 | 176 |
| Total | 107 | 323 | 430 | 63 | 87 | 150 | 326 | 52 | 378 | 958 |
| Grand Total | 208 | 512 | 720 | 131 | 169 | 300 | 534 | 106 | 640 | 1660 |
| Apprch % | 28.9 | 71.1 | | 43.7 | 56.3 | | 83.4 | 16.6 | | |
| Total % | 12.5 | 30.8 | 43.4 | 7.9 | 10.2 | 18.1 | 32.2 | 6.4 | 38.6 | |

| | South Fortuna Boulevard Southbound | | | Redwood Way Westbound | | | South Fortuna Boulevard Northbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | App. Total | Left | Right | App. Total | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | |
| 07:45 AM | 50 | 85 | 135 | 27 | 26 | 53 | 82 | 26 | 108 | 296 |
| 08:00 AM | 31 | 78 | 109 | 18 | 21 | 39 | 91 | 17 | 108 | 256 |
| 08:15 AM | 33 | 106 | 139 | 16 | 20 | 36 | 93 | 9 | 102 | 277 |
| 08:30 AM | 28 | 91 | 119 | 16 | 16 | 32 | 79 | 19 | 98 | 249 |
| Total Volume | 142 | 360 | 502 | 77 | 83 | 160 | 345 | 71 | 416 | 1078 |
| % App. Total | 28.3 | 71.7 | | 48.1 | 51.9 | | 82.9 | 17.1 | | |
| PHF | .710 | .849 | .903 | .713 | .798 | .755 | .927 | .683 | .963 | .910 |

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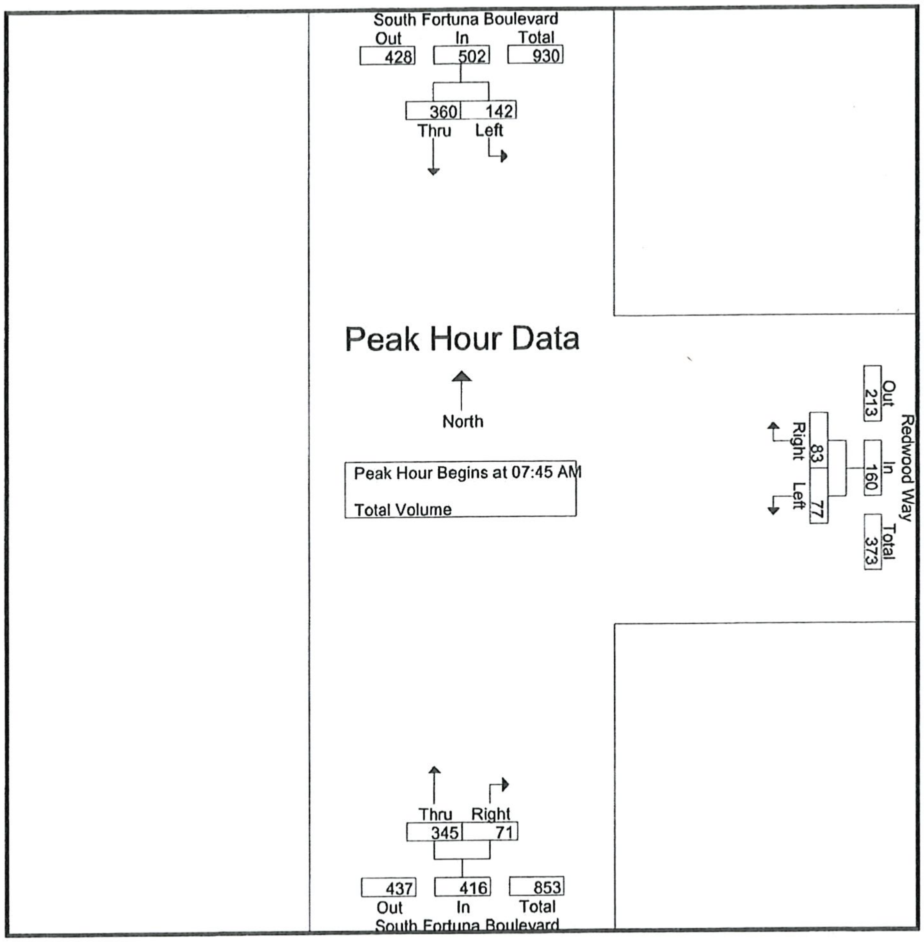
City of Fortuna
N/S: South Fortuna Boulevard
E/W: Redwood Way
Weather: Clear

File Name : FORFOREAM
Site Code : 001
Start Date : 6/2/2015
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:45 AM | | | 07:15 AM | | | 07:45 AM | | |
|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 50 | 85 | 135 | 21 | 21 | 42 | 82 | 26 | 108 |
| +15 mins. | 31 | 78 | 109 | 12 | 20 | 32 | 91 | 17 | 108 |
| +30 mins. | 33 | 106 | 139 | 27 | 26 | 53 | 93 | 9 | 102 |
| +45 mins. | 28 | 91 | 119 | 18 | 21 | 39 | 79 | 19 | 98 |
| Total Volume | 142 | 360 | 502 | 78 | 88 | 166 | 345 | 71 | 416 |
| % App. Total | 28.3 | 71.7 | | 47 | 53 | | 82.9 | 17.1 | |
| PHF | .710 | .849 | .903 | .722 | .846 | .783 | .927 | .683 | .963 |

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City of Fortuna
N/S: South Fortuna Boulevard
E/W: Redwood Way
Weather: Clear

File Name : FORFOREPM
Site Code : 001
Start Date : 6/2/2015
Page No : 1

Groups Printed- Total Volume

| | South Fortuna Boulevard Southbound | | | Redwood Way Westbound | | | South Fortuna Boulevard Northbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | App. Total | Left | Right | App. Total | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 54 | 117 | 171 | 25 | 30 | 55 | 102 | 14 | 116 | 342 |
| 04:15 PM | 52 | 107 | 159 | 35 | 36 | 71 | 120 | 17 | 137 | 367 |
| 04:30 PM | 49 | 136 | 185 | 30 | 35 | 65 | 104 | 26 | 130 | 380 |
| 04:45 PM | 37 | 129 | 166 | 26 | 41 | 67 | 102 | 19 | 121 | 354 |
| Total | 192 | 489 | 681 | 116 | 142 | 258 | 428 | 76 | 504 | 1443 |
| | | | | | | | | | | |
| 05:00 PM | 46 | 136 | 182 | 36 | 41 | 77 | 99 | 12 | 111 | 370 |
| 05:15 PM | 43 | 121 | 164 | 26 | 35 | 61 | 92 | 17 | 109 | 334 |
| 05:30 PM | 42 | 114 | 156 | 29 | 32 | 61 | 96 | 22 | 118 | 335 |
| 05:45 PM | 42 | 110 | 152 | 28 | 30 | 58 | 91 | 19 | 110 | 320 |
| Total | 173 | 481 | 654 | 119 | 138 | 257 | 378 | 70 | 448 | 1359 |
| | | | | | | | | | | |
| Grand Total | 365 | 970 | 1335 | 235 | 280 | 515 | 806 | 146 | 952 | 2802 |
| Apprch % | 27.3 | 72.7 | | 45.6 | 54.4 | | 84.7 | 15.3 | | |
| Total % | 13 | 34.6 | 47.6 | 8.4 | 10 | 18.4 | 28.8 | 5.2 | 34 | |

| | South Fortuna Boulevard Southbound | | | Redwood Way Westbound | | | South Fortuna Boulevard Northbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | App. Total | Left | Right | App. Total | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | |
| 04:15 PM | 52 | 107 | 159 | 35 | 36 | 71 | 120 | 17 | 137 | 367 |
| 04:30 PM | 49 | 136 | 185 | 30 | 35 | 65 | 104 | 26 | 130 | 380 |
| 04:45 PM | 37 | 129 | 166 | 26 | 41 | 67 | 102 | 19 | 121 | 354 |
| 05:00 PM | 46 | 136 | 182 | 36 | 41 | 77 | 99 | 12 | 111 | 370 |
| Total Volume | 184 | 508 | 692 | 127 | 153 | 280 | 425 | 74 | 499 | 1471 |
| % App. Total | 26.6 | 73.4 | | 45.4 | 54.6 | | 85.2 | 14.8 | | |
| PHF | .885 | .934 | .935 | .882 | .933 | .909 | .885 | .712 | .911 | .968 |

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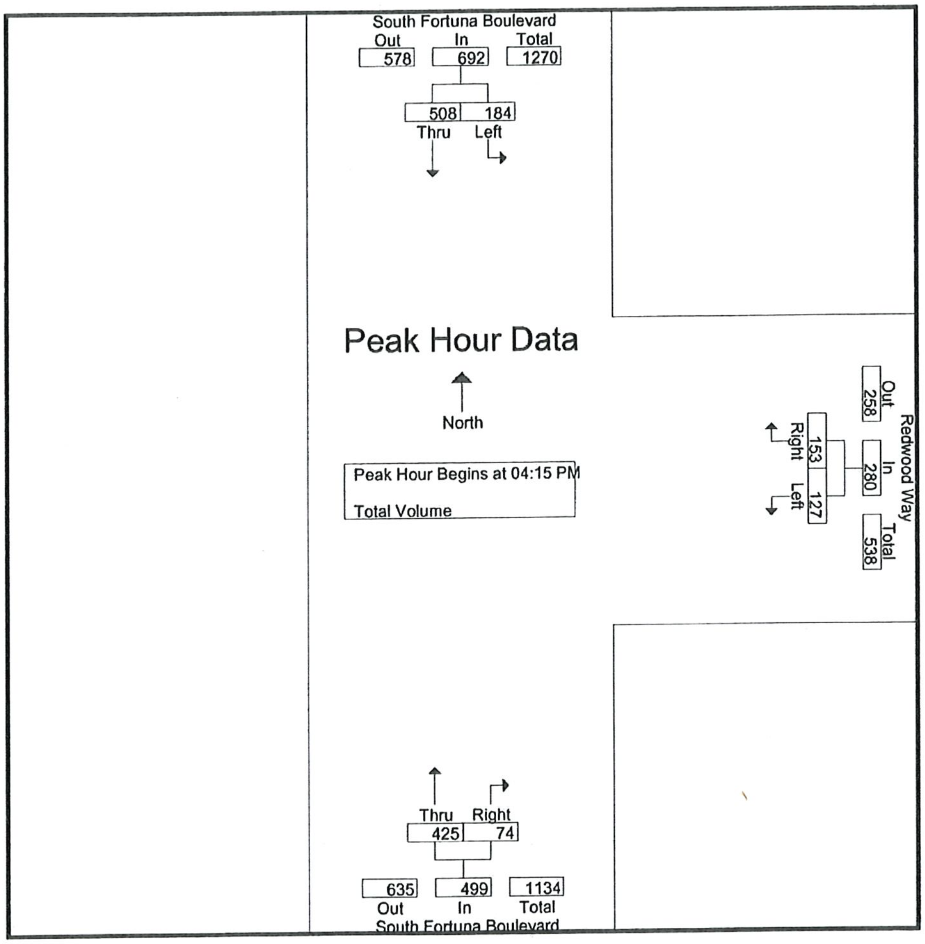
Weather: Clear

File Name : FORFOREPM
Site Code : 001
Start Date : 6/2/2015
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:30 PM | | | 04:15 PM | | | 04:00 PM | | |
|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 49 | 136 | 185 | 35 | 36 | 71 | 102 | 14 | 116 |
| +15 mins. | 37 | 129 | 166 | 30 | 35 | 65 | 120 | 17 | 137 |
| +30 mins. | 46 | 136 | 182 | 26 | 41 | 67 | 104 | 26 | 130 |
| +45 mins. | 43 | 121 | 164 | 36 | 41 | 77 | 102 | 19 | 121 |
| Total Volume | 175 | 522 | 697 | 127 | 153 | 280 | 428 | 76 | 504 |
| % App. Total | 25.1 | 74.9 | | 45.4 | 54.6 | | 84.9 | 15.1 | |
| PHF | .893 | .960 | .942 | .882 | .933 | .909 | .892 | .731 | .920 |

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City of Fortuna
N/S: Newburg Road
E/W: Rohnerville Road
Weather: Clear

File Name : FORNEROAM
Site Code : 22016222
Start Date : 4/21/2016
Page No : 1

Groups Printed- Total Volume

| | Newburg Road Southbound | | | | Rohnerville Road Westbound | | | | Newburg Road Northbound | | | | Rohnerville Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 2 | 2 | 3 | 7 | 5 | 18 | 1 | 24 | 4 | 2 | 4 | 10 | 1 | 13 | 4 | 18 | 59 |
| 07:15 AM | 2 | 7 | 4 | 13 | 8 | 30 | 2 | 40 | 5 | 3 | 4 | 12 | 1 | 15 | 6 | 22 | 87 |
| 07:30 AM | 1 | 2 | 8 | 11 | 8 | 34 | 1 | 43 | 6 | 1 | 4 | 11 | 0 | 18 | 15 | 33 | 98 |
| 07:45 AM | 8 | 9 | 11 | 28 | 19 | 53 | 2 | 74 | 10 | 6 | 6 | 22 | 6 | 48 | 45 | 99 | 223 |
| Total | 13 | 20 | 26 | 59 | 40 | 135 | 6 | 181 | 25 | 12 | 18 | 55 | 8 | 94 | 70 | 172 | 467 |
| | | | | | | | | | | | | | | | | | |
| 08:00 AM | 3 | 2 | 9 | 14 | 15 | 53 | 5 | 73 | 11 | 7 | 11 | 29 | 4 | 41 | 49 | 94 | 210 |
| 08:15 AM | 5 | 5 | 4 | 14 | 7 | 34 | 2 | 43 | 5 | 2 | 7 | 14 | 4 | 44 | 14 | 62 | 133 |
| 08:30 AM | 2 | 5 | 3 | 10 | 8 | 33 | 4 | 45 | 7 | 3 | 7 | 17 | 4 | 20 | 4 | 28 | 100 |
| 08:45 AM | 3 | 2 | 11 | 16 | 7 | 52 | 2 | 61 | 5 | 2 | 4 | 11 | 8 | 18 | 8 | 34 | 122 |
| Total | 13 | 14 | 27 | 54 | 37 | 172 | 13 | 222 | 28 | 14 | 29 | 71 | 20 | 123 | 75 | 218 | 565 |
| | | | | | | | | | | | | | | | | | |
| Grand Total | 26 | 34 | 53 | 113 | 77 | 307 | 19 | 403 | 53 | 26 | 47 | 126 | 28 | 217 | 145 | 390 | 1032 |
| Apprch % | 23 | 30.1 | 46.9 | | 19.1 | 76.2 | 4.7 | | 42.1 | 20.6 | 37.3 | | 7.2 | 55.6 | 37.2 | | |
| Total % | 2.5 | 3.3 | 5.1 | 10.9 | 7.5 | 29.7 | 1.8 | 39.1 | 5.1 | 2.5 | 4.6 | 12.2 | 2.7 | 21 | 14.1 | 37.8 | |

| | Newburg Road Southbound | | | | Rohnerville Road Westbound | | | | Newburg Road Northbound | | | | Rohnerville Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | **8** | **9** | **11** | **28** | **19** | **53** | 2 | **74** | 10 | 6 | 6 | 22 | **6** | **48** | 45 | **99** | **223** |
| 08:00 AM | 3 | 2 | 9 | 14 | 15 | 53 | **5** | 73 | **11** | **7** | **11** | **29** | 4 | 41 | **49** | 94 | 210 |
| 08:15 AM | 5 | 5 | 4 | 14 | 7 | 34 | 2 | 43 | 5 | 2 | 7 | 14 | 4 | 44 | 14 | 62 | 133 |
| 08:30 AM | 2 | 5 | 3 | 10 | 8 | 33 | 4 | 45 | 7 | 3 | 7 | 17 | 4 | 20 | 4 | 28 | 100 |
| Total Volume | 18 | 21 | 27 | 66 | 49 | 173 | 13 | 235 | 33 | 18 | 31 | 82 | 18 | 153 | 112 | 283 | 666 |
| % App. Total | 27.3 | 31.8 | 40.9 | | 20.9 | 73.6 | 5.5 | | 40.2 | 22 | 37.8 | | 6.4 | 54.1 | 39.6 | | |
| PHF | .563 | .583 | .614 | .589 | .645 | .816 | .650 | .794 | .750 | .643 | .705 | .707 | .750 | .797 | .571 | .715 | .747 |

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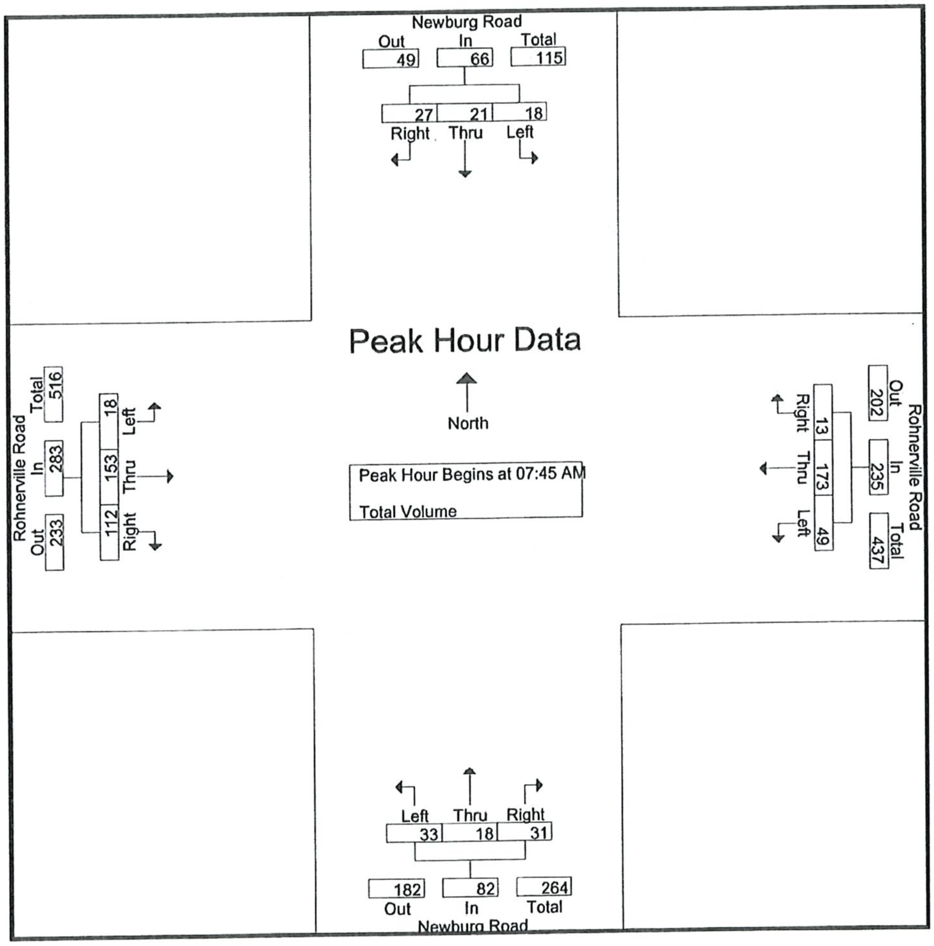
City of Fortuna
N/S: Newburg Road
E/W: Rohnerville Road
Weather: Clear

File Name : FORNEROAM
Site Code : 22016222
Start Date : 4/21/2016
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:30 AM | | | | 07:45 AM | | | | 07:45 AM | | | | 07:30 AM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 1 | 2 | 8 | 11 | **19** | **53** | 2 | **74** | 10 | 6 | 6 | 22 | 0 | 18 | 15 | 33 |
| +15 mins. | **8** | **9** | **11** | **28** | 15 | 53 | **5** | 73 | **11** | **7** | **11** | **29** | **6** | **48** | 45 | **99** |
| +30 mins. | 3 | 2 | 9 | 14 | 7 | 34 | 2 | 43 | 5 | 2 | 7 | 14 | 4 | 41 | **49** | 94 |
| +45 mins. | 5 | 5 | 4 | 14 | 8 | 33 | 4 | 45 | 7 | 3 | 7 | 17 | 4 | 44 | 14 | 62 |
| Total Volume | 17 | 18 | 32 | 67 | 49 | 173 | 13 | 235 | 33 | 18 | 31 | 82 | 14 | 151 | 123 | 288 |
| % App. Total | 25.4 | 26.9 | 47.8 | | 20.9 | 73.6 | 5.5 | | 40.2 | 22 | 37.8 | | 4.9 | 52.4 | 42.7 | |
| PHF | .531 | .500 | .727 | .598 | .645 | .816 | .650 | .794 | .750 | .643 | .705 | .707 | .583 | .786 | .628 | .727 |

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City of Fortuna
N/S: Newburg Road
E/W: Rohnerville Road
Weather: Clear

File Name : FORNEROPM
Site Code : 22016222
Start Date : 4/21/2016
Page No : 1

Groups Printed- Total Volume

| | Newburg Road Southbound | | | | Rohnerville Road Westbound | | | | Newburg Road Northbound | | | | Rohnerville Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 5 | 9 | 13 | 27 | 9 | 45 | 8 | 62 | 8 | 10 | 12 | 30 | 14 | 39 | 8 | 61 | 180 |
| 04:15 PM | 4 | 4 | 10 | 18 | 10 | 41 | 8 | 59 | 8 | 6 | 10 | 24 | 7 | 51 | 14 | 72 | 173 |
| 04:30 PM | 3 | 5 | 8 | 16 | 8 | 50 | 10 | 68 | 6 | 6 | 16 | 28 | 10 | 48 | 13 | 71 | 183 |
| 04:45 PM | 6 | 2 | 7 | 15 | 10 | 52 | 8 | 70 | 5 | 7 | 10 | 22 | 9 | 49 | 13 | 71 | 178 |
| Total | 18 | 20 | 38 | 76 | 37 | 188 | 34 | 259 | 27 | 29 | 48 | 104 | 40 | 187 | 48 | 275 | 714 |
| 05:00 PM | 5 | 8 | 9 | 22 | 6 | 48 | 3 | 57 | 7 | 7 | 13 | 27 | 17 | 67 | 15 | 99 | 205 |
| 05:15 PM | 0 | 7 | 4 | 11 | 9 | 41 | 10 | 60 | 6 | 8 | 10 | 24 | 13 | 62 | 13 | 88 | 183 |
| 05:30 PM | 7 | 4 | 9 | 20 | 6 | 43 | 7 | 56 | 4 | 6 | 12 | 22 | 23 | 58 | 14 | 95 | 193 |
| 05:45 PM | 6 | 2 | 5 | 13 | 1 | 44 | 9 | 54 | 4 | 17 | 8 | 29 | 20 | 47 | 14 | 81 | 177 |
| Total | 18 | 21 | 27 | 66 | 22 | 176 | 29 | 227 | 21 | 38 | 43 | 102 | 73 | 234 | 56 | 363 | 758 |
| Grand Total | 36 | 41 | 65 | 142 | 59 | 364 | 63 | 486 | 48 | 67 | 91 | 206 | 113 | 421 | 104 | 638 | 1472 |
| Apprch % | 25.4 | 28.9 | 45.8 | | 12.1 | 74.9 | 13 | | 23.3 | 32.5 | 44.2 | | 17.7 | 66 | 16.3 | | |
| Total % | 2.4 | 2.8 | 4.4 | 9.6 | 4 | 24.7 | 4.3 | 33 | 3.3 | 4.6 | 6.2 | 14 | 7.7 | 28.6 | 7.1 | 43.3 | |

| | Newburg Road Southbound | | | | Rohnerville Road Westbound | | | | Newburg Road Northbound | | | | Rohnerville Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 6 | 2 | 7 | 15 | **10** | **52** | 8 | **70** | 5 | 7 | 10 | 22 | 9 | 49 | 13 | 71 | 178 |
| 05:00 PM | 5 | **8** | **9** | **22** | 6 | 48 | 3 | 57 | **7** | 7 | **13** | **27** | 17 | **67** | **15** | **99** | **205** |
| 05:15 PM | 0 | 7 | 4 | 11 | 9 | 41 | **10** | 60 | 6 | **8** | 10 | 24 | 13 | 62 | 13 | 88 | 183 |
| 05:30 PM | **7** | 4 | 9 | 20 | 6 | 43 | 7 | 56 | 4 | 6 | 12 | 22 | **23** | 58 | 14 | 95 | 193 |
| Total Volume | 18 | 21 | 29 | 68 | 31 | 184 | 28 | 243 | 22 | 28 | 45 | 95 | 62 | 236 | 55 | 353 | 759 |
| % App. Total | 26.5 | 30.9 | 42.6 | | 12.8 | 75.7 | 11.5 | | 23.2 | 29.5 | 47.4 | | 17.6 | 66.9 | 15.6 | | |
| PHF | .643 | .656 | .806 | .773 | .775 | .885 | .700 | .868 | .786 | .875 | .865 | .880 | .674 | .881 | .917 | .891 | .926 |

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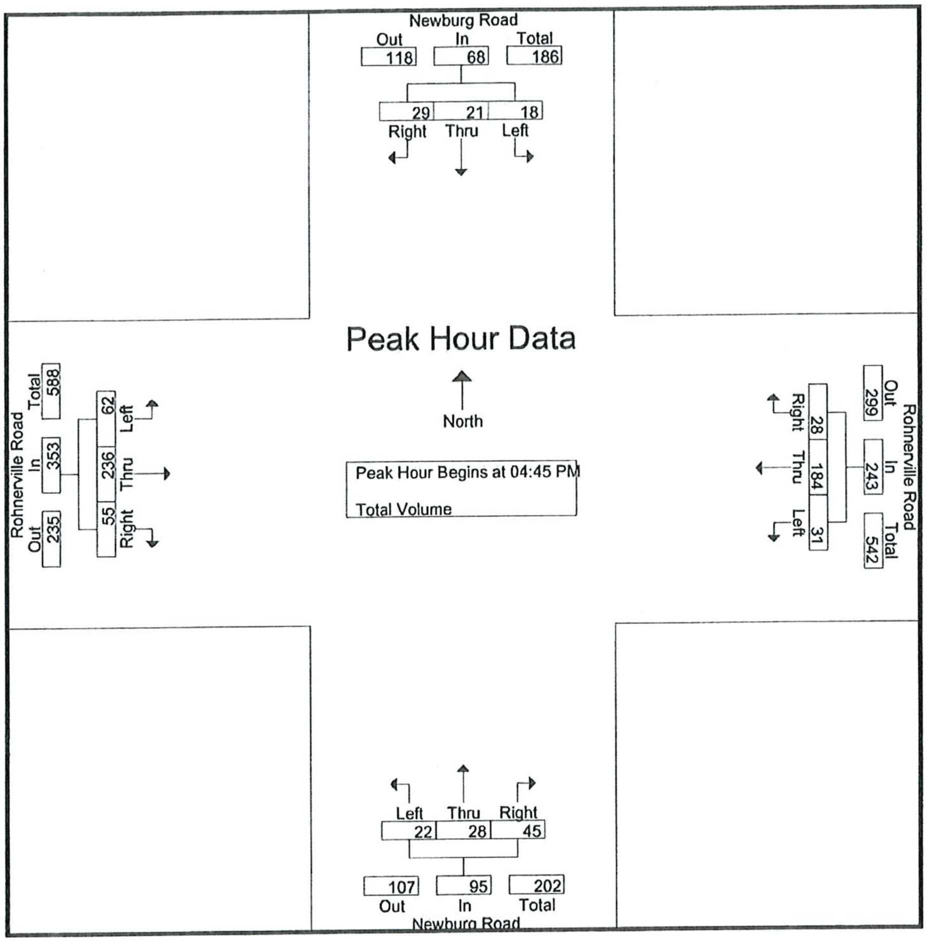
City of Fortuna
N/S: Newburg Road
E/W: Rohnerville Road
Weather: Clear

File Name : FORNEROPM
Site Code : 22016222
Start Date : 4/21/2016
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 04:00 PM | | | | 04:00 PM | | | | 04:00 PM | | | | 05:00 PM | | | |
| +0 mins. | 5 | **9** | **13** | **27** | 9 | 45 | 8 | 62 | **8** | **10** | 12 | **30** | 17 | **67** | **15** | **99** |
| +15 mins. | 4 | 4 | 10 | 18 | **10** | 41 | 8 | 59 | 8 | 6 | 10 | 24 | 13 | 62 | 13 | 88 |
| +30 mins. | 3 | 5 | 8 | 16 | 8 | 50 | **10** | 68 | 6 | 6 | **16** | 28 | **23** | 58 | 14 | 95 |
| +45 mins. | **6** | 2 | 7 | 15 | 10 | **52** | 8 | **70** | 5 | 7 | 10 | 22 | 20 | 47 | 14 | 81 |
| Total Volume | 18 | 20 | 38 | 76 | 37 | 188 | 34 | 259 | 27 | 29 | 48 | 104 | 73 | 234 | 56 | 363 |
| % App. Total | 23.7 | 26.3 | 50 | | 14.3 | 72.6 | 13.1 | | 26 | 27.9 | 46.2 | | 20.1 | 64.5 | 15.4 | |
| PHF | .750 | .556 | .731 | .704 | .925 | .904 | .850 | .925 | .844 | .725 | .750 | .867 | .793 | .873 | .933 | .917 |

# **Appendix C** - Baseline Conditions Scenario Level of Service and Queue Calculations

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | ↰ | ↱ | ↑↑ | ↱ | ↰ | ↑↑ |
| Traffic Volume (veh/h) | 77 | 87 | 360 | 71 | 156 | 364 |
| Future Volume (veh/h) | 77 | 87 | 360 | 71 | 156 | 364 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 85 | 96 | 396 | 78 | 171 | 400 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 183 | 163 | 1628 | 726 | 218 | 2438 |
| Arrive On Green | 0.10 | 0.10 | 0.46 | 0.46 | 0.12 | 0.69 |
| Sat Flow, veh/h | 1781 | 1585 | 3647 | 1585 | 1781 | 3647 |
| Grp Volume(v), veh/h | 85 | 96 | 396 | 78 | 171 | 400 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1585 | 1777 | 1585 | 1781 | 1777 |
| Q Serve(g_s), s | 1.7 | 2.2 | 2.6 | 1.1 | 3.5 | 1.5 |
| Cycle Q Clear(g_c), s | 1.7 | 2.2 | 2.6 | 1.1 | 3.5 | 1.5 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 183 | 163 | 1628 | 726 | 218 | 2438 |
| V/C Ratio(X) | 0.46 | 0.59 | 0.24 | 0.11 | 0.78 | 0.16 |
| Avail Cap(c_a), veh/h | 752 | 669 | 1628 | 726 | 282 | 2438 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 16.0 | 16.2 | 6.3 | 5.8 | 16.1 | 2.1 |
| Incr Delay (d2), s/veh | 1.8 | 3.4 | 0.4 | 0.3 | 10.4 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.8 | 0.7 | 0.3 | 1.8 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 17.8 | 19.6 | 6.6 | 6.1 | 26.6 | 2.2 |
| LnGrp LOS | B | B | A | A | C | A |
| Approach Vol, veh/h | 181 | | 474 | | | 571 |
| Approach Delay, s/veh | 18.8 | | 6.5 | | | 9.5 |
| Approach LOS | B | | A | | | A |

| Timer - Assigned Phs | 1 | 2 | 6 | 8 |
|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.6 | 21.4 | 30.0 | 7.9 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | 4.0 | 4.0 |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | 26.0 | 16.0 |
| Max Q Clear Time (g_c+I1), s | 5.5 | 4.6 | 3.5 | 4.2 |
| Green Ext Time (p_c), s | 0.0 | 2.2 | 2.6 | 0.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 9.7 |
| HCM 6th LOS | A |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 16 | 0 | 100 | 2 | 0 | 0 | 83 | 219 | 0 | 1 | 171 | 23 |
| Future Vol, veh/h | 16 | 0 | 100 | 2 | 0 | 0 | 83 | 219 | 0 | 1 | 171 | 23 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 100 | - | - | - | 110 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 21 | 0 | 128 | 3 | 0 | 0 | 106 | 281 | 0 | 1 | 219 | 29 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 729 | 729 | 234 | 793 | 743 | 281 | 248 | 0 | 0 | 281 | 0 | 0 |
| Stage 1 | 236 | 236 | - | 493 | 493 | - | - | - | - | - | - | - |
| Stage 2 | 493 | 493 | - | 300 | 250 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 338 | 350 | 805 | 306 | 343 | 758 | 1318 | - | - | 1282 | - | - |
| Stage 1 | 767 | 710 | - | 558 | 547 | - | - | - | - | - | - | - |
| Stage 2 | 558 | 547 | - | 709 | 700 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 317 | 322 | 805 | 241 | 315 | 758 | 1318 | - | - | 1282 | - | - |
| Mov Cap-2 Maneuver | 317 | 322 | - | 241 | 315 | - | - | - | - | - | - | - |
| Stage 1 | 706 | 709 | - | 513 | 503 | - | - | - | - | - | - | - |
| Stage 2 | 513 | 503 | - | 595 | 699 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 11.2 | 20.1 | 2.2 | 0 |
| HCM LOS | B | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1318 | - | - | 317 | 805 | 241 | 1282 | - | - |
| HCM Lane V/C Ratio | 0.081 | - | - | 0.065 | 0.159 | 0.011 | 0.001 | - | - |
| HCM Control Delay (s) | 8 | - | - | 17.1 | 10.3 | 20.1 | 7.8 | 0 | - |
| HCM Lane LOS | A | - | - | C | B | C | A | A | - |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.2 | 0.6 | 0 | 0 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↰ | ↱ | | ↰ | ↱ | ↰ | ↑↑ | ↱ | ↰ | ↑↑↱ | |
| Traffic Volume (veh/h) | 204 | 62 | 133 | 32 | 162 | 70 | 300 | 242 | 20 | 38 | 155 | 202 |
| Future Volume (veh/h) | 204 | 62 | 133 | 32 | 162 | 70 | 300 | 242 | 20 | 38 | 155 | 202 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 224 | 68 | 0 | 35 | 178 | 77 | 330 | 266 | 22 | 42 | 170 | 0 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 263 | 80 | | 45 | 230 | 235 | 374 | 1434 | 640 | 57 | 802 | |
| Arrive On Green | 0.19 | 0.19 | 0.00 | 0.15 | 0.15 | 0.15 | 0.21 | 0.40 | 0.40 | 0.03 | 0.23 | 0.00 |
| Sat Flow, veh/h | 1382 | 419 | 1585 | 305 | 1550 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 292 | 0 | 0 | 213 | 0 | 77 | 330 | 266 | 22 | 42 | 170 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1801 | 0 | 1585 | 1855 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 11.1 | 0.0 | 0.0 | 7.8 | 0.0 | 3.1 | 12.7 | 3.4 | 0.6 | 1.7 | 2.8 | 0.0 |
| Cycle Q Clear(g_c), s | 11.1 | 0.0 | 0.0 | 7.8 | 0.0 | 3.1 | 12.7 | 3.4 | 0.6 | 1.7 | 2.8 | 0.0 |
| Prop In Lane | 0.77 | | 1.00 | 0.16 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 343 | 0 | | 275 | 0 | 235 | 374 | 1434 | 640 | 57 | 802 | |
| V/C Ratio(X) | 0.85 | 0.00 | | 0.77 | 0.00 | 0.33 | 0.88 | 0.19 | 0.03 | 0.74 | 0.21 | |
| Avail Cap(c_a), veh/h | 406 | 0 | | 419 | 0 | 358 | 402 | 1434 | 640 | 151 | 802 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 27.7 | 0.0 | 0.0 | 29.0 | 0.0 | 27.0 | 27.2 | 13.6 | 12.8 | 34.0 | 22.3 | 0.0 |
| Incr Delay (d2), s/veh | 13.8 | 0.0 | 0.0 | 4.9 | 0.0 | 0.8 | 19.2 | 0.3 | 0.1 | 17.3 | 0.6 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.9 | 0.0 | 0.0 | 3.7 | 0.0 | 1.2 | 7.1 | 1.3 | 0.2 | 1.0 | 1.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 41.5 | 0.0 | 0.0 | 34.0 | 0.0 | 27.8 | 46.4 | 13.9 | 12.9 | 51.3 | 22.9 | 0.0 |
| LnGrp LOS | D | A | | C | A | C | D | B | B | D | C | |
| Approach Vol, veh/h | | 292 | A | | 290 | | | 618 | | | 212 | A |
| Approach Delay, s/veh | | 41.5 | | | 32.3 | | | 31.2 | | | 28.6 | |
| Approach LOS | | D | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.3 | 32.6 | | 17.5 | 18.9 | 20.0 | | 14.5 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 |
| Max Green Setting (Gmax), s | 6.0 | 26.0 | | 16.0 | 16.0 | 16.0 | | 16.0 |
| Max Q Clear Time (g_c+I1), s | 3.7 | 5.4 | | 13.1 | 14.7 | 4.8 | | 9.8 |
| Green Ext Time (p_c), s | 0.0 | 1.7 | | 0.5 | 0.1 | 0.7 | | 0.7 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 33.2 |
| HCM 6th LOS | | | C |

**Notes**

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | | | | | | |
|---|---|---|---|---|---|---|
| Int Delay, s/veh | 1.1 | | | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 30 | 10 | 4 | 246 | 210 | 12 |
| Future Vol, veh/h | 30 | 10 | 4 | 246 | 210 | 12 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 77 | 77 | 77 | 77 | 77 | 77 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 13 | 5 | 319 | 273 | 16 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 610 | 281 | 289 | 0 | - | 0 |
| Stage 1 | 281 | - | - | - | - | - |
| Stage 2 | 329 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 458 | 758 | 1273 | - | - | - |
| Stage 1 | 767 | - | - | - | - | - |
| Stage 2 | 729 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 456 | 758 | 1273 | - | - | - |
| Mov Cap-2 Maneuver | 456 | - | - | - | - | - |
| Stage 1 | 763 | - | - | - | - | - |
| Stage 2 | 729 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 12.9 | 0.1 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1273 | - | 506 | - | - |
| HCM Lane V/C Ratio | 0.004 | - | 0.103 | - | - |
| HCM Control Delay (s) | 7.8 | 0 | 12.9 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.3 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 99 | 156 | 83 | 113 | 86 | 136 | 237 | 57 | 46 | 252 | 55 |
| Future Volume (veh/h) | 46 | 99 | 156 | 83 | 113 | 86 | 136 | 237 | 57 | 46 | 252 | 55 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 51 | 110 | 173 | 92 | 126 | 96 | 151 | 263 | 63 | 51 | 280 | 61 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 199 | 361 | 416 | 188 | 187 | 119 | 192 | 1513 | 675 | 75 | 1278 | 570 |
| Arrive On Green | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.11 | 0.43 | 0.43 | 0.04 | 0.36 | 0.36 |
| Sat Flow, veh/h | 352 | 1376 | 1585 | 319 | 711 | 454 | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 161 | 0 | 173 | 314 | 0 | 0 | 151 | 263 | 63 | 51 | 280 | 61 |
| Grp Sat Flow(s),veh/h/ln | 1728 | 0 | 1585 | 1484 | 0 | 0 | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 0.0 | 0.0 | 4.0 | 5.7 | 0.0 | 0.0 | 3.7 | 2.0 | 1.1 | 1.3 | 2.4 | 1.1 |
| Cycle Q Clear(g_c), s | 3.1 | 0.0 | 4.0 | 8.8 | 0.0 | 0.0 | 3.7 | 2.0 | 1.1 | 1.3 | 2.4 | 1.1 |
| Prop In Lane | 0.32 | | 1.00 | 0.29 | | 0.31 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 560 | 0 | 416 | 494 | 0 | 0 | 192 | 1513 | 675 | 75 | 1278 | 570 |
| V/C Ratio(X) | 0.29 | 0.00 | 0.42 | 0.64 | 0.00 | 0.00 | 0.78 | 0.17 | 0.09 | 0.68 | 0.22 | 0.11 |
| Avail Cap(c_a), veh/h | 712 | 0 | 570 | 638 | 0 | 0 | 240 | 1513 | 675 | 160 | 1278 | 570 |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 13.2 | 0.0 | 13.6 | 15.3 | 0.0 | 0.0 | 19.3 | 7.9 | 7.6 | 21.0 | 9.9 | 9.5 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.7 | 1.4 | 0.0 | 0.0 | 12.6 | 0.3 | 0.3 | 10.3 | 0.4 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.1 | 0.0 | 1.3 | 2.7 | 0.0 | 0.0 | 2.0 | 0.7 | 0.3 | 0.7 | 0.8 | 0.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 13.5 | 0.0 | 14.2 | 16.6 | 0.0 | 0.0 | 31.9 | 8.2 | 7.9 | 31.4 | 10.3 | 9.9 |
| LnGrp LOS | B | A | B | B | A | A | C | A | A | C | B | A |
| Approach Vol, veh/h | | 334 | | | 314 | | | 477 | | | 392 | |
| Approach Delay, s/veh | | 13.9 | | | 16.6 | | | 15.7 | | | 13.0 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.9 | 22.9 | | 15.7 | 8.8 | 20.0 | | 15.7 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 |
| Max Green Setting (Gmax), s | 4.0 | 18.0 | | 16.0 | 6.0 | 16.0 | | 16.0 |
| Max Q Clear Time (g_c+I1), s | 3.3 | 4.0 | | 6.0 | 5.7 | 4.4 | | 10.8 |
| Green Ext Time (p_c), s | 0.0 | 1.5 | | 1.1 | 0.0 | 1.5 | | 0.9 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 14.8 |
| HCM 6th LOS | | | B |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.9 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 33 | 50 | 31 | 29 | 37 | 48 | 49 | 177 | 34 | 60 | 168 | 112 |
| Future Vol, veh/h | 33 | 50 | 31 | 29 | 37 | 48 | 49 | 177 | 34 | 60 | 168 | 112 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 25 | - | - | 25 | - | - | 70 | - | - | 70 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 37 | 56 | 34 | 32 | 41 | 53 | 54 | 197 | 38 | 67 | 187 | 124 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 692 | 664 | 187 | 733 | 750 | 197 | 311 | 0 | 0 | 235 | 0 | 0 |
| Stage 1 | 321 | 321 | - | 305 | 305 | - | - | - | - | - | - | - |
| Stage 2 | 371 | 343 | - | 428 | 445 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 358 | 381 | 855 | 336 | 340 | 844 | 1249 | - | - | 1332 | - | - |
| Stage 1 | 691 | 652 | - | 705 | 662 | - | - | - | - | - | - | - |
| Stage 2 | 649 | 637 | - | 605 | 575 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 276 | 339 | 855 | 259 | 303 | 844 | 1249 | - | - | 1332 | - | - |
| Mov Cap-2 Maneuver | 276 | 339 | - | 259 | 303 | - | - | - | - | - | - | - |
| Stage 1 | 656 | 612 | - | 670 | 629 | - | - | - | - | - | - | - |
| Stage 2 | 540 | 605 | - | 495 | 539 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 18.1 | 16.9 | 1.5 | 1.4 |
| HCM LOS | C | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1249 | - | - | 311 | 855 | 282 | 844 | 1332 | - | - |
| HCM Lane V/C Ratio | 0.044 | - | - | 0.297 | 0.04 | 0.26 | 0.063 | 0.05 | - | - |
| HCM Control Delay (s) | 8 | 0 | - | 21.4 | 9.4 | 22.2 | 9.6 | 7.8 | 0 | - |
| HCM Lane LOS | A | A | - | C | A | C | A | A | A | - |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 1.2 | 0.1 | 1 | 0.2 | 0.2 | - | - |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 127 | 171 | 443 | 74 | 191 | 517 |
| Future Volume (veh/h) | 127 | 171 | 443 | 74 | 191 | 517 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 131 | 176 | 457 | 76 | 197 | 533 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 294 | 261 | 1425 | 636 | 248 | 2269 |
| Arrive On Green | 0.16 | 0.16 | 0.40 | 0.40 | 0.14 | 0.64 |
| Sat Flow, veh/h | 1781 | 1585 | 3647 | 1585 | 1781 | 3647 |
| Grp Volume(v), veh/h | 131 | 176 | 457 | 76 | 197 | 533 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1585 | 1777 | 1585 | 1781 | 1777 |
| Q Serve(g_s), s | 2.7 | 4.2 | 3.6 | 1.2 | 4.4 | 2.6 |
| Cycle Q Clear(g_c), s | 2.7 | 4.2 | 3.6 | 1.2 | 4.4 | 2.6 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 294 | 261 | 1425 | 636 | 248 | 2269 |
| V/C Ratio(X) | 0.45 | 0.67 | 0.32 | 0.12 | 0.79 | 0.23 |
| Avail Cap(c_a), veh/h | 700 | 623 | 1425 | 636 | 262 | 2269 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.3 | 16.0 | 8.4 | 7.7 | 17.0 | 3.1 |
| Incr Delay (d2), s/veh | 1.1 | 3.0 | 0.6 | 0.4 | 14.7 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.0 | 1.5 | 1.1 | 0.4 | 2.5 | 0.5 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 16.4 | 19.0 | 9.0 | 8.1 | 31.6 | 3.4 |
| LnGrp LOS | B | B | A | A | C | A |
| Approach Vol, veh/h | 307 | | 533 | | | 730 |
| Approach Delay, s/veh | 17.9 | | 8.8 | | | 11.0 |
| Approach LOS | B | | A | | | B |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.7 | 20.3 | | | | 30.0 | | 10.7 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | | | 4.0 | | 4.0 |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | | | | 26.0 | | 16.0 |
| Max Q Clear Time (g_c+I1), s | 6.4 | 5.6 | | | | 4.6 | | 6.2 |
| Green Ext Time (p_c), s | 0.0 | 2.4 | | | | 3.6 | | 0.7 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 11.6 |
| HCM 6th LOS | | | B |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 38 | 0 | 150 | 0 | 0 | 0 | 98 | 231 | 0 | 2 | 258 | 31 |
| Future Vol, veh/h | 38 | 0 | 150 | 0 | 0 | 0 | 98 | 231 | 0 | 2 | 258 | 31 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 100 | - | - | - | 110 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 42 | 0 | 167 | 0 | 0 | 0 | 109 | 257 | 0 | 2 | 287 | 34 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 783 | 783 | 304 | 867 | 800 | 257 | 321 | 0 | 0 | 257 | 0 | 0 |
| Stage 1 | 308 | 308 | - | 475 | 475 | - | - | - | - | - | - | - |
| Stage 2 | 475 | 475 | - | 392 | 325 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 311 | 325 | 736 | 273 | 318 | 782 | 1239 | - | - | 1308 | - | - |
| Stage 1 | 702 | 660 | - | 570 | 557 | - | - | - | - | - | - | - |
| Stage 2 | 570 | 557 | - | 633 | 649 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 290 | 296 | 736 | 197 | 289 | 782 | 1239 | - | - | 1308 | - | - |
| Mov Cap-2 Maneuver | 290 | 296 | - | 197 | 289 | - | - | - | - | - | - | - |
| Stage 1 | 640 | 659 | - | 520 | 508 | - | - | - | - | - | - | - |
| Stage 2 | 520 | 508 | - | 489 | 648 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 13 | 0 | 2.4 | 0.1 |
| HCM LOS | B | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1239 | - | - | 290 | 736 | - | 1308 | - | - |
| HCM Lane V/C Ratio | 0.088 | - | - | 0.146 | 0.226 | - | 0.002 | - | - |
| HCM Control Delay (s) | 8.2 | - | - | 19.5 | 11.3 | 0 | 7.8 | 0 | - |
| HCM Lane LOS | A | - | - | C | B | A | A | A | - |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.5 | 0.9 | - | 0 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↰↑ | ↱ | | ↰↑ | ↱ | ↰ | ↑↑ | ↱ | ↰ | ↑↑↱ | |
| Traffic Volume (veh/h) | 284 | 103 | 233 | 17 | 90 | 66 | 124 | 172 | 10 | 79 | 227 | 330 |
| Future Volume (veh/h) | 284 | 103 | 233 | 17 | 90 | 66 | 124 | 172 | 10 | 79 | 227 | 330 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 296 | 107 | 0 | 18 | 94 | 69 | 129 | 179 | 10 | 82 | 236 | 0 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 339 | 123 | | 29 | 150 | 153 | 164 | 1106 | 493 | 105 | 987 | |
| Arrive On Green | 0.26 | 0.26 | 0.00 | 0.10 | 0.10 | 0.10 | 0.09 | 0.31 | 0.31 | 0.06 | 0.28 | 0.00 |
| Sat Flow, veh/h | 1325 | 479 | 1585 | 298 | 1557 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 403 | 0 | 0 | 112 | 0 | 69 | 129 | 179 | 10 | 82 | 236 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1804 | 0 | 1585 | 1855 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 12.3 | 0.0 | 0.0 | 3.3 | 0.0 | 2.4 | 4.1 | 2.1 | 0.3 | 2.6 | 3.0 | 0.0 |
| Cycle Q Clear(g_c), s | 12.3 | 0.0 | 0.0 | 3.3 | 0.0 | 2.4 | 4.1 | 2.1 | 0.3 | 2.6 | 3.0 | 0.0 |
| Prop In Lane | 0.73 | | 1.00 | 0.16 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 461 | 0 | | 179 | 0 | 153 | 164 | 1106 | 493 | 105 | 987 | |
| V/C Ratio(X) | 0.87 | 0.00 | | 0.63 | 0.00 | 0.45 | 0.79 | 0.16 | 0.02 | 0.78 | 0.24 | |
| Avail Cap(c_a), veh/h | 501 | 0 | | 515 | 0 | 440 | 186 | 1106 | 493 | 186 | 987 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 20.5 | 0.0 | 0.0 | 25.0 | 0.0 | 24.6 | 25.6 | 14.4 | 13.7 | 26.7 | 16.1 | 0.0 |
| Incr Delay (d2), s/veh | 14.8 | 0.0 | 0.0 | 3.6 | 0.0 | 2.1 | 17.7 | 0.3 | 0.1 | 11.9 | 0.6 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 6.6 | 0.0 | 0.0 | 1.6 | 0.0 | 0.9 | 2.4 | 0.8 | 0.1 | 1.4 | 1.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.3 | 0.0 | 0.0 | 28.6 | 0.0 | 26.7 | 43.3 | 14.7 | 13.8 | 38.7 | 16.7 | 0.0 |
| LnGrp LOS | D | A | | C | A | C | D | B | B | D | B | |
| Approach Vol, veh/h | | 403 | A | | 181 | | | 318 | | | 318 | A |
| Approach Delay, s/veh | | 35.3 | | | 27.8 | | | 26.3 | | | 22.3 | |
| Approach LOS | | D | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 7.4 | 21.9 | | 18.7 | 9.3 | 20.0 | | 9.6 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.6 | 4.1 | | 14.3 | 6.1 | 5.0 | | 5.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.8 | | 0.4 | 0.0 | 1.0 | | 0.5 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 28.5 |
| HCM 6th LOS | | | C |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | | | | | | |
|---|---|---|---|---|---|---|
| Int Delay, s/veh | 0.6 | | | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 23 | 4 | 7 | 225 | 310 | 39 |
| Future Vol, veh/h | 23 | 4 | 7 | 225 | 310 | 39 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 4 | 7 | 237 | 326 | 41 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 598 | 347 | 367 | 0 | - | 0 |
| Stage 1 | 347 | - | - | - | - | - |
| Stage 2 | 251 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 465 | 696 | 1192 | - | - | - |
| Stage 1 | 716 | - | - | - | - | - |
| Stage 2 | 791 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 462 | 696 | 1192 | - | - | - |
| Mov Cap-2 Maneuver | 462 | - | - | - | - | - |
| Stage 1 | 711 | - | - | - | - | - |
| Stage 2 | 791 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 12.9 | 0.2 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1192 | - | 486 | - | - |
| HCM Lane V/C Ratio | 0.006 | - | 0.058 | - | - |
| HCM Control Delay (s) | 8 | 0 | 12.9 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.2 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 65 | 107 | 203 | 52 | 78 | 46 | 136 | 393 | 54 | 62 | 441 | 49 |
| Future Volume (veh/h) | 65 | 107 | 203 | 52 | 78 | 46 | 136 | 393 | 54 | 62 | 441 | 49 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 68 | 111 | 211 | 54 | 81 | 48 | 142 | 409 | 56 | 65 | 459 | 51 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 224 | 254 | 320 | 166 | 153 | 72 | 182 | 1594 | 711 | 91 | 1414 | 630 |
| Arrive On Green | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.10 | 0.45 | 0.45 | 0.05 | 0.40 | 0.40 |
| Sat Flow, veh/h | 497 | 1256 | 1585 | 250 | 756 | 358 | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 179 | 0 | 211 | 183 | 0 | 0 | 142 | 409 | 56 | 65 | 459 | 51 |
| Grp Sat Flow(s),veh/h/ln | 1753 | 0 | 1585 | 1364 | 0 | 0 | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 0.0 | 0.0 | 4.9 | 1.8 | 0.0 | 0.0 | 3.1 | 2.9 | 0.8 | 1.4 | 3.6 | 0.8 |
| Cycle Q Clear(g_c), s | 3.4 | 0.0 | 4.9 | 5.2 | 0.0 | 0.0 | 3.1 | 2.9 | 0.8 | 1.4 | 3.6 | 0.8 |
| Prop In Lane | 0.38 | | 1.00 | 0.30 | | 0.26 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 477 | 0 | 320 | 391 | 0 | 0 | 182 | 1594 | 711 | 91 | 1414 | 630 |
| V/C Ratio(X) | 0.37 | 0.00 | 0.66 | 0.47 | 0.00 | 0.00 | 0.78 | 0.26 | 0.08 | 0.71 | 0.32 | 0.08 |
| Avail Cap(c_a), veh/h | 787 | 0 | 630 | 679 | 0 | 0 | 266 | 1594 | 711 | 177 | 1414 | 630 |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.2 | 0.0 | 14.8 | 14.7 | 0.0 | 0.0 | 17.6 | 6.9 | 6.3 | 18.8 | 8.4 | 7.5 |
| Incr Delay (d2), s/veh | 0.5 | 0.0 | 2.3 | 0.9 | 0.0 | 0.0 | 8.8 | 0.4 | 0.2 | 9.7 | 0.6 | 0.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.3 | 0.0 | 1.7 | 1.4 | 0.0 | 0.0 | 1.5 | 0.8 | 0.2 | 0.8 | 1.1 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.7 | 0.0 | 17.1 | 15.6 | 0.0 | 0.0 | 26.4 | 7.3 | 6.6 | 28.5 | 9.0 | 7.8 |
| LnGrp LOS | B | A | B | B | A | A | C | A | A | C | A | A |
| Approach Vol, veh/h | | 390 | | | 183 | | | 607 | | | 575 | |
| Approach Delay, s/veh | | 16.0 | | | 15.6 | | | 11.7 | | | 11.1 | |
| Approach LOS | | B | | | B | | | B | | | B | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.1 | 22.0 | | 12.1 | 8.1 | 20.0 | | 12.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 4.0 | 18.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.4 | 4.9 | | 6.9 | 5.1 | 5.6 | | 7.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.3 | | 1.2 | 0.0 | 2.3 | | 0.6 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 12.9 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

| Intersection | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Int Delay, s/veh | 9.4 | | | | | | | | | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 22 | 65 | 45 | 44 | 60 | 81 | 31 | 202 | 53 | 112 | 215 | 55 |
| Future Vol, veh/h | 22 | 65 | 45 | 44 | 60 | 81 | 31 | 202 | 53 | 112 | 215 | 55 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 25 | - | - | 25 | - | - | 70 | - | - | 70 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 72 | 50 | 49 | 67 | 90 | 34 | 224 | 59 | 124 | 239 | 61 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 887 | 838 | 239 | 871 | 840 | 224 | 300 | 0 | 0 | 283 | 0 | 0 |
| Stage 1 | 487 | 487 | - | 292 | 292 | - | - | - | - | - | - | - |
| Stage 2 | 400 | 351 | - | 579 | 548 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 265 | 302 | 800 | 271 | 302 | 815 | 1261 | - | - | 1279 | - | - |
| Stage 1 | 562 | 550 | - | 716 | 671 | - | - | - | - | - | - | - |
| Stage 2 | 626 | 632 | - | 501 | 517 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 169 | 258 | 800 | 178 | 258 | 815 | 1261 | - | - | 1279 | - | - |
| Mov Cap-2 Maneuver | 169 | 258 | - | 178 | 258 | - | - | - | - | - | - | - |
| Stage 1 | 544 | 486 | - | 693 | 650 | - | - | - | - | - | - | - |
| Stage 2 | 484 | 612 | - | 353 | 457 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 24.4 | 26.3 | 0.9 | 2.4 |
| HCM LOS | C | D | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1261 | - | - | 228 | 800 | 217 | 815 | 1279 | - | - |
| HCM Lane V/C Ratio | 0.027 | - | - | 0.424 | 0.063 | 0.533 | 0.11 | 0.097 | - | - |
| HCM Control Delay (s) | 7.9 | 0 | - | 31.9 | 9.8 | 39 | 10 | 8.1 | 0 | - |
| HCM Lane LOS | A | A | - | D | A | E | B | A | A | - |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 2 | 0.2 | 2.8 | 0.4 | 0.3 | - | - |

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 85 | 96 | 396 | 78 | 171 | 400 |
| v/c Ratio | 0.28 | 0.27 | 0.25 | 0.10 | 0.68 | 0.16 |
| Control Delay | 17.0 | 6.5 | 9.2 | 3.5 | 35.8 | 3.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 17.0 | 6.5 | 9.2 | 3.5 | 35.8 | 3.5 |
| Queue Length 50th (ft) | 17 | 0 | 31 | 0 | 39 | 15 |
| Queue Length 95th (ft) | 44 | 26 | 60 | 18 | #115 | 32 |
| Internal Link Dist (ft) | 1656 | | 1689 | | | 1325 |
| Turn Bay Length (ft) | | 60 | | 75 | 150 | |
| Base Capacity (vph) | 667 | 656 | 1569 | 745 | 250 | 2466 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.13 | 0.15 | 0.25 | 0.10 | 0.68 | 0.16 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 292 | 146 | 213 | 77 | 330 | 266 | 22 | 42 | 392 |
| v/c Ratio | 0.82 | 0.32 | 0.67 | 0.18 | 0.90 | 0.19 | 0.03 | 0.31 | 0.46 |
| Control Delay | 50.5 | 5.0 | 40.7 | 1.0 | 59.9 | 17.8 | 0.1 | 41.1 | 13.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 50.5 | 5.0 | 40.7 | 1.0 | 59.9 | 17.8 | 0.1 | 41.1 | 13.8 |
| Queue Length 50th (ft) | 136 | 0 | 97 | 0 | 158 | 48 | 0 | 20 | 36 |
| Queue Length 95th (ft) | #268 | 31 | 166 | 0 | #317 | 79 | 0 | 52 | 77 |
| Internal Link Dist (ft) | 199 | | 154 | | | 208 | | | 252 |
| Turn Bay Length (ft) | | 150 | | 100 | 100 | | 50 | 85 | |
| Base Capacity (vph) | 377 | 473 | 388 | 473 | 372 | 1400 | 700 | 139 | 856 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.77 | 0.31 | 0.55 | 0.16 | 0.89 | 0.19 | 0.03 | 0.30 | 0.46 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 161 | 173 | 314 | 151 | 263 | 63 | 51 | 280 | 61 |
| v/c Ratio | 0.39 | 0.31 | 0.70 | 0.64 | 0.15 | 0.08 | 0.32 | 0.21 | 0.09 |
| Control Delay | 16.5 | 4.5 | 21.9 | 37.1 | 8.9 | 1.4 | 27.3 | 12.0 | 1.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 16.5 | 4.5 | 21.9 | 37.1 | 8.9 | 1.4 | 27.3 | 12.0 | 1.6 |
| Queue Length 50th (ft) | 35 | 0 | 63 | 41 | 15 | 0 | 14 | 28 | 0 |
| Queue Length 95th (ft) | 74 | 32 | 130 | #118 | 47 | 9 | 41 | 54 | 9 |
| Internal Link Dist (ft) | 1015 | | 544 | | 1325 | | | 2204 | |
| Turn Bay Length (ft) | | 100 | | 70 | | 120 | 70 | | 110 |
| Base Capacity (vph) | 548 | 676 | 573 | 237 | 1717 | 824 | 157 | 1352 | 672 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.29 | 0.26 | 0.55 | 0.64 | 0.15 | 0.08 | 0.32 | 0.21 | 0.09 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 131 | 176 | 457 | 76 | 197 | 533 |
| v/c Ratio | 0.38 | 0.39 | 0.30 | 0.10 | 0.81 | 0.22 |
| Control Delay | 18.0 | 6.0 | 10.1 | 3.7 | 48.8 | 4.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 18.0 | 6.0 | 10.1 | 3.7 | 48.8 | 4.1 |
| Queue Length 50th (ft) | 28 | 0 | 38 | 0 | 47 | 23 |
| Queue Length 95th (ft) | 62 | 34 | 74 | 19 | #142 | 50 |
| Internal Link Dist (ft) | 1656 | | 1689 | | | 1325 |
| Turn Bay Length (ft) | | 60 | | 75 | 150 | |
| Base Capacity (vph) | 651 | 693 | 1537 | 730 | 244 | 2414 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.20 | 0.25 | 0.30 | 0.10 | 0.81 | 0.22 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 403 | 243 | 112 | 69 | 129 | 179 | 10 | 82 | 580 |
| v/c Ratio | 0.85 | 0.41 | 0.41 | 0.20 | 0.74 | 0.17 | 0.02 | 0.48 | 0.53 |
| Control Delay | 43.1 | 5.7 | 29.2 | 1.7 | 57.0 | 19.4 | 0.1 | 38.3 | 10.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 43.1 | 5.7 | 29.2 | 1.7 | 57.0 | 19.4 | 0.1 | 38.3 | 10.3 |
| Queue Length 50th (ft) | 148 | 0 | 40 | 0 | 49 | 28 | 0 | 31 | 38 |
| Queue Length 95th (ft) | #318 | 50 | 82 | 4 | #139 | 54 | 0 | #81 | 85 |
| Internal Link Dist (ft) | 199 | | 154 | | | 208 | | | 252 |
| Turn Bay Length (ft) | | 150 | | 100 | 100 | | 50 | 85 | |
| Base Capacity (vph) | 475 | 596 | 488 | 521 | 175 | 1076 | 578 | 175 | 1104 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.85 | 0.41 | 0.23 | 0.13 | 0.74 | 0.17 | 0.02 | 0.47 | 0.53 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 179 | 211 | 183 | 142 | 409 | 56 | 65 | 459 | 51 |
| v/c Ratio | 0.48 | 0.39 | 0.47 | 0.60 | 0.24 | 0.07 | 0.41 | 0.32 | 0.07 |
| Control Delay | 19.0 | 5.0 | 15.5 | 33.9 | 9.4 | 1.1 | 30.2 | 11.7 | 1.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 19.0 | 5.0 | 15.5 | 33.9 | 9.4 | 1.1 | 30.2 | 11.7 | 1.0 |
| Queue Length 50th (ft) | 39 | 0 | 31 | 35 | 34 | 0 | 16 | 42 | 0 |
| Queue Length 95th (ft) | 81 | 35 | 72 | #109 | 71 | 6 | #57 | 86 | 5 |
| Internal Link Dist (ft) | 1015 | | 544 | | 1325 | | | 2204 | |
| Turn Bay Length (ft) | | 100 | | 70 | | 120 | 70 | | 110 |
| Base Capacity (vph) | 563 | 702 | 576 | 237 | 1705 | 819 | 158 | 1448 | 712 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.32 | 0.30 | 0.32 | 0.60 | 0.24 | 0.07 | 0.41 | 0.32 | 0.07 |

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# **Appendix D** - Trip Generation Calculations

# Land Use: 251
# Senior Adult Housing—Detached

## Description

Senior adult housing consists of detached independent living developments, including retirement communities, age-restricted housing, and active adult communities. These developments may include amenities such as golf courses, swimming pools, 24-hour security, transportation, and common recreational facilities. However, they generally lack centralized dining and on-site health facilities. Detached senior adult housing communities may or may not be gated. Residents in these communities are typically active (requiring little to no medical supervision). The percentage of retired residents varies by development. Senior adult housing—attached (Land Use 252), congregate care facility (Land Use 253), assisted living (Land Use 254), and continuing care retirement community (Land Use 255) are related land uses.

## Additional Data

***Caution should be used when applying trip rates for this land use as it may contain a wide variety of studies ranging from communities with very active, working residents to communities with older, retired residents. As more data becomes available, consideration will be given to future stratification of this land use.***

Many factors affected the trip rates for detached senior adult housing. Factors such as the average age of residents, development location and size, affluence of residents, employment status, and vehicular access should be taken into consideration when conducting an analysis. Some developments were located within close proximity to medical facilities, restaurants, shopping centers, banks, and recreational activities.

For the six sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 98.5 percent of the total dwelling units were occupied.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 11:45 a.m. and 12:45 p.m. and 5:00 and 6:00 p.m., respectively.

For the six sites for which data were provided for both occupied dwelling units and total dwelling units, an average of 98.5 percent of the units were occupied.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Delaware, Florida, New Hampshire, New Jersey, and Pennsylvania.

## Source Numbers

221, 289, 398, 421, 500, 550, 598, 601, 629, 734, 930

**Project Trip Generation Estimates for Weekday**

| Description | Proposed Land Use (ITE Code) | Net Size | Units | Daily Rate | Daily Trips | AM Peak Hour | | | | | | PM Peak Hour | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Peak Hour Rate | Splits | | Trips | | | Peak Hour Rate | Splits | | Trips | | |
| | | | | | | | Entering | Exiting | Entering | Exiting | Total | | Entering | Exiting | Entering | Exiting | Total |
| Planned Unit Development - Senior Community | Senior Adult Housing - Detached (251) - Fitted Curve | 59 | Dwelling Units | 5.97 | 352 | 0.46 | 33% | 67% | 9 | 19 | 28 | 0.54 | 61% | 39% | 20 | 13 | 33 |
| | **Total** | | | | | | | | **9** | **19** | **28** | | | | **20** | **13** | **33** |

Notes:

# **Appendix E** - Baseline Plus Project Conditions Scenario Level of Service and Queue Calculations

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 83 | 93 | 360 | 73 | 161 | 364 |
| Future Volume (veh/h) | 83 | 93 | 360 | 73 | 161 | 364 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 91 | 102 | 396 | 80 | 177 | 400 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 193 | 172 | 1601 | 714 | 225 | 2423 |
| Arrive On Green | 0.11 | 0.11 | 0.45 | 0.45 | 0.13 | 0.68 |
| Sat Flow, veh/h | 1781 | 1585 | 3647 | 1585 | 1781 | 3647 |
| Grp Volume(v), veh/h | 91 | 102 | 396 | 80 | 177 | 400 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1585 | 1777 | 1585 | 1781 | 1777 |
| Q Serve(g_s), s | 1.8 | 2.3 | 2.6 | 1.1 | 3.7 | 1.5 |
| Cycle Q Clear(g_c), s | 1.8 | 2.3 | 2.6 | 1.1 | 3.7 | 1.5 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 193 | 172 | 1601 | 714 | 225 | 2423 |
| V/C Ratio(X) | 0.47 | 0.59 | 0.25 | 0.11 | 0.79 | 0.17 |
| Avail Cap(c_a), veh/h | 747 | 665 | 1601 | 714 | 280 | 2423 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 16.0 | 16.2 | 6.5 | 6.1 | 16.2 | 2.2 |
| Incr Delay (d2), s/veh | 1.8 | 3.2 | 0.4 | 0.3 | 11.1 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.7 | 0.9 | 0.7 | 0.3 | 2.0 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 17.7 | 19.4 | 6.8 | 6.4 | 27.3 | 2.3 |
| LnGrp LOS | B | B | A | A | C | A |
| Approach Vol, veh/h | 193 | | 476 | | | 577 |
| Approach Delay, s/veh | 18.6 | | 6.8 | | | 10.0 |
| Approach LOS | B | | A | | | A |

| Timer - Assigned Phs | 1 | 2 | 6 | 8 |
|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.8 | 21.2 | 30.0 | 8.1 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | 4.0 | 4.0 |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | 26.0 | 16.0 |
| Max Q Clear Time (g_c+I1), s | 5.7 | 4.6 | 3.5 | 4.3 |
| Green Ext Time (p_c), s | 0.0 | 2.2 | 2.6 | 0.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 10.1 |
| HCM 6th LOS | B |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.4 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 17 | 0 | 107 | 2 | 0 | 0 | 86 | 219 | 0 | 1 | 171 | 24 |
| Future Vol, veh/h | 17 | 0 | 107 | 2 | 0 | 0 | 86 | 219 | 0 | 1 | 171 | 24 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 100 | - | - | - | 110 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 | 78 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 22 | 0 | 137 | 3 | 0 | 0 | 110 | 281 | 0 | 1 | 219 | 31 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 738 | 738 | 235 | 806 | 753 | 281 | 250 | 0 | 0 | 281 | 0 | 0 |
| Stage 1 | 237 | 237 | - | 501 | 501 | - | - | - | - | - | - | - |
| Stage 2 | 501 | 501 | - | 305 | 252 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 334 | 346 | 804 | 300 | 339 | 758 | 1316 | - | - | 1282 | - | - |
| Stage 1 | 766 | 709 | - | 552 | 543 | - | - | - | - | - | - | - |
| Stage 2 | 552 | 543 | - | 705 | 698 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 312 | 317 | 804 | 233 | 310 | 758 | 1316 | - | - | 1282 | - | - |
| Mov Cap-2 Maneuver | 312 | 317 | - | 233 | 310 | - | - | - | - | - | - | - |
| Stage 1 | 702 | 708 | - | 506 | 497 | - | - | - | - | - | - | - |
| Stage 2 | 506 | 497 | - | 584 | 697 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 11.4 | 20.6 | 2.3 | 0 |
| HCM LOS | B | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1316 | - | - | 312 | 804 | 233 | 1282 | - | - |
| HCM Lane V/C Ratio | 0.084 | - | - | 0.07 | 0.171 | 0.011 | 0.001 | - | - |
| HCM Control Delay (s) | 8 | - | - | 17.4 | 10.4 | 20.6 | 7.8 | 0 | - |
| HCM Lane LOS | A | - | - | C | B | C | A | A | - |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.2 | 0.6 | 0 | 0 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 205 | 62 | 133 | 32 | 162 | 70 | 300 | 243 | 20 | 39 | 157 | 205 |
| Future Volume (veh/h) | 205 | 62 | 133 | 32 | 162 | 70 | 300 | 243 | 20 | 39 | 157 | 205 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 225 | 68 | 0 | 35 | 178 | 77 | 330 | 267 | 22 | 43 | 173 | 0 |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 264 | 80 | | 45 | 230 | 235 | 373 | 1432 | 639 | 57 | 801 | |
| Arrive On Green | 0.19 | 0.19 | 0.00 | 0.15 | 0.15 | 0.15 | 0.21 | 0.40 | 0.40 | 0.03 | 0.23 | 0.00 |
| Sat Flow, veh/h | 1383 | 418 | 1585 | 305 | 1550 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 293 | 0 | 0 | 213 | 0 | 77 | 330 | 267 | 22 | 43 | 173 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1801 | 0 | 1585 | 1855 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 11.2 | 0.0 | 0.0 | 7.8 | 0.0 | 3.1 | 12.8 | 3.4 | 0.6 | 1.7 | 2.8 | 0.0 |
| Cycle Q Clear(g_c), s | 11.2 | 0.0 | 0.0 | 7.8 | 0.0 | 3.1 | 12.8 | 3.4 | 0.6 | 1.7 | 2.8 | 0.0 |
| Prop In Lane | 0.77 | | 1.00 | 0.16 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 344 | 0 | | 275 | 0 | 235 | 373 | 1432 | 639 | 57 | 801 | |
| V/C Ratio(X) | 0.85 | 0.00 | | 0.77 | 0.00 | 0.33 | 0.88 | 0.19 | 0.03 | 0.75 | 0.22 | |
| Avail Cap(c_a), veh/h | 406 | 0 | | 418 | 0 | 357 | 402 | 1432 | 639 | 151 | 801 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 27.7 | 0.0 | 0.0 | 29.1 | 0.0 | 27.1 | 27.2 | 13.7 | 12.8 | 34.1 | 22.4 | 0.0 |
| Incr Delay (d2), s/veh | 13.9 | 0.0 | 0.0 | 4.9 | 0.0 | 0.8 | 19.3 | 0.3 | 0.1 | 17.5 | 0.6 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.9 | 0.0 | 0.0 | 3.7 | 0.0 | 1.2 | 7.1 | 1.3 | 0.2 | 1.0 | 1.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 41.7 | 0.0 | 0.0 | 34.0 | 0.0 | 27.9 | 46.5 | 14.0 | 12.9 | 51.6 | 23.0 | 0.0 |
| LnGrp LOS | D | A | | C | A | C | D | B | B | D | C | |
| Approach Vol, veh/h | | 293 | A | | 290 | | | 619 | | | 216 | A |
| Approach Delay, s/veh | | 41.7 | | | 32.4 | | | 31.3 | | | 28.7 | |
| Approach LOS | | D | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.3 | 32.6 | | 17.6 | 18.9 | 20.0 | | 14.5 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 |
| Max Green Setting (Gmax), s | 6.0 | 26.0 | | 16.0 | 16.0 | 16.0 | | 16.0 |
| Max Q Clear Time (g_c+I1), s | 3.7 | 5.4 | | 13.2 | 14.8 | 4.8 | | 9.8 |
| Green Ext Time (p_c), s | 0.0 | 1.7 | | 0.5 | 0.1 | 0.7 | | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 33.3 |
| HCM 6th LOS | C |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.1 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 30 | 10 | 4 | 249 | 217 | 12 |
| Future Vol, veh/h | 30 | 10 | 4 | 249 | 217 | 12 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 77 | 77 | 77 | 77 | 77 | 77 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 39 | 13 | 5 | 323 | 282 | 16 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 623 | 290 | 298 | 0 | - | 0 |
| Stage 1 | 290 | - | - | - | - | - |
| Stage 2 | 333 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 450 | 749 | 1263 | - | - | - |
| Stage 1 | 759 | - | - | - | - | - |
| Stage 2 | 726 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 448 | 749 | 1263 | - | - | - |
| Mov Cap-2 Maneuver | 448 | - | - | - | - | - |
| Stage 1 | 755 | - | - | - | - | - |
| Stage 2 | 726 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 13.1 | 0.1 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1263 | - | 498 | - | - |
| HCM Lane V/C Ratio | 0.004 | - | 0.104 | - | - |
| HCM Control Delay (s) | 7.9 | 0 | 13.1 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.3 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 99 | 157 | 84 | 113 | 86 | 138 | 240 | 58 | 46 | 253 | 55 |
| Future Volume (veh/h) | 46 | 99 | 157 | 84 | 113 | 86 | 138 | 240 | 58 | 46 | 253 | 55 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 51 | 110 | 174 | 93 | 126 | 96 | 153 | 267 | 64 | 51 | 281 | 61 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 199 | 361 | 417 | 189 | 186 | 119 | 195 | 1513 | 675 | 75 | 1274 | 568 |
| Arrive On Green | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.11 | 0.43 | 0.43 | 0.04 | 0.36 | 0.36 |
| Sat Flow, veh/h | 352 | 1372 | 1585 | 322 | 708 | 451 | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 161 | 0 | 174 | 315 | 0 | 0 | 153 | 267 | 64 | 51 | 281 | 61 |
| Grp Sat Flow(s),veh/h/ln | 1724 | 0 | 1585 | 1481 | 0 | 0 | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 0.0 | 0.0 | 4.1 | 5.8 | 0.0 | 0.0 | 3.7 | 2.1 | 1.1 | 1.3 | 2.5 | 1.1 |
| Cycle Q Clear(g_c), s | 3.1 | 0.0 | 4.1 | 8.9 | 0.0 | 0.0 | 3.7 | 2.1 | 1.1 | 1.3 | 2.5 | 1.1 |
| Prop In Lane | 0.32 | | 1.00 | 0.30 | | 0.30 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 560 | 0 | 417 | 494 | 0 | 0 | 195 | 1513 | 675 | 75 | 1274 | 568 |
| V/C Ratio(X) | 0.29 | 0.00 | 0.42 | 0.64 | 0.00 | 0.00 | 0.79 | 0.18 | 0.09 | 0.68 | 0.22 | 0.11 |
| Avail Cap(c_a), veh/h | 709 | 0 | 568 | 635 | 0 | 0 | 239 | 1513 | 675 | 200 | 1274 | 568 |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 13.3 | 0.0 | 13.6 | 15.3 | 0.0 | 0.0 | 19.4 | 8.0 | 7.7 | 21.1 | 10.0 | 9.6 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.7 | 1.4 | 0.0 | 0.0 | 12.9 | 0.3 | 0.3 | 10.4 | 0.4 | 0.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.1 | 0.0 | 1.3 | 2.7 | 0.0 | 0.0 | 2.1 | 0.7 | 0.3 | 0.7 | 0.8 | 0.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 13.5 | 0.0 | 14.3 | 16.7 | 0.0 | 0.0 | 32.3 | 8.2 | 7.9 | 31.5 | 10.4 | 9.9 |
| LnGrp LOS | B | A | B | B | A | A | C | A | A | C | B | A |
| Approach Vol, veh/h | | 335 | | | 315 | | | 484 | | | 393 | |
| Approach Delay, s/veh | | 13.9 | | | 16.7 | | | 15.8 | | | 13.0 | |
| Approach LOS | | B | | | B | | | B | | | B | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 5.9 | 23.0 | | 15.8 | 8.9 | 20.0 | | 15.8 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 17.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.3 | 4.1 | | 6.1 | 5.7 | 4.5 | | 10.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.5 | | 1.1 | 0.0 | 1.5 | | 0.9 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 14.9 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 5.9 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 33 | 50 | 31 | 29 | 37 | 48 | 49 | 178 | 34 | 60 | 169 | 112 |
| Future Vol, veh/h | 33 | 50 | 31 | 29 | 37 | 48 | 49 | 178 | 34 | 60 | 169 | 112 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 25 | - | - | 25 | - | - | 70 | - | - | 70 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 37 | 56 | 34 | 32 | 41 | 53 | 54 | 198 | 38 | 67 | 188 | 124 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 694 | 666 | 188 | 735 | 752 | 198 | 312 | 0 | 0 | 236 | 0 | 0 |
| Stage 1 | 322 | 322 | - | 306 | 306 | - | - | - | - | - | - | - |
| Stage 2 | 372 | 344 | - | 429 | 446 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 357 | 380 | 854 | 335 | 339 | 843 | 1248 | - | - | 1331 | - | - |
| Stage 1 | 690 | 651 | - | 704 | 662 | - | - | - | - | - | - | - |
| Stage 2 | 648 | 637 | - | 604 | 574 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 275 | 339 | 854 | 258 | 302 | 843 | 1248 | - | - | 1331 | - | - |
| Mov Cap-2 Maneuver | 275 | 339 | - | 258 | 302 | - | - | - | - | - | - | - |
| Stage 1 | 656 | 611 | - | 669 | 629 | - | - | - | - | - | - | - |
| Stage 2 | 539 | 605 | - | 494 | 538 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 18.2 | 17 | 1.5 | 1.4 |
| HCM LOS | C | C | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1248 | - | - | 310 | 854 | 281 | 843 | 1331 | - | - |
| HCM Lane V/C Ratio | 0.044 | - | - | 0.297 | 0.04 | 0.261 | 0.063 | 0.05 | - | - |
| HCM Control Delay (s) | 8 | 0 | - | 21.5 | 9.4 | 22.3 | 9.6 | 7.8 | 0 | - |
| HCM Lane LOS | A | A | - | C | A | C | A | A | A | - |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 1.2 | 0.1 | 1 | 0.2 | 0.2 | - | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.7 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 218 | 7 | 4 | 116 | 12 | 8 |
| Future Vol, veh/h | 218 | 7 | 4 | 116 | 12 | 8 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 237 | 8 | 4 | 126 | 13 | 9 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 245 | 0 | 375 | 241 |
| Stage 1 | - | - | - | - | 241 | - |
| Stage 2 | - | - | - | - | 134 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1321 | - | 626 | 798 |
| Stage 1 | - | - | - | - | 799 | - |
| Stage 2 | - | - | - | - | 892 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1321 | - | 624 | 798 |
| Mov Cap-2 Maneuver | - | - | - | - | 624 | - |
| Stage 1 | - | - | - | - | 797 | - |
| Stage 2 | - | - | - | - | 892 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0.3 | 10.4 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 684 | - | - | 1321 | - |
| HCM Lane V/C Ratio | 0.032 | - | - | 0.003 | - |
| HCM Control Delay (s) | 10.4 | - | - | 7.7 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0 | - |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 130 | 176 | 443 | 81 | 199 | 517 |
| Future Volume (veh/h) | 130 | 176 | 443 | 81 | 199 | 517 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 134 | 181 | 457 | 84 | 205 | 533 |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 300 | 267 | 1398 | 624 | 257 | 2260 |
| Arrive On Green | 0.17 | 0.17 | 0.39 | 0.39 | 0.14 | 0.64 |
| Sat Flow, veh/h | 1781 | 1585 | 3647 | 1585 | 1781 | 3647 |
| Grp Volume(v), veh/h | 134 | 181 | 457 | 84 | 205 | 533 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1585 | 1777 | 1585 | 1781 | 1777 |
| Q Serve(g_s), s | 2.8 | 4.4 | 3.7 | 1.4 | 4.5 | 2.6 |
| Cycle Q Clear(g_c), s | 2.8 | 4.4 | 3.7 | 1.4 | 4.5 | 2.6 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 300 | 267 | 1398 | 624 | 257 | 2260 |
| V/C Ratio(X) | 0.45 | 0.68 | 0.33 | 0.13 | 0.80 | 0.24 |
| Avail Cap(c_a), veh/h | 697 | 620 | 1398 | 624 | 261 | 2260 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.3 | 16.0 | 8.6 | 7.9 | 16.9 | 3.2 |
| Incr Delay (d2), s/veh | 1.0 | 3.0 | 0.6 | 0.4 | 15.5 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.0 | 1.6 | 1.2 | 0.4 | 2.7 | 0.5 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 16.3 | 19.0 | 9.3 | 8.4 | 32.4 | 3.4 |
| LnGrp LOS | B | B | A | A | C | A |
| Approach Vol, veh/h | 315 | | 541 | | | 738 |
| Approach Delay, s/veh | 17.8 | | 9.1 | | | 11.5 |
| Approach LOS | B | | A | | | B |

| Timer - Assigned Phs | 1 | 2 | 6 | 8 |
|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.9 | 20.1 | 30.0 | 10.9 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | 4.0 | 4.0 |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | 26.0 | 16.0 |
| Max Q Clear Time (g_c+I1), s | 6.5 | 5.7 | 4.6 | 6.4 |
| Green Ext Time (p_c), s | 0.0 | 2.4 | 3.6 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 11.9 |
| HCM 6th LOS | B |

| Intersection | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Int Delay, s/veh | 4.1 | | | | | | | | | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 39 | 0 | 155 | 0 | 0 | 0 | 103 | 231 | 0 | 2 | 258 | 33 |
| Future Vol, veh/h | 39 | 0 | 155 | 0 | 0 | 0 | 103 | 231 | 0 | 2 | 258 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 100 | - | - | - | 110 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 43 | 0 | 172 | 0 | 0 | 0 | 114 | 257 | 0 | 2 | 287 | 37 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 795 | 795 | 306 | 881 | 813 | 257 | 324 | 0 | 0 | 257 | 0 | 0 |
| Stage 1 | 310 | 310 | - | 485 | 485 | - | - | - | - | - | - | - |
| Stage 2 | 485 | 485 | - | 396 | 328 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 305 | 320 | 734 | 267 | 313 | 782 | 1236 | - | - | 1308 | - | - |
| Stage 1 | 700 | 659 | - | 563 | 552 | - | - | - | - | - | - | - |
| Stage 2 | 563 | 552 | - | 629 | 647 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 283 | 290 | 734 | 190 | 284 | 782 | 1236 | - | - | 1308 | - | - |
| Mov Cap-2 Maneuver | 283 | 290 | - | 190 | 284 | - | - | - | - | - | - | - |
| Stage 1 | 636 | 658 | - | 511 | 501 | - | - | - | - | - | - | - |
| Stage 2 | 511 | 501 | - | 480 | 646 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 13.1 | 0 | 2.5 | 0.1 |
| HCM LOS | B | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1236 | - | - | 283 | 734 | - | 1308 | - | - |
| HCM Lane V/C Ratio | 0.093 | - | - | 0.153 | 0.235 | - | 0.002 | - | - |
| HCM Control Delay (s) | 8.2 | - | - | 20 | 11.4 | 0 | 7.8 | 0 | - |
| HCM Lane LOS | A | - | - | C | B | A | A | A | - |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.5 | 0.9 | - | 0 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 288 | 103 | 233 | 17 | 90 | 67 | 124 | 174 | 10 | 79 | 228 | 332 |
| Future Volume (veh/h) | 288 | 103 | 233 | 17 | 90 | 67 | 124 | 174 | 10 | 79 | 228 | 332 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 300 | 107 | 0 | 18 | 94 | 70 | 129 | 181 | 10 | 82 | 238 | 0 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 342 | 122 | | 29 | 150 | 153 | 164 | 1103 | 492 | 105 | 984 | |
| Arrive On Green | 0.26 | 0.26 | 0.00 | 0.10 | 0.10 | 0.10 | 0.09 | 0.31 | 0.31 | 0.06 | 0.28 | 0.00 |
| Sat Flow, veh/h | 1330 | 474 | 1585 | 298 | 1557 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 407 | 0 | 0 | 112 | 0 | 70 | 129 | 181 | 10 | 82 | 238 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1804 | 0 | 1585 | 1855 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 12.5 | 0.0 | 0.0 | 3.4 | 0.0 | 2.4 | 4.1 | 2.1 | 0.3 | 2.6 | 3.0 | 0.0 |
| Cycle Q Clear(g_c), s | 12.5 | 0.0 | 0.0 | 3.4 | 0.0 | 2.4 | 4.1 | 2.1 | 0.3 | 2.6 | 3.0 | 0.0 |
| Prop In Lane | 0.74 | | 1.00 | 0.16 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 464 | 0 | | 179 | 0 | 153 | 164 | 1103 | 492 | 105 | 984 | |
| V/C Ratio(X) | 0.88 | 0.00 | | 0.63 | 0.00 | 0.46 | 0.79 | 0.16 | 0.02 | 0.78 | 0.24 | |
| Avail Cap(c_a), veh/h | 500 | 0 | | 514 | 0 | 439 | 185 | 1103 | 492 | 185 | 984 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 20.6 | 0.0 | 0.0 | 25.1 | 0.0 | 24.7 | 25.7 | 14.5 | 13.8 | 26.8 | 16.2 | 0.0 |
| Incr Delay (d2), s/veh | 15.3 | 0.0 | 0.0 | 3.6 | 0.0 | 2.1 | 17.8 | 0.3 | 0.1 | 11.9 | 0.6 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 6.7 | 0.0 | 0.0 | 1.6 | 0.0 | 0.9 | 2.4 | 0.8 | 0.1 | 1.4 | 1.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.9 | 0.0 | 0.0 | 28.6 | 0.0 | 26.8 | 43.5 | 14.8 | 13.9 | 38.7 | 16.8 | 0.0 |
| LnGrp LOS | D | A | | C | A | C | D | B | B | D | B | |
| Approach Vol, veh/h | | 407 | A | | 182 | | | 320 | | | 320 | A |
| Approach Delay, s/veh | | 35.9 | | | 27.9 | | | 26.3 | | | 22.4 | |
| Approach LOS | | D | | | C | | | C | | | C | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 7.4 | 21.9 | | 18.9 | 9.3 | 20.0 | | 9.6 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.6 | 4.1 | | 14.5 | 6.1 | 5.0 | | 5.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.8 | | 0.4 | 0.0 | 1.0 | | 0.5 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 28.7 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.6 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 23 | 4 | 7 | 230 | 315 | 39 |
| Future Vol, veh/h | 23 | 4 | 7 | 230 | 315 | 39 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 95 | 95 | 95 | 95 | 95 | 95 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 4 | 7 | 242 | 332 | 41 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 609 | 353 | 373 | 0 | - | 0 |
| Stage 1 | 353 | - | - | - | - | - |
| Stage 2 | 256 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 458 | 691 | 1185 | - | - | - |
| Stage 1 | 711 | - | - | - | - | - |
| Stage 2 | 787 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 455 | 691 | 1185 | - | - | - |
| Mov Cap-2 Maneuver | 455 | - | - | - | - | - |
| Stage 1 | 706 | - | - | - | - | - |
| Stage 2 | 787 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 13 | 0.2 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1185 | - | 479 | - | - |
| HCM Lane V/C Ratio | 0.006 | - | 0.059 | - | - |
| HCM Control Delay (s) | 8.1 | 0 | 13 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.2 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 65 | 107 | 205 | 53 | 78 | 46 | 137 | 397 | 54 | 62 | 446 | 49 |
| Future Volume (veh/h) | 65 | 107 | 205 | 53 | 78 | 46 | 137 | 397 | 54 | 62 | 446 | 49 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 68 | 111 | 214 | 55 | 81 | 48 | 143 | 414 | 56 | 65 | 465 | 51 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 224 | 256 | 323 | 168 | 153 | 72 | 183 | 1592 | 710 | 91 | 1409 | 628 |
| Arrive On Green | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.10 | 0.45 | 0.45 | 0.05 | 0.40 | 0.40 |
| Sat Flow, veh/h | 495 | 1257 | 1585 | 255 | 754 | 356 | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 179 | 0 | 214 | 184 | 0 | 0 | 143 | 414 | 56 | 65 | 465 | 51 |
| Grp Sat Flow(s),veh/h/ln | 1752 | 0 | 1585 | 1364 | 0 | 0 | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 0.0 | 0.0 | 5.0 | 1.8 | 0.0 | 0.0 | 3.2 | 2.9 | 0.8 | 1.5 | 3.7 | 0.8 |
| Cycle Q Clear(g_c), s | 3.4 | 0.0 | 5.0 | 5.3 | 0.0 | 0.0 | 3.2 | 2.9 | 0.8 | 1.5 | 3.7 | 0.8 |
| Prop In Lane | 0.38 | | 1.00 | 0.30 | | 0.26 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 480 | 0 | 323 | 393 | 0 | 0 | 183 | 1592 | 710 | 91 | 1409 | 628 |
| V/C Ratio(X) | 0.37 | 0.00 | 0.66 | 0.47 | 0.00 | 0.00 | 0.78 | 0.26 | 0.08 | 0.71 | 0.33 | 0.08 |
| Avail Cap(c_a), veh/h | 785 | 0 | 628 | 676 | 0 | 0 | 265 | 1592 | 710 | 177 | 1409 | 628 |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.2 | 0.0 | 14.8 | 14.7 | 0.0 | 0.0 | 17.7 | 7.0 | 6.4 | 18.9 | 8.5 | 7.6 |
| Incr Delay (d2), s/veh | 0.5 | 0.0 | 2.3 | 0.9 | 0.0 | 0.0 | 9.0 | 0.4 | 0.2 | 9.8 | 0.6 | 0.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.3 | 0.0 | 1.7 | 1.4 | 0.0 | 0.0 | 1.6 | 0.9 | 0.2 | 0.8 | 1.2 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.6 | 0.0 | 17.1 | 15.6 | 0.0 | 0.0 | 26.7 | 7.4 | 6.6 | 28.6 | 9.1 | 7.8 |
| LnGrp LOS | B | A | B | B | A | A | C | A | A | C | A | A |
| Approach Vol, veh/h | | 393 | | | 184 | | | 613 | | | 581 | |
| Approach Delay, s/veh | | 16.0 | | | 15.6 | | | 11.8 | | | 11.2 | |
| Approach LOS | | B | | | B | | | B | | | B | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.1 | 22.1 | | 12.2 | 8.1 | 20.0 | | 12.2 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 4.0 | 18.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.5 | 4.9 | | 7.0 | 5.2 | 5.7 | | 7.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.4 | | 1.2 | 0.0 | 2.3 | | 0.6 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 12.9 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 9.5 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 22 | 65 | 45 | 44 | 60 | 81 | 31 | 203 | 53 | 112 | 217 | 55 |
| Future Vol, veh/h | 22 | 65 | 45 | 44 | 60 | 81 | 31 | 203 | 53 | 112 | 217 | 55 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | - | - | 25 | - | - | 25 | - | - | 70 | - | - | 70 |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 72 | 50 | 49 | 67 | 90 | 34 | 226 | 59 | 124 | 241 | 61 |

| Major/Minor | Minor2 | | | Minor1 | | | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 891 | 842 | 241 | 875 | 844 | 226 | 302 | 0 | 0 | 285 | 0 | 0 |
| Stage 1 | 489 | 489 | - | 294 | 294 | - | - | - | - | - | - | - |
| Stage 2 | 402 | 353 | - | 581 | 550 | - | - | - | - | - | - | - |
| Critical Hdwy | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 | 4.12 | - | - | 4.12 | - | - |
| Critical Hdwy Stg 1 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 6.12 | 5.52 | - | 6.12 | 5.52 | - | - | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 | 2.218 | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver | 263 | 301 | 798 | 270 | 300 | 813 | 1259 | - | - | 1277 | - | - |
| Stage 1 | 561 | 549 | - | 714 | 670 | - | - | - | - | - | - | - |
| Stage 2 | 625 | 631 | - | 499 | 516 | - | - | - | - | - | - | - |
| Platoon blocked, % | | | | | | | | - | - | | - | - |
| Mov Cap-1 Maneuver | 167 | 257 | 798 | 177 | 256 | 813 | 1259 | - | - | 1277 | - | - |
| Mov Cap-2 Maneuver | 167 | 257 | - | 177 | 256 | - | - | - | - | - | - | - |
| Stage 1 | 543 | 484 | - | 691 | 649 | - | - | - | - | - | - | - |
| Stage 2 | 483 | 611 | - | 351 | 455 | - | - | - | - | - | - | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 24.6 | 26.7 | 0.9 | 2.4 |
| HCM LOS | C | D | | |

| Minor Lane/Major Mvmt | NBL | NBT | NBR | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1259 | - | - | 226 | 798 | 215 | 813 | 1277 | - | - |
| HCM Lane V/C Ratio | 0.027 | - | - | 0.428 | 0.063 | 0.537 | 0.111 | 0.097 | - | - |
| HCM Control Delay (s) | 7.9 | 0 | - | 32.3 | 9.8 | 39.7 | 10 | 8.1 | 0 | - |
| HCM Lane LOS | A | A | - | D | A | E | B | A | A | - |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 2 | 0.2 | 2.8 | 0.4 | 0.3 | - | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.5 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 183 | 15 | 7 | 197 | 8 | 6 |
| Future Vol, veh/h | 183 | 15 | 7 | 197 | 8 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 199 | 16 | 8 | 214 | 9 | 7 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 215 | 0 | 437 | 207 |
| Stage 1 | - | - | - | - | 207 | - |
| Stage 2 | - | - | - | - | 230 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1355 | - | 577 | 833 |
| Stage 1 | - | - | - | - | 828 | - |
| Stage 2 | - | - | - | - | 808 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1355 | - | 573 | 833 |
| Mov Cap-2 Maneuver | - | - | - | - | 573 | - |
| Stage 1 | - | - | - | - | 822 | - |
| Stage 2 | - | - | - | - | 808 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0.3 | 10.6 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 661 | - | - | 1355 | - |
| HCM Lane V/C Ratio | 0.023 | - | - | 0.006 | - |
| HCM Control Delay (s) | 10.6 | - | - | 7.7 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0 | - |

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 91 | 102 | 396 | 80 | 177 | 400 |
| v/c Ratio | 0.29 | 0.28 | 0.25 | 0.11 | 0.71 | 0.16 |
| Control Delay | 17.1 | 6.4 | 9.3 | 3.5 | 37.8 | 3.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 17.1 | 6.4 | 9.3 | 3.5 | 37.8 | 3.5 |
| Queue Length 50th (ft) | 19 | 0 | 31 | 0 | 40 | 15 |
| Queue Length 95th (ft) | 46 | 26 | 60 | 18 | #121 | 33 |
| Internal Link Dist (ft) | 1656 | | 1689 | | | 1325 |
| Turn Bay Length (ft) | | 60 | | 75 | 150 | |
| Base Capacity (vph) | 664 | 658 | 1565 | 744 | 249 | 2459 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.14 | 0.16 | 0.25 | 0.11 | 0.71 | 0.16 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 293 | 146 | 213 | 77 | 330 | 267 | 22 | 43 | 398 |
| v/c Ratio | 0.83 | 0.32 | 0.67 | 0.18 | 0.90 | 0.19 | 0.03 | 0.32 | 0.46 |
| Control Delay | 50.8 | 5.0 | 40.7 | 1.0 | 59.9 | 17.8 | 0.1 | 41.3 | 13.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 50.8 | 5.0 | 40.7 | 1.0 | 59.9 | 17.8 | 0.1 | 41.3 | 13.8 |
| Queue Length 50th (ft) | 136 | 0 | 97 | 0 | 158 | 48 | 0 | 20 | 37 |
| Queue Length 95th (ft) | #269 | 31 | 166 | 0 | #317 | 79 | 0 | 52 | 78 |
| Internal Link Dist (ft) | 199 | | 154 | | | 208 | | | 252 |
| Turn Bay Length (ft) | | 150 | | 100 | 100 | | 50 | 85 | |
| Base Capacity (vph) | 377 | 473 | 388 | 473 | 372 | 1400 | 700 | 139 | 859 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.78 | 0.31 | 0.55 | 0.16 | 0.89 | 0.19 | 0.03 | 0.31 | 0.46 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 161 | 174 | 315 | 153 | 267 | 64 | 51 | 281 | 61 |
| v/c Ratio | 0.38 | 0.31 | 0.70 | 0.64 | 0.16 | 0.08 | 0.26 | 0.21 | 0.09 |
| Control Delay | 16.4 | 4.4 | 22.0 | 37.3 | 9.4 | 1.6 | 24.1 | 12.1 | 1.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 16.4 | 4.4 | 22.0 | 37.3 | 9.4 | 1.6 | 24.1 | 12.1 | 1.6 |
| Queue Length 50th (ft) | 35 | 0 | 64 | 41 | 16 | 0 | 13 | 28 | 0 |
| Queue Length 95th (ft) | 74 | 32 | 132 | #120 | 50 | 10 | 40 | 54 | 9 |
| Internal Link Dist (ft) | 1015 | | 544 | | 1325 | | | 2204 | |
| Turn Bay Length (ft) | | 100 | | 70 | | 120 | 70 | | 110 |
| Base Capacity (vph) | 554 | 681 | 576 | 239 | 1677 | 807 | 199 | 1342 | 668 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.29 | 0.26 | 0.55 | 0.64 | 0.16 | 0.08 | 0.26 | 0.21 | 0.09 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 134 | 181 | 457 | 84 | 205 | 533 |
| v/c Ratio | 0.39 | 0.40 | 0.30 | 0.11 | 0.84 | 0.22 |
| Control Delay | 18.1 | 6.0 | 10.2 | 3.7 | 53.0 | 4.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 18.1 | 6.0 | 10.2 | 3.7 | 53.0 | 4.2 |
| Queue Length 50th (ft) | 28 | 0 | 38 | 0 | 49 | 23 |
| Queue Length 95th (ft) | 63 | 34 | 74 | 20 | #149 | 50 |
| Internal Link Dist (ft) | 1656 | | 1689 | | | 1325 |
| Turn Bay Length (ft) | | 60 | | 75 | 150 | |
| Base Capacity (vph) | 651 | 697 | 1534 | 733 | 244 | 2412 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.21 | 0.26 | 0.30 | 0.11 | 0.84 | 0.22 |

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 407 | 243 | 112 | 70 | 129 | 181 | 10 | 82 | 584 |
| v/c Ratio | 0.86 | 0.41 | 0.41 | 0.20 | 0.74 | 0.17 | 0.02 | 0.48 | 0.53 |
| Control Delay | 44.2 | 5.7 | 29.2 | 1.8 | 57.0 | 19.4 | 0.1 | 38.3 | 10.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 44.2 | 5.7 | 29.2 | 1.8 | 57.0 | 19.4 | 0.1 | 38.3 | 10.3 |
| Queue Length 50th (ft) | 150 | 0 | 40 | 0 | 49 | 28 | 0 | 31 | 38 |
| Queue Length 95th (ft) | #323 | 50 | 82 | 5 | #139 | 55 | 0 | #81 | 85 |
| Internal Link Dist (ft) | 199 | | 154 | | | 208 | | | 252 |
| Turn Bay Length (ft) | | 150 | | 100 | 100 | | 50 | 85 | |
| Base Capacity (vph) | 474 | 596 | 488 | 521 | 175 | 1076 | 578 | 175 | 1106 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.86 | 0.41 | 0.23 | 0.13 | 0.74 | 0.17 | 0.02 | 0.47 | 0.53 |

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 179 | 214 | 184 | 143 | 414 | 56 | 65 | 465 | 51 |
| v/c Ratio | 0.48 | 0.40 | 0.47 | 0.60 | 0.24 | 0.07 | 0.41 | 0.32 | 0.07 |
| Control Delay | 19.0 | 5.0 | 15.7 | 34.0 | 9.4 | 1.1 | 30.2 | 11.7 | 1.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 19.0 | 5.0 | 15.7 | 34.0 | 9.4 | 1.1 | 30.2 | 11.7 | 1.0 |
| Queue Length 50th (ft) | 39 | 0 | 32 | 35 | 34 | 0 | 16 | 43 | 0 |
| Queue Length 95th (ft) | 81 | 35 | 73 | #111 | 72 | 6 | #57 | 87 | 5 |
| Internal Link Dist (ft) | 1015 | | 544 | | 1325 | | | 2204 | |
| Turn Bay Length (ft) | | 100 | | 70 | | 120 | 70 | | 110 |
| Base Capacity (vph) | 564 | 705 | 575 | 238 | 1705 | 819 | 158 | 1448 | 711 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.32 | 0.30 | 0.32 | 0.60 | 0.24 | 0.07 | 0.41 | 0.32 | 0.07 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

**Appendix F** - Cumulative Conditions Scenario Level of Service and Queue Calculations

| Movement | WBL | WBR | NBT | NBR | SBL | SBT | |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Traffic Volume (veh/h) | 77 | 83 | 345 | 71 | 142 | 360 | |
| Future Volume (veh/h) | 77 | 83 | 345 | 71 | 142 | 360 | |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Work Zone On Approach | No | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | |
| Adj Flow Rate, veh/h | 112 | 121 | 504 | 104 | 207 | 526 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | |
| Cap, veh/h | 217 | 193 | 1631 | 727 | 266 | 2481 | |
| Arrive On Green | 0.12 | 0.12 | 0.46 | 0.46 | 0.15 | 0.70 | |
| Sat Flow, veh/h | 1781 | 1585 | 3647 | 1585 | 1781 | 3647 | |
| Grp Volume(v), veh/h | 112 | 121 | 504 | 104 | 207 | 526 | |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1585 | 1777 | 1585 | 1781 | 1777 | |
| Q Serve(g_s), s | 2.6 | 3.2 | 4.0 | 1.7 | 5.0 | 2.3 | |
| Cycle Q Clear(g_c), s | 2.6 | 3.2 | 4.0 | 1.7 | 5.0 | 2.3 | |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Lane Grp Cap(c), veh/h | 217 | 193 | 1631 | 727 | 266 | 2481 | |
| V/C Ratio(X) | 0.52 | 0.63 | 0.31 | 0.14 | 0.78 | 0.21 | |
| Avail Cap(c_a), veh/h | 642 | 571 | 1631 | 727 | 441 | 2481 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Uniform Delay (d), s/veh | 18.3 | 18.5 | 7.6 | 7.0 | 18.2 | 2.4 | |
| Incr Delay (d2), s/veh | 1.9 | 3.3 | 0.5 | 0.4 | 4.9 | 0.2 | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| %ile BackOfQ(50%),veh/ln | 1.1 | 1.2 | 1.2 | 0.5 | 2.1 | 0.3 | |
| Unsig. Movement Delay, s/veh | | | | | | | |
| LnGrp Delay(d),s/veh | 20.2 | 21.9 | 8.1 | 7.4 | 23.1 | 2.6 | |
| LnGrp LOS | C | C | A | A | C | A | |
| Approach Vol, veh/h | 233 | | 608 | | | 733 | |
| Approach Delay, s/veh | 21.1 | | 7.9 | | | 8.4 | |
| Approach LOS | C | | A | | | A | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | 8 |
| Phs Duration (G+Y+Rc), s | 10.6 | 24.4 | | | | 35.0 | 9.4 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | | | 4.0 | 4.0 |
| Max Green Setting (Gmax), s | 11.0 | 16.0 | | | | 31.0 | 16.0 |
| Max Q Clear Time (g_c+I1), s | 7.0 | 6.0 | | | | 4.3 | 5.2 |
| Green Ext Time (p_c), s | 0.2 | 2.7 | | | | 3.8 | 0.5 |
| Intersection Summary | | | | | | | |
| HCM 6th Ctrl Delay | | | 10.1 | | | | |
| HCM 6th LOS | | | B | | | | |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.9 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 14 | 0 | 86 | 2 | 0 | 0 | 79 | 198 | 0 | 1 | 148 | 22 |
| Future Vol, veh/h | 14 | 0 | 86 | 2 | 0 | 0 | 79 | 198 | 0 | 1 | 148 | 22 |
| Peak Hour 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 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 20 | 0 | 126 | 3 | 0 | 0 | 115 | 289 | 0 | 1 | 216 | 32 |
| Number of Lanes | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 2 | 1 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 2 | 2 | 1 |
| Conflicting Approach Righ | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 1 | 1 | 2 |
| HCM Control Delay | 9.5 | 9.7 | 11.1 | 11.5 |
| HCM LOS | A | A | B | B |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 |
|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 100% | 1% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 0% | 87% |
| Vol Right, % | 0% | 0% | 0% | 100% | 0% | 13% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 79 | 198 | 14 | 86 | 2 | 171 |
| LT Vol | 79 | 0 | 14 | 0 | 2 | 1 |
| Through Vol | 0 | 198 | 0 | 0 | 0 | 148 |
| RT Vol | 0 | 0 | 0 | 86 | 0 | 22 |
| Lane Flow Rate | 115 | 289 | 20 | 126 | 3 | 250 |
| Geometry Grp | 7 | 7 | 7 | 7 | 6 | 6 |
| Degree of Util (X) | 0.182 | 0.415 | 0.038 | 0.189 | 0.005 | 0.369 |
| Departure Headway (Hd) | 5.677 | 5.174 | 6.623 | 5.408 | 6.667 | 5.317 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 629 | 691 | 538 | 659 | 540 | 672 |
| Service Time | 3.44 | 2.936 | 4.396 | 3.181 | 4.667 | 3.382 |
| HCM Lane V/C Ratio | 0.183 | 0.418 | 0.037 | 0.191 | 0.006 | 0.372 |
| HCM Control Delay | 9.7 | 11.6 | 9.7 | 9.5 | 9.7 | 11.5 |
| HCM Lane LOS | A | B | A | A | A | B |
| HCM 95th-tile Q | 0.7 | 2 | 0.1 | 0.7 | 0 | 1.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↰ | ↱ | | ↰ | ↱ | ↰ | ↑↑ | ↱ | ↰ | ↑↱ | |
| Traffic Volume (veh/h) | 195 | 48 | 133 | 30 | 158 | 70 | 300 | 236 | 11 | 37 | 154 | 200 |
| Future Volume (veh/h) | 195 | 48 | 133 | 30 | 158 | 70 | 300 | 236 | 11 | 37 | 154 | 200 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 285 | 70 | 0 | 44 | 231 | 102 | 438 | 345 | 16 | 54 | 225 | 0 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 292 | 72 | | 50 | 264 | 269 | 460 | 1457 | 650 | 69 | 678 | |
| Arrive On Green | 0.20 | 0.20 | 0.00 | 0.17 | 0.17 | 0.17 | 0.26 | 0.41 | 0.41 | 0.04 | 0.19 | 0.00 |
| Sat Flow, veh/h | 1444 | 355 | 1585 | 297 | 1559 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 355 | 0 | 0 | 275 | 0 | 102 | 438 | 345 | 16 | 54 | 225 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1798 | 0 | 1585 | 1856 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 17.5 | 0.0 | 0.0 | 12.9 | 0.0 | 5.1 | 21.6 | 5.7 | 0.5 | 2.7 | 4.9 | 0.0 |
| Cycle Q Clear(g_c), s | 17.5 | 0.0 | 0.0 | 12.9 | 0.0 | 5.1 | 21.6 | 5.7 | 0.5 | 2.7 | 4.9 | 0.0 |
| Prop In Lane | 0.80 | | 1.00 | 0.16 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 363 | 0 | | 315 | 0 | 269 | 460 | 1457 | 650 | 69 | 678 | |
| V/C Ratio(X) | 0.98 | 0.00 | | 0.87 | 0.00 | 0.38 | 0.95 | 0.24 | 0.02 | 0.78 | 0.33 | |
| Avail Cap(c_a), veh/h | 363 | 0 | | 333 | 0 | 285 | 460 | 1457 | 650 | 140 | 678 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 35.4 | 0.0 | 0.0 | 36.1 | 0.0 | 32.8 | 32.5 | 17.2 | 15.7 | 42.4 | 31.1 | 0.0 |
| Incr Delay (d2), s/veh | 41.0 | 0.0 | 0.0 | 21.0 | 0.0 | 0.9 | 30.2 | 0.4 | 0.1 | 17.1 | 1.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 11.6 | 0.0 | 0.0 | 7.5 | 0.0 | 2.0 | 12.8 | 2.3 | 0.2 | 1.5 | 2.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 76.4 | 0.0 | 0.0 | 57.1 | 0.0 | 33.7 | 62.7 | 17.6 | 15.7 | 59.5 | 32.5 | 0.0 |
| LnGrp LOS | E | A | | E | A | C | E | B | B | E | C | |
| Approach Vol, veh/h | | 355 | A | | 377 | | | 799 | | | 279 | A |
| Approach Delay, s/veh | | 76.4 | | | 50.8 | | | 42.3 | | | 37.7 | |
| Approach LOS | | E | | | D | | | D | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 7.5 | 40.5 | | 22.0 | 27.0 | 21.0 | | 19.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 33.0 | | 18.0 | 23.0 | 17.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.7 | 7.7 | | 19.5 | 23.6 | 6.9 | | 14.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.4 | | 0.0 | 0.0 | 0.9 | | 0.2 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 50.0 |
| HCM 6th LOS | | | D |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | | | | | | |
|---|---|---|---|---|---|---|
| Int Delay, s/veh | 0.4 | | | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 10 | 4 | 225 | 199 | 6 |
| Future Vol, veh/h | 5 | 10 | 4 | 225 | 199 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 7 | 15 | 6 | 329 | 291 | 9 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 637 | 296 | 300 | 0 | - | 0 |
| Stage 1 | 296 | - | - | - | - | - |
| Stage 2 | 341 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 441 | 743 | 1261 | - | - | - |
| Stage 1 | 755 | - | - | - | - | - |
| Stage 2 | 720 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 438 | 743 | 1261 | - | - | - |
| Mov Cap-2 Maneuver | 438 | - | - | - | - | - |
| Stage 1 | 750 | - | - | - | - | - |
| Stage 2 | 720 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 11.2 | 0.1 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1261 | - | 603 | - | - |
| HCM Lane V/C Ratio | 0.005 | - | 0.036 | - | - |
| HCM Control Delay (s) | 7.9 | 0 | 11.2 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.1 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 46 | 99 | 150 | 79 | 106 | 82 | 134 | 235 | 42 | 31 | 243 | 55 |
| Future Volume (veh/h) | 46 | 99 | 150 | 79 | 106 | 82 | 134 | 235 | 42 | 31 | 243 | 55 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 67 | 145 | 219 | 115 | 155 | 120 | 196 | 343 | 61 | 45 | 355 | 80 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 193 | 376 | 516 | 182 | 205 | 135 | 245 | 1506 | 672 | 64 | 1146 | 511 |
| Arrive On Green | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.14 | 0.42 | 0.42 | 0.04 | 0.32 | 0.32 |
| Sat Flow, veh/h | 334 | 1154 | 1585 | 304 | 631 | 416 | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 212 | 0 | 219 | 390 | 0 | 0 | 196 | 343 | 61 | 45 | 355 | 80 |
| Grp Sat Flow(s),veh/h/ln | 1489 | 0 | 1585 | 1351 | 0 | 0 | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 0.0 | 0.0 | 6.0 | 10.4 | 0.0 | 0.0 | 6.0 | 3.4 | 1.3 | 1.4 | 4.2 | 2.0 |
| Cycle Q Clear(g_c), s | 5.1 | 0.0 | 6.0 | 15.5 | 0.0 | 0.0 | 6.0 | 3.4 | 1.3 | 1.4 | 4.2 | 2.0 |
| Prop In Lane | 0.32 | | 1.00 | 0.29 | | 0.31 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 569 | 0 | 516 | 523 | 0 | 0 | 245 | 1506 | 672 | 64 | 1146 | 511 |
| V/C Ratio(X) | 0.37 | 0.00 | 0.42 | 0.75 | 0.00 | 0.00 | 0.80 | 0.23 | 0.09 | 0.70 | 0.31 | 0.16 |
| Avail Cap(c_a), veh/h | 619 | 0 | 568 | 570 | 0 | 0 | 319 | 1506 | 672 | 160 | 1146 | 511 |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.3 | 0.0 | 14.7 | 18.1 | 0.0 | 0.0 | 23.3 | 10.3 | 9.6 | 26.6 | 14.2 | 13.5 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.6 | 4.9 | 0.0 | 0.0 | 10.4 | 0.4 | 0.3 | 13.0 | 0.7 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.9 | 0.0 | 2.0 | 4.9 | 0.0 | 0.0 | 3.0 | 1.2 | 0.4 | 0.8 | 1.6 | 0.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.8 | 0.0 | 15.3 | 23.0 | 0.0 | 0.0 | 33.8 | 10.6 | 9.9 | 39.6 | 14.9 | 14.2 |
| LnGrp LOS | B | A | B | C | A | A | C | B | A | D | B | B |
| Approach Vol, veh/h | | 431 | | | 390 | | | 600 | | | 480 | |
| Approach Delay, s/veh | | 15.0 | | | 23.0 | | | 18.1 | | | 17.1 | |
| Approach LOS | | B | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.0 | 27.7 | | 22.2 | 11.7 | 22.0 | | 22.2 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 |
| Max Green Setting (Gmax), s | 5.0 | 23.0 | | 20.0 | 10.0 | 18.0 | | 20.0 |
| Max Q Clear Time (g_c+I1), s | 3.4 | 5.4 | | 8.0 | 8.0 | 6.2 | | 17.5 |
| Green Ext Time (p_c), s | 0.0 | 2.2 | | 1.6 | 0.1 | 2.0 | | 0.6 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 18.2 |
| HCM 6th LOS | | | B |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↰ | ↱ | | ↰ | ↱ | | ↰ | ↱ | | ↰ | ↱ |
| Traffic Vol, veh/h | 33 | 18 | 31 | 18 | 21 | 27 | 49 | 173 | 13 | 18 | 153 | 112 |
| Future Vol, veh/h | 33 | 18 | 31 | 18 | 21 | 27 | 49 | 173 | 13 | 18 | 153 | 112 |
| Peak Hour 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 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 48 | 26 | 45 | 26 | 31 | 39 | 72 | 253 | 19 | 26 | 223 | 164 |
| Number of Lanes | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 2 | 2 |
| HCM Control Delay | 10.3 | 10 | 14.5 | 11 |
| HCM LOS | B | A | B | B |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 22% | 0% | 65% | 0% | 46% | 0% | 11% | 0% |
| Vol Thru, % | 78% | 0% | 35% | 0% | 54% | 0% | 89% | 0% |
| Vol Right, % | 0% | 100% | 0% | 100% | 0% | 100% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 222 | 13 | 51 | 31 | 39 | 27 | 171 | 112 |
| LT Vol | 49 | 0 | 33 | 0 | 18 | 0 | 18 | 0 |
| Through Vol | 173 | 0 | 18 | 0 | 21 | 0 | 153 | 0 |
| RT Vol | 0 | 13 | 0 | 31 | 0 | 27 | 0 | 112 |
| Lane Flow Rate | 324 | 19 | 74 | 45 | 57 | 39 | 250 | 164 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.526 | 0.026 | 0.144 | 0.075 | 0.11 | 0.066 | 0.397 | 0.225 |
| Departure Headway (Hd) | 5.84 | 5.021 | 6.984 | 5.942 | 6.944 | 5.996 | 5.722 | 4.961 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 619 | 713 | 513 | 602 | 516 | 596 | 629 | 724 |
| Service Time | 3.571 | 2.753 | 4.729 | 3.687 | 4.69 | 3.742 | 3.452 | 2.691 |
| HCM Lane V/C Ratio | 0.523 | 0.027 | 0.144 | 0.075 | 0.11 | 0.065 | 0.397 | 0.227 |
| HCM Control Delay | 14.9 | 7.9 | 10.9 | 9.2 | 10.6 | 9.2 | 12.2 | 9.1 |
| HCM Lane LOS | B | A | B | A | B | A | B | A |
| HCM 95th-tile Q | 3.1 | 0.1 | 0.5 | 0.2 | 0.4 | 0.2 | 1.9 | 0.9 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 278 | 0 | 0 | 143 | 0 | 0 |
| Future Vol, veh/h | 278 | 0 | 0 | 143 | 0 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 278 | 0 | 0 | 143 | 0 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 278 | 0 | 421 | 278 |
| Stage 1 | - | - | - | - | 278 | - |
| Stage 2 | - | - | - | - | 143 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1285 | - | 589 | 761 |
| Stage 1 | - | - | - | - | 769 | - |
| Stage 2 | - | - | - | - | 884 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1285 | - | 589 | 761 |
| Mov Cap-2 Maneuver | - | - | - | - | 589 | - |
| Stage 1 | - | - | - | - | 769 | - |
| Stage 2 | - | - | - | - | 884 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 0 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 1285 | - |
| HCM Lane V/C Ratio | - | - | - | - | - |
| HCM Control Delay (s) | 0 | - | - | 0 | - |
| HCM Lane LOS | A | - | - | A | - |
| HCM 95th %tile Q(veh) | - | - | - | 0 | - |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT | |
|---|---|---|---|---|---|---|---|
| Lane Configurations | ↰ | ↱ | ↑↑ | ↱ | ↰ | ↑↑ | |
| Traffic Volume (veh/h) | 127 | 153 | 425 | 74 | 184 | 508 | |
| Future Volume (veh/h) | 127 | 153 | 425 | 74 | 184 | 508 | |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Work Zone On Approach | No | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | |
| Adj Flow Rate, veh/h | 185 | 223 | 620 | 108 | 269 | 742 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | |
| Cap, veh/h | 353 | 314 | 1341 | 598 | 252 | 2179 | |
| Arrive On Green | 0.20 | 0.20 | 0.38 | 0.38 | 0.14 | 0.61 | |
| Sat Flow, veh/h | 1781 | 1585 | 3647 | 1585 | 1781 | 3647 | |
| Grp Volume(v), veh/h | 185 | 223 | 620 | 108 | 269 | 742 | |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1585 | 1777 | 1585 | 1781 | 1777 | |
| Q Serve(g_s), s | 3.9 | 5.6 | 5.6 | 1.9 | 6.0 | 4.3 | |
| Cycle Q Clear(g_c), s | 3.9 | 5.6 | 5.6 | 1.9 | 6.0 | 4.3 | |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Lane Grp Cap(c), veh/h | 353 | 314 | 1341 | 598 | 252 | 2179 | |
| V/C Ratio(X) | 0.52 | 0.71 | 0.46 | 0.18 | 1.07 | 0.34 | |
| Avail Cap(c_a), veh/h | 672 | 598 | 1341 | 598 | 252 | 2179 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Uniform Delay (d), s/veh | 15.2 | 15.9 | 10.0 | 8.8 | 18.2 | 4.0 | |
| Incr Delay (d2), s/veh | 1.2 | 3.0 | 1.1 | 0.7 | 75.5 | 0.4 | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| %ile BackOfQ(50%),veh/ln | 1.5 | 2.0 | 1.9 | 0.6 | 7.4 | 0.9 | |
| Unsig. Movement Delay, s/veh | | | | | | | |
| LnGrp Delay(d),s/veh | 16.4 | 18.8 | 11.1 | 9.5 | 93.7 | 4.4 | |
| LnGrp LOS | B | B | B | A | F | A | |
| Approach Vol, veh/h | 408 | | 728 | | | 1011 | |
| Approach Delay, s/veh | 17.7 | | 10.9 | | | 28.2 | |
| Approach LOS | B | | B | | | C | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | 8 |
| Phs Duration (G+Y+Rc), s | 10.0 | 20.0 | | | | 30.0 | 12.4 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | | | 4.0 | 4.0 |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | | | | 26.0 | 16.0 |
| Max Q Clear Time (g_c+I1), s | 8.0 | 7.6 | | | | 6.3 | 7.6 |
| Green Ext Time (p_c), s | 0.0 | 2.9 | | | | 5.1 | 0.9 |
| Intersection Summary | | | | | | | |
| HCM 6th Ctrl Delay | | | 20.3 | | | | |
| HCM 6th LOS | | | C | | | | |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 14.2 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 35 | 0 | 143 | 0 | 0 | 0 | 80 | 192 | 0 | 2 | 231 | 28 |
| Future Vol, veh/h | 35 | 0 | 143 | 0 | 0 | 0 | 80 | 192 | 0 | 2 | 231 | 28 |
| Peak Hour 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 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 51 | 0 | 209 | 0 | 0 | 0 | 117 | 280 | 0 | 3 | 337 | 41 |
| Number of Lanes | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 2 | 1 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 2 | 2 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 1 | 1 | 2 |
| HCM Control Delay | 11.5 | 0 | 12.6 | 17.8 |
| HCM LOS | B | - | B | C |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 |
|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 0% | 1% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 89% |
| Vol Right, % | 0% | 0% | 0% | 100% | 0% | 11% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 80 | 192 | 35 | 143 | 0 | 261 |
| LT Vol | 80 | 0 | 35 | 0 | 0 | 2 |
| Through Vol | 0 | 192 | 0 | 0 | 0 | 231 |
| RT Vol | 0 | 0 | 0 | 143 | 0 | 28 |
| Lane Flow Rate | 117 | 280 | 51 | 209 | 0 | 381 |
| Geometry Grp | 7 | 7 | 7 | 7 | 6 | 6 |
| Degree of Util (X) | 0.206 | 0.454 | 0.101 | 0.342 | 0 | 0.616 |
| Departure Headway (Hd) | 6.342 | 5.836 | 7.111 | 5.891 | 7.251 | 5.818 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 566 | 617 | 504 | 610 | 0 | 621 |
| Service Time | 4.078 | 3.571 | 4.852 | 3.632 | 5.317 | 3.851 |
| HCM Lane V/C Ratio | 0.207 | 0.454 | 0.101 | 0.343 | 0 | 0.614 |
| HCM Control Delay | 10.7 | 13.4 | 10.7 | 11.7 | 10.3 | 17.8 |
| HCM Lane LOS | B | B | B | B | N | C |
| HCM 95th-tile Q | 0.8 | 2.4 | 0.3 | 1.5 | 0 | 4.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 273 | 96 | 233 | 6 | 72 | 66 | 124 | 165 | 6 | 77 | 225 | 325 |
| Future Volume (veh/h) | 273 | 96 | 233 | 6 | 72 | 66 | 124 | 165 | 6 | 77 | 225 | 325 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 399 | 140 | 0 | 9 | 105 | 96 | 181 | 241 | 9 | 112 | 328 | 0 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 356 | 125 | | 15 | 170 | 157 | 178 | 1018 | 454 | 143 | 948 | |
| Arrive On Green | 0.27 | 0.27 | 0.00 | 0.10 | 0.10 | 0.10 | 0.10 | 0.29 | 0.29 | 0.08 | 0.27 | 0.00 |
| Sat Flow, veh/h | 1335 | 468 | 1585 | 147 | 1716 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 539 | 0 | 0 | 114 | 0 | 96 | 181 | 241 | 9 | 112 | 328 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1804 | 0 | 1585 | 1863 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 16.0 | 0.0 | 0.0 | 3.5 | 0.0 | 3.5 | 6.0 | 3.1 | 0.2 | 3.7 | 4.5 | 0.0 |
| Cycle Q Clear(g_c), s | 16.0 | 0.0 | 0.0 | 3.5 | 0.0 | 3.5 | 6.0 | 3.1 | 0.2 | 3.7 | 4.5 | 0.0 |
| Prop In Lane | 0.74 | | 1.00 | 0.08 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 481 | 0 | | 185 | 0 | 157 | 178 | 1018 | 454 | 143 | 948 | |
| V/C Ratio(X) | 1.12 | 0.00 | | 0.62 | 0.00 | 0.61 | 1.02 | 0.24 | 0.02 | 0.78 | 0.35 | |
| Avail Cap(c_a), veh/h | 481 | 0 | | 497 | 0 | 423 | 178 | 1018 | 454 | 178 | 948 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 22.0 | 0.0 | 0.0 | 25.9 | 0.0 | 25.9 | 27.0 | 16.4 | 15.3 | 27.0 | 17.7 | 0.0 |
| Incr Delay (d2), s/veh | 78.0 | 0.0 | 0.0 | 3.3 | 0.0 | 3.8 | 71.5 | 0.5 | 0.1 | 16.1 | 1.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 16.6 | 0.0 | 0.0 | 1.6 | 0.0 | 1.4 | 5.9 | 1.2 | 0.1 | 2.1 | 1.8 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 100.0 | 0.0 | 0.0 | 29.2 | 0.0 | 29.7 | 98.4 | 16.9 | 15.4 | 43.2 | 18.7 | 0.0 |
| LnGrp LOS | F | A | | C | A | C | F | B | B | D | B | |
| Approach Vol, veh/h | | 539 | A | | 210 | | | 431 | | | 440 | A |
| Approach Delay, s/veh | | 100.0 | | | 29.4 | | | 51.1 | | | 25.0 | |
| Approach LOS | | F | | | C | | | D | | | C | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 8.8 | 21.2 | | 20.0 | 10.0 | 20.0 | | 10.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.7 | 5.1 | | 18.0 | 8.0 | 6.5 | | 5.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.1 | | 0.0 | 0.0 | 1.4 | | 0.6 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 57.5 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.5 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 9 | 4 | 7 | 205 | 284 | 9 |
| Future Vol, veh/h | 9 | 4 | 7 | 205 | 284 | 9 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 13 | 6 | 10 | 299 | 415 | 13 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 741 | 422 | 428 | 0 | - | 0 |
| Stage 1 | 422 | - | - | - | - | - |
| Stage 2 | 319 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 384 | 632 | 1131 | - | - | - |
| Stage 1 | 662 | - | - | - | - | - |
| Stage 2 | 737 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 380 | 632 | 1131 | - | - | - |
| Mov Cap-2 Maneuver | 380 | - | - | - | - | - |
| Stage 1 | 655 | - | - | - | - | - |
| Stage 2 | 737 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 13.7 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1131 | - | 433 | - | - |
| HCM Lane V/C Ratio | 0.009 | - | 0.044 | - | - |
| HCM Control Delay (s) | 8.2 | 0 | 13.7 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.1 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 65 | 107 | 203 | 43 | 59 | 37 | 136 | 393 | 36 | 43 | 441 | 49 |
| Future Volume (veh/h) | 65 | 107 | 203 | 43 | 59 | 37 | 136 | 393 | 36 | 43 | 441 | 49 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 95 | 156 | 296 | 63 | 86 | 54 | 199 | 574 | 53 | 63 | 644 | 72 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 232 | 289 | 393 | 155 | 167 | 79 | 236 | 1557 | 694 | 86 | 1257 | 561 |
| Arrive On Green | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.13 | 0.44 | 0.44 | 0.05 | 0.35 | 0.35 |
| Sat Flow, veh/h | 493 | 1163 | 1585 | 206 | 671 | 318 | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 251 | 0 | 296 | 203 | 0 | 0 | 199 | 574 | 53 | 63 | 644 | 72 |
| Grp Sat Flow(s),veh/h/ln | 1656 | 0 | 1585 | 1195 | 0 | 0 | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 0.0 | 0.0 | 7.8 | 1.8 | 0.0 | 0.0 | 4.9 | 4.9 | 0.9 | 1.6 | 6.5 | 1.4 |
| Cycle Q Clear(g_c), s | 5.8 | 0.0 | 7.8 | 7.6 | 0.0 | 0.0 | 4.9 | 4.9 | 0.9 | 1.6 | 6.5 | 1.4 |
| Prop In Lane | 0.38 | | 1.00 | 0.31 | | 0.27 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 521 | 0 | 393 | 401 | 0 | 0 | 236 | 1557 | 694 | 86 | 1257 | 561 |
| V/C Ratio(X) | 0.48 | 0.00 | 0.75 | 0.51 | 0.00 | 0.00 | 0.84 | 0.37 | 0.08 | 0.73 | 0.51 | 0.13 |
| Avail Cap(c_a), veh/h | 687 | 0 | 561 | 547 | 0 | 0 | 236 | 1557 | 694 | 158 | 1257 | 561 |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.9 | 0.0 | 15.7 | 15.0 | 0.0 | 0.0 | 19.1 | 8.5 | 7.4 | 21.2 | 11.5 | 9.9 |
| Incr Delay (d2), s/veh | 0.7 | 0.0 | 3.5 | 1.0 | 0.0 | 0.0 | 23.1 | 0.7 | 0.2 | 11.2 | 1.5 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.0 | 0.0 | 2.8 | 1.6 | 0.0 | 0.0 | 3.3 | 1.6 | 0.3 | 0.9 | 2.3 | 0.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.6 | 0.0 | 19.2 | 16.0 | 0.0 | 0.0 | 42.2 | 9.2 | 7.6 | 32.5 | 13.0 | 10.4 |
| LnGrp LOS | B | A | B | B | A | A | D | A | A | C | B | B |
| Approach Vol, veh/h | | 547 | | | 203 | | | 826 | | | 779 | |
| Approach Delay, s/veh | | 17.5 | | | 16.0 | | | 17.0 | | | 14.4 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.2 | 23.8 | | 15.2 | 10.0 | 20.0 | | 15.2 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 4.0 | 18.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.6 | 6.9 | | 9.8 | 6.9 | 8.5 | | 9.6 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.1 | | 1.4 | 0.0 | 2.7 | | 0.6 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 16.2 |
| HCM 6th LOS | | | B |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 16.3 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 22 | 28 | 45 | 18 | 21 | 29 | 31 | 184 | 28 | 62 | 236 | 55 |
| Future Vol, veh/h | 22 | 28 | 45 | 18 | 21 | 29 | 31 | 184 | 28 | 62 | 236 | 55 |
| Peak Hour 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 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 32 | 41 | 66 | 26 | 31 | 42 | 45 | 269 | 41 | 91 | 345 | 80 |
| Number of Lanes | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 2 |
| Conflicting Approach RighNB | | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 2 | 2 |
| HCM Control Delay | 10.7 | 10.5 | 14.7 | 20 |
| HCM LOS | B | B | B | C |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 14% | 0% | 44% | 0% | 46% | 0% | 21% | 0% |
| Vol Thru, % | 86% | 0% | 56% | 0% | 54% | 0% | 79% | 0% |
| Vol Right, % | 0% | 100% | 0% | 100% | 0% | 100% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 215 | 28 | 50 | 45 | 39 | 29 | 298 | 55 |
| LT Vol | 31 | 0 | 22 | 0 | 18 | 0 | 62 | 0 |
| Through Vol | 184 | 0 | 28 | 0 | 21 | 0 | 236 | 0 |
| RT Vol | 0 | 28 | 0 | 45 | 0 | 29 | 0 | 55 |
| Lane Flow Rate | 314 | 41 | 73 | 66 | 57 | 42 | 435 | 80 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.53 | 0.06 | 0.148 | 0.116 | 0.117 | 0.076 | 0.714 | 0.114 |
| Departure Headway (Hd) | 6.075 | 5.293 | 7.282 | 6.342 | 7.389 | 6.437 | 5.912 | 5.099 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 593 | 674 | 491 | 562 | 483 | 554 | 609 | 701 |
| Service Time | 3.828 | 3.045 | 5.052 | 4.111 | 5.163 | 4.21 | 3.659 | 2.846 |
| HCM Lane V/C Ratio | 0.53 | 0.061 | 0.149 | 0.117 | 0.118 | 0.076 | 0.714 | 0.114 |
| HCM Control Delay | 15.5 | 8.4 | 11.3 | 10 | 11.1 | 9.7 | 22.1 | 8.5 |
| HCM Lane LOS | C | A | B | A | B | A | C | A |
| HCM 95th-tile Q | 3.1 | 0.2 | 0.5 | 0.4 | 0.4 | 0.2 | 5.9 | 0.4 |

| Intersection | | | | | | |
|---|---|---|---|---|---|---|
| Int Delay, s/veh | 0 | | | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 247 | 0 | 0 | 278 | 0 | 0 |
| Future Vol, veh/h | 247 | 0 | 0 | 278 | 0 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 247 | 0 | 0 | 278 | 0 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 247 | 0 | 525 | 247 |
| Stage 1 | - | - | - | - | 247 | - |
| Stage 2 | - | - | - | - | 278 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1319 | - | 513 | 792 |
| Stage 1 | - | - | - | - | 794 | - |
| Stage 2 | - | - | - | - | 769 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1319 | - | 513 | 792 |
| Mov Cap-2 Maneuver | - | - | - | - | 513 | - |
| Stage 1 | - | - | - | - | 794 | - |
| Stage 2 | - | - | - | - | 769 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 0 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | - | - | - | 1319 | - |
| HCM Lane V/C Ratio | - | - | - | - | - |
| HCM Control Delay (s) | 0 | - | - | 0 | - |
| HCM Lane LOS | A | - | - | A | - |
| HCM 95th %tile Q(veh) | - | - | - | 0 | - |

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 112 | 121 | 504 | 104 | 207 | 526 |
| v/c Ratio | 0.37 | 0.33 | 0.34 | 0.14 | 0.58 | 0.21 |
| Control Delay | 20.6 | 6.9 | 12.3 | 4.1 | 24.5 | 3.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 20.6 | 6.9 | 12.3 | 4.1 | 24.5 | 3.6 |
| Queue Length 50th (ft) | 27 | 0 | 53 | 0 | 50 | 23 |
| Queue Length 95th (ft) | 62 | 31 | 96 | 25 | 107 | 47 |
| Internal Link Dist (ft) | 1656 | | 1689 | | | 1325 |
| Turn Bay Length (ft) | | 60 | | 75 | 150 | |
| Base Capacity (vph) | 584 | 604 | 1475 | 720 | 402 | 2535 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.19 | 0.20 | 0.34 | 0.14 | 0.51 | 0.21 |

Intersection Summary

| Lane Group | EBT | EBR | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 355 | 194 | 275 | 102 | 438 | 345 | 16 | 54 | 517 |
| v/c Ratio | 0.99 | 0.41 | 0.86 | 0.25 | 0.96 | 0.25 | 0.02 | 0.41 | 0.61 |
| Control Delay | 81.9 | 8.0 | 62.8 | 3.1 | 68.9 | 19.7 | 0.1 | 49.4 | 17.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 81.9 | 8.0 | 62.8 | 3.1 | 68.9 | 19.7 | 0.1 | 49.4 | 17.5 |
| Queue Length 50th (ft) | 203 | 1 | 153 | 0 | 247 | 71 | 0 | 30 | 59 |
| Queue Length 95th (ft) | #379 | 56 | #285 | 13 | #435 | 104 | 0 | 67 | 111 |
| Internal Link Dist (ft) | 199 | | 154 | | | 208 | | | 252 |
| Turn Bay Length (ft) | | 150 | | 100 | 100 | | 50 | 85 | |
| Base Capacity (vph) | 360 | 471 | 330 | 413 | 455 | 1395 | 690 | 138 | 852 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.99 | 0.41 | 0.83 | 0.25 | 0.96 | 0.25 | 0.02 | 0.39 | 0.61 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 212 | 219 | 390 | 196 | 343 | 61 | 45 | 355 | 80 |
| v/c Ratio | 0.49 | 0.35 | 0.85 | 0.67 | 0.21 | 0.08 | 0.29 | 0.31 | 0.13 |
| Control Delay | 20.6 | 4.3 | 36.6 | 36.4 | 11.4 | 2.0 | 30.8 | 16.5 | 0.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 20.6 | 4.3 | 36.6 | 36.4 | 11.4 | 2.0 | 30.8 | 16.5 | 0.6 |
| Queue Length 50th (ft) | 59 | 0 | 112 | 67 | 42 | 0 | 16 | 51 | 0 |
| Queue Length 95th (ft) | 113 | 39 | #246 | #148 | 69 | 12 | 43 | 83 | 3 |
| Internal Link Dist (ft) | 1015 | | 544 | | 1325 | | | 2204 | |
| Turn Bay Length (ft) | | 100 | | 70 | | 120 | 70 | | 110 |
| Base Capacity (vph) | 508 | 702 | 531 | 314 | 1650 | 786 | 157 | 1130 | 617 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.42 | 0.31 | 0.73 | 0.62 | 0.21 | 0.08 | 0.29 | 0.31 | 0.13 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 185 | 223 | 621 | 108 | 269 | 742 |
| v/c Ratio | 0.47 | 0.42 | 0.48 | 0.17 | 1.11 | 0.35 |
| Control Delay | 18.6 | 5.3 | 13.0 | 3.9 | 118.8 | 5.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 18.6 | 5.3 | 13.0 | 3.9 | 118.8 | 5.8 |
| Queue Length 50th (ft) | 40 | 0 | 60 | 0 | ~81 | 40 |
| Queue Length 95th (ft) | 82 | 37 | 114 | 25 | #213 | 87 |
| Internal Link Dist (ft) | 1656 | | 1689 | | | 1325 |
| Turn Bay Length (ft) | | 60 | | 75 | 150 | |
| Base Capacity (vph) | 645 | 718 | 1290 | 646 | 242 | 2097 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.29 | 0.31 | 0.48 | 0.17 | 1.11 | 0.35 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 539 | 340 | 114 | 96 | 181 | 241 | 9 | 112 | 804 |
| v/c Ratio | 1.14 | 0.54 | 0.41 | 0.27 | 1.03 | 0.22 | 0.02 | 0.64 | 0.67 |
| Control Delay | 112.4 | 8.2 | 29.2 | 4.2 | 113.1 | 19.6 | 0.0 | 48.4 | 11.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 112.4 | 8.2 | 29.2 | 4.2 | 113.1 | 19.6 | 0.0 | 48.4 | 11.8 |
| Queue Length 50th (ft) | ~256 | 14 | 41 | 0 | ~80 | 38 | 0 | 42 | 55 |
| Queue Length 95th (ft) | #456 | 79 | 83 | 18 | #201 | 71 | 0 | #119 | 118 |
| Internal Link Dist (ft) | 199 | | 154 | | | 208 | | | 252 |
| Turn Bay Length (ft) | | 150 | | 100 | 100 | | 50 | 85 | |
| Base Capacity (vph) | 473 | 634 | 489 | 520 | 175 | 1075 | 578 | 175 | 1200 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.14 | 0.54 | 0.23 | 0.18 | 1.03 | 0.22 | 0.02 | 0.64 | 0.67 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 251 | 296 | 203 | 199 | 574 | 53 | 63 | 644 | 72 |
| v/c Ratio | 0.62 | 0.47 | 0.48 | 0.87 | 0.35 | 0.07 | 0.41 | 0.53 | 0.12 |
| Control Delay | 22.1 | 5.5 | 15.4 | 61.7 | 10.8 | 1.0 | 31.0 | 14.9 | 2.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 22.1 | 5.5 | 15.4 | 61.7 | 10.8 | 1.0 | 31.0 | 14.9 | 2.2 |
| Queue Length 50th (ft) | 59 | 4 | 36 | 55 | 58 | 0 | 17 | 73 | 0 |
| Queue Length 95th (ft) | 115 | 46 | 81 | #160 | 101 | 6 | #55 | 123 | 13 |
| Internal Link Dist (ft) | 1015 | | 544 | | 1325 | | | 2204 | |
| Turn Bay Length (ft) | | 100 | | 70 | | 120 | 70 | | 110 |
| Base Capacity (vph) | 524 | 728 | 535 | 229 | 1639 | 791 | 152 | 1221 | 617 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.48 | 0.41 | 0.38 | 0.87 | 0.35 | 0.07 | 0.41 | 0.53 | 0.12 |

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

# **Appendix G** - Cumulative Plus Project Conditions Scenario Level of Service and Queue Calculations

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 118 | 127 | 504 | 106 | 212 | 526 |
| Future Volume (veh/h) | 118 | 127 | 504 | 106 | 212 | 526 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 118 | 127 | 504 | 106 | 212 | 526 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 225 | 200 | 1608 | 717 | 271 | 2467 |
| Arrive On Green | 0.13 | 0.13 | 0.45 | 0.45 | 0.15 | 0.69 |
| Sat Flow, veh/h | 1781 | 1585 | 3647 | 1585 | 1781 | 3647 |
| Grp Volume(v), veh/h | 118 | 127 | 504 | 106 | 212 | 526 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1585 | 1777 | 1585 | 1781 | 1777 |
| Q Serve(g_s), s | 2.8 | 3.4 | 4.0 | 1.8 | 5.1 | 2.4 |
| Cycle Q Clear(g_c), s | 2.8 | 3.4 | 4.0 | 1.8 | 5.1 | 2.4 |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 225 | 200 | 1608 | 717 | 271 | 2467 |
| V/C Ratio(X) | 0.52 | 0.63 | 0.31 | 0.15 | 0.78 | 0.21 |
| Avail Cap(c_a), veh/h | 638 | 568 | 1608 | 717 | 439 | 2467 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.2 | 18.5 | 7.8 | 7.2 | 18.2 | 2.4 |
| Incr Delay (d2), s/veh | 1.9 | 3.3 | 0.5 | 0.4 | 4.9 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.1 | 1.3 | 1.3 | 0.5 | 2.2 | 0.3 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 20.1 | 21.8 | 8.3 | 7.6 | 23.1 | 2.6 |
| LnGrp LOS | C | C | A | A | C | A |
| Approach Vol, veh/h | 245 | | 610 | | | 738 |
| Approach Delay, s/veh | 21.0 | | 8.2 | | | 8.5 |
| Approach LOS | C | | A | | | A |

| Timer - Assigned Phs | 1 | 2 | 6 | 8 |
|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.8 | 24.2 | 35.0 | 9.6 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | 4.0 | 4.0 |
| Max Green Setting (Gmax), s | 11.0 | 16.0 | 31.0 | 16.0 |
| Max Q Clear Time (g_c+I1), s | 7.1 | 6.0 | 4.4 | 5.4 |
| Green Ext Time (p_c), s | 0.2 | 2.7 | 3.8 | 0.5 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 10.3 |
| HCM 6th LOS | B |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 11 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 21 | 0 | 133 | 3 | 0 | 0 | 118 | 289 | 0 | 1 | 216 | 33 |
| Future Vol, veh/h | 21 | 0 | 133 | 3 | 0 | 0 | 118 | 289 | 0 | 1 | 216 | 33 |
| Peak Hour 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 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 21 | 0 | 133 | 3 | 0 | 0 | 118 | 289 | 0 | 1 | 216 | 33 |
| Number of Lanes | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 2 | 1 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 2 | 2 | 1 |
| Conflicting Approach RighNB | | SB | WB | EB |
| Conflicting Lanes Right | 2 | 1 | 1 | 2 |
| HCM Control Delay | 9.6 | 9.7 | 11.1 | 11.6 |
| HCM LOS | A | A | B | B |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 |
|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 0% | 86% |
| Vol Right, % | 0% | 0% | 0% | 100% | 0% | 13% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 118 | 289 | 21 | 133 | 3 | 250 |
| LT Vol | 118 | 0 | 21 | 0 | 3 | 1 |
| Through Vol | 0 | 289 | 0 | 0 | 0 | 216 |
| RT Vol | 0 | 0 | 0 | 133 | 0 | 33 |
| Lane Flow Rate | 118 | 289 | 21 | 133 | 3 | 250 |
| Geometry Grp | 7 | 7 | 7 | 7 | 6 | 6 |
| Degree of Util (X) | 0.187 | 0.417 | 0.039 | 0.2 | 0.006 | 0.371 |
| Departure Headway (Hd) | 5.702 | 5.199 | 6.634 | 5.419 | 6.696 | 5.341 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 625 | 688 | 537 | 657 | 538 | 670 |
| Service Time | 3.469 | 2.965 | 4.41 | 3.194 | 4.696 | 3.411 |
| HCM Lane V/C Ratio | 0.189 | 0.42 | 0.039 | 0.202 | 0.006 | 0.373 |
| HCM Control Delay | 9.8 | 11.7 | 9.7 | 9.6 | 9.7 | 11.6 |
| HCM Lane LOS | A | B | A | A | A | B |
| HCM 95th-tile Q | 0.7 | 2.1 | 0.1 | 0.7 | 0 | 1.7 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 286 | 70 | 194 | 44 | 231 | 102 | 438 | 346 | 16 | 55 | 227 | 295 |
| Future Volume (veh/h) | 286 | 70 | 194 | 44 | 231 | 102 | 438 | 346 | 16 | 55 | 227 | 295 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 286 | 70 | 0 | 44 | 231 | 102 | 438 | 346 | 16 | 55 | 227 | 0 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 292 | 71 | | 50 | 264 | 269 | 460 | 1455 | 649 | 71 | 678 | |
| Arrive On Green | 0.20 | 0.20 | 0.00 | 0.17 | 0.17 | 0.17 | 0.26 | 0.41 | 0.41 | 0.04 | 0.19 | 0.00 |
| Sat Flow, veh/h | 1445 | 354 | 1585 | 297 | 1559 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 356 | 0 | 0 | 275 | 0 | 102 | 438 | 346 | 16 | 55 | 227 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1798 | 0 | 1585 | 1856 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 17.6 | 0.0 | 0.0 | 12.9 | 0.0 | 5.1 | 21.6 | 5.7 | 0.5 | 2.7 | 4.9 | 0.0 |
| Cycle Q Clear(g_c), s | 17.6 | 0.0 | 0.0 | 12.9 | 0.0 | 5.1 | 21.6 | 5.7 | 0.5 | 2.7 | 4.9 | 0.0 |
| Prop In Lane | 0.80 | | 1.00 | 0.16 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 363 | 0 | | 315 | 0 | 269 | 460 | 1455 | 649 | 71 | 678 | |
| V/C Ratio(X) | 0.98 | 0.00 | | 0.87 | 0.00 | 0.38 | 0.95 | 0.24 | 0.02 | 0.78 | 0.33 | |
| Avail Cap(c_a), veh/h | 363 | 0 | | 333 | 0 | 285 | 460 | 1455 | 649 | 140 | 678 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 35.4 | 0.0 | 0.0 | 36.1 | 0.0 | 32.8 | 32.5 | 17.2 | 15.7 | 42.4 | 31.2 | 0.0 |
| Incr Delay (d2), s/veh | 41.8 | 0.0 | 0.0 | 21.0 | 0.0 | 0.9 | 30.2 | 0.4 | 0.1 | 16.7 | 1.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 11.7 | 0.0 | 0.0 | 7.5 | 0.0 | 2.0 | 12.8 | 2.3 | 0.2 | 1.5 | 2.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 77.1 | 0.0 | 0.0 | 57.1 | 0.0 | 33.7 | 62.7 | 17.6 | 15.8 | 59.1 | 32.5 | 0.0 |
| LnGrp LOS | E | A | | E | A | C | E | B | B | E | C | |
| Approach Vol, veh/h | | 356 | A | | 377 | | | 800 | | | 282 | A |
| Approach Delay, s/veh | | 77.1 | | | 50.8 | | | 42.3 | | | 37.7 | |
| Approach LOS | | E | | | D | | | D | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 7.5 | 40.5 | | 22.0 | 27.0 | 21.0 | | 19.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 33.0 | | 18.0 | 23.0 | 17.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.7 | 7.7 | | 19.6 | 23.6 | 6.9 | | 14.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.4 | | 0.0 | 0.0 | 0.9 | | 0.2 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 50.2 |
| HCM 6th LOS | | | D |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | | | | | | |
|---|---|---|---|---|---|---|
| Int Delay, s/veh | 0.4 | | | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 7 | 15 | 6 | 332 | 298 | 9 |
| Future Vol, veh/h | 7 | 15 | 6 | 332 | 298 | 9 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 7 | 15 | 6 | 332 | 298 | 9 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 647 | 303 | 307 | 0 | - | 0 |
| Stage 1 | 303 | - | - | - | - | - |
| Stage 2 | 344 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 436 | 737 | 1254 | - | - | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 718 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 433 | 737 | 1254 | - | - | - |
| Mov Cap-2 Maneuver | 433 | - | - | - | - | - |
| Stage 1 | 745 | - | - | - | - | - |
| Stage 2 | 718 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 11.2 | 0.1 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1254 | - | 602 | - | - |
| HCM Lane V/C Ratio | 0.005 | - | 0.037 | - | - |
| HCM Control Delay (s) | 7.9 | 0 | 11.2 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.1 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↰↑ | ↱ | | ↰↑↱ | | ↰ | ↑↑ | ↱ | ↰ | ↑↑ | ↱ |
| Traffic Volume (veh/h) | 67 | 145 | 220 | 116 | 155 | 120 | 198 | 346 | 62 | 45 | 356 | 80 |
| Future Volume (veh/h) | 67 | 145 | 220 | 116 | 155 | 120 | 198 | 346 | 62 | 45 | 356 | 80 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 67 | 145 | 220 | 116 | 155 | 120 | 198 | 346 | 62 | 45 | 356 | 80 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 193 | 376 | 517 | 183 | 205 | 135 | 247 | 1506 | 672 | 64 | 1141 | 509 |
| Arrive On Green | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.14 | 0.42 | 0.42 | 0.04 | 0.32 | 0.32 |
| Sat Flow, veh/h | 334 | 1151 | 1585 | 306 | 627 | 413 | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 212 | 0 | 220 | 391 | 0 | 0 | 198 | 346 | 62 | 45 | 356 | 80 |
| Grp Sat Flow(s),veh/h/ln | 1485 | 0 | 1585 | 1347 | 0 | 0 | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 0.0 | 0.0 | 6.1 | 10.6 | 0.0 | 0.0 | 6.0 | 3.5 | 1.3 | 1.4 | 4.2 | 2.0 |
| Cycle Q Clear(g_c), s | 5.1 | 0.0 | 6.1 | 15.7 | 0.0 | 0.0 | 6.0 | 3.5 | 1.3 | 1.4 | 4.2 | 2.0 |
| Prop In Lane | 0.32 | | 1.00 | 0.30 | | 0.31 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 569 | 0 | 517 | 523 | 0 | 0 | 247 | 1506 | 672 | 64 | 1141 | 509 |
| V/C Ratio(X) | 0.37 | 0.00 | 0.43 | 0.75 | 0.00 | 0.00 | 0.80 | 0.23 | 0.09 | 0.70 | 0.31 | 0.16 |
| Avail Cap(c_a), veh/h | 616 | 0 | 566 | 566 | 0 | 0 | 318 | 1506 | 672 | 159 | 1141 | 509 |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.4 | 0.0 | 14.8 | 18.1 | 0.0 | 0.0 | 23.4 | 10.3 | 9.7 | 26.7 | 14.4 | 13.6 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.6 | 5.0 | 0.0 | 0.0 | 10.8 | 0.4 | 0.3 | 13.1 | 0.7 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.9 | 0.0 | 2.0 | 5.0 | 0.0 | 0.0 | 3.1 | 1.2 | 0.4 | 0.8 | 1.6 | 0.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.8 | 0.0 | 15.3 | 23.2 | 0.0 | 0.0 | 34.2 | 10.7 | 10.0 | 39.8 | 15.1 | 14.3 |
| LnGrp LOS | B | A | B | C | A | A | C | B | A | D | B | B |
| Approach Vol, veh/h | | 432 | | | 391 | | | 606 | | | 481 | |
| Approach Delay, s/veh | | 15.1 | | | 23.2 | | | 18.3 | | | 17.3 | |
| Approach LOS | | B | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.0 | 27.8 | | 22.3 | 11.8 | 22.0 | | 22.3 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 |
| Max Green Setting (Gmax), s | 5.0 | 23.0 | | 20.0 | 10.0 | 18.0 | | 20.0 |
| Max Q Clear Time (g_c+I1), s | 3.4 | 5.5 | | 8.1 | 8.0 | 6.2 | | 17.7 |
| Green Ext Time (p_c), s | 0.0 | 2.2 | | 1.6 | 0.1 | 2.0 | | 0.6 |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | | 18.3 |
| HCM 6th LOS | | | B |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12.1 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 48 | 26 | 45 | 26 | 31 | 39 | 72 | 254 | 19 | 26 | 224 | 164 |
| Future Vol, veh/h | 48 | 26 | 45 | 26 | 31 | 39 | 72 | 254 | 19 | 26 | 224 | 164 |
| Peak Hour 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 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 48 | 26 | 45 | 26 | 31 | 39 | 72 | 254 | 19 | 26 | 224 | 164 |
| Number of Lanes | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 2 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 2 | 2 |
| HCM Control Delay | 10.3 | 10 | 14.5 | 11 |
| HCM LOS | B | A | B | B |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 22% | 0% | 65% | 0% | 46% | 0% | 10% | 0% |
| Vol Thru, % | 78% | 0% | 35% | 0% | 54% | 0% | 90% | 0% |
| Vol Right, % | 0% | 100% | 0% | 100% | 0% | 100% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 326 | 19 | 74 | 45 | 57 | 39 | 250 | 164 |
| LT Vol | 72 | 0 | 48 | 0 | 26 | 0 | 26 | 0 |
| Through Vol | 254 | 0 | 26 | 0 | 31 | 0 | 224 | 0 |
| RT Vol | 0 | 19 | 0 | 45 | 0 | 39 | 0 | 164 |
| Lane Flow Rate | 326 | 19 | 74 | 45 | 57 | 39 | 250 | 164 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.528 | 0.026 | 0.144 | 0.074 | 0.11 | 0.065 | 0.397 | 0.226 |
| Departure Headway (Hd) | 5.835 | 5.016 | 6.99 | 5.947 | 6.945 | 6 | 5.717 | 4.958 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 619 | 713 | 513 | 602 | 516 | 596 | 630 | 723 |
| Service Time | 3.568 | 2.749 | 4.733 | 3.69 | 4.69 | 3.745 | 3.449 | 2.689 |
| HCM Lane V/C Ratio | 0.527 | 0.027 | 0.144 | 0.075 | 0.11 | 0.065 | 0.397 | 0.227 |
| HCM Control Delay | 14.9 | 7.9 | 10.9 | 9.2 | 10.6 | 9.2 | 12.2 | 9.1 |
| HCM Lane LOS | B | A | B | A | B | A | B | A |
| HCM 95th-tile Q | 3.1 | 0.1 | 0.5 | 0.2 | 0.4 | 0.2 | 1.9 | 0.9 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.5 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 278 | 7 | 4 | 143 | 12 | 8 |
| Future Vol, veh/h | 278 | 7 | 4 | 143 | 12 | 8 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 278 | 7 | 4 | 143 | 12 | 8 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 285 | 0 | 433 | 282 |
| Stage 1 | - | - | - | - | 282 | - |
| Stage 2 | - | - | - | - | 151 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1277 | - | 580 | 757 |
| Stage 1 | - | - | - | - | 766 | - |
| Stage 2 | - | - | - | - | 877 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1277 | - | 578 | 757 |
| Mov Cap-2 Maneuver | - | - | - | - | 578 | - |
| Stage 1 | - | - | - | - | 764 | - |
| Stage 2 | - | - | - | - | 877 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0.2 | 10.8 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 638 | - | - | 1277 | - |
| HCM Lane V/C Ratio | 0.031 | - | - | 0.003 | - |
| HCM Control Delay (s) | 10.8 | - | - | 7.8 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0 | - |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT | |
|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | |
| Traffic Volume (veh/h) | 188 | 228 | 620 | 115 | 277 | 742 | |
| Future Volume (veh/h) | 188 | 228 | 620 | 115 | 277 | 742 | |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Work Zone On Approach | No | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | |
| Adj Flow Rate, veh/h | 188 | 228 | 620 | 115 | 277 | 742 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | |
| Cap, veh/h | 345 | 307 | 1311 | 585 | 337 | 2277 | |
| Arrive On Green | 0.19 | 0.19 | 0.37 | 0.37 | 0.19 | 0.64 | |
| Sat Flow, veh/h | 1781 | 1585 | 3647 | 1585 | 1781 | 3647 | |
| Grp Volume(v), veh/h | 188 | 228 | 620 | 115 | 277 | 742 | |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1585 | 1777 | 1585 | 1781 | 1777 | |
| Q Serve(g_s), s | 4.6 | 6.6 | 6.5 | 2.4 | 7.2 | 4.6 | |
| Cycle Q Clear(g_c), s | 4.6 | 6.6 | 6.5 | 2.4 | 7.2 | 4.6 | |
| Prop In Lane | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Lane Grp Cap(c), veh/h | 345 | 307 | 1311 | 585 | 337 | 2277 | |
| V/C Ratio(X) | 0.54 | 0.74 | 0.47 | 0.20 | 0.82 | 0.33 | |
| Avail Cap(c_a), veh/h | 589 | 524 | 1311 | 585 | 405 | 2277 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Uniform Delay (d), s/veh | 17.6 | 18.4 | 11.7 | 10.4 | 18.8 | 3.9 | |
| Incr Delay (d2), s/veh | 1.3 | 3.5 | 1.2 | 0.8 | 10.9 | 0.4 | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| %ile BackOfQ(50%),veh/ln | 1.8 | 2.4 | 2.3 | 0.8 | 3.7 | 1.0 | |
| Unsig. Movement Delay, s/veh | | | | | | | |
| LnGrp Delay(d),s/veh | 18.9 | 21.9 | 12.9 | 11.1 | 29.8 | 4.3 | |
| LnGrp LOS | B | C | B | B | C | A | |
| Approach Vol, veh/h | 416 | | 735 | | | 1019 | |
| Approach Delay, s/veh | 20.6 | | 12.6 | | | 11.2 | |
| Approach LOS | C | | B | | | B | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | 8 |
| Phs Duration (G+Y+Rc), s | 13.2 | 21.8 | | | | 35.0 | 13.4 |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | | | 4.0 | 4.0 |
| Max Green Setting (Gmax), s | 11.0 | 16.0 | | | | 31.0 | 16.0 |
| Max Q Clear Time (g_c+I1), s | 9.2 | 8.5 | | | | 6.6 | 8.6 |
| Green Ext Time (p_c), s | 0.2 | 2.7 | | | | 5.5 | 0.9 |
| Intersection Summary | | | | | | | |
| HCM 6th Ctrl Delay | | | 13.5 | | | | |
| HCM 6th LOS | | | B | | | | |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 14.4 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 52 | 0 | 214 | 0 | 0 | 0 | 122 | 280 | 0 | 3 | 337 | 43 |
| Future Vol, veh/h | 52 | 0 | 214 | 0 | 0 | 0 | 122 | 280 | 0 | 3 | 337 | 43 |
| Peak Hour 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 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 52 | 0 | 214 | 0 | 0 | 0 | 122 | 280 | 0 | 3 | 337 | 43 |
| Number of Lanes | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 2 | 1 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 2 | 2 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 1 | 1 | 2 |
| HCM Control Delay | 11.6 | 0 | 12.6 | 18.1 |
| HCM LOS | B | - | B | C |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 |
|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 0% | 1% |
| Vol Thru, % | 0% | 100% | 0% | 0% | 100% | 88% |
| Vol Right, % | 0% | 0% | 0% | 100% | 0% | 11% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 122 | 280 | 52 | 214 | 0 | 383 |
| LT Vol | 122 | 0 | 52 | 0 | 0 | 3 |
| Through Vol | 0 | 280 | 0 | 0 | 0 | 337 |
| RT Vol | 0 | 0 | 0 | 214 | 0 | 43 |
| Lane Flow Rate | 122 | 280 | 52 | 214 | 0 | 383 |
| Geometry Grp | 7 | 7 | 7 | 7 | 6 | 6 |
| Degree of Util (X) | 0.216 | 0.456 | 0.103 | 0.351 | 0 | 0.622 |
| Departure Headway (Hd) | 6.372 | 5.865 | 7.13 | 5.911 | 7.291 | 5.845 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 564 | 613 | 503 | 608 | 0 | 617 |
| Service Time | 4.106 | 3.599 | 4.874 | 3.654 | 5.359 | 3.876 |
| HCM Lane V/C Ratio | 0.216 | 0.457 | 0.103 | 0.352 | 0 | 0.621 |
| HCM Control Delay | 10.9 | 13.4 | 10.7 | 11.8 | 10.4 | 18.1 |
| HCM Lane LOS | B | B | B | B | N | C |
| HCM 95th-tile Q | 0.8 | 2.4 | 0.3 | 1.6 | 0 | 4.3 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 403 | 140 | 340 | 9 | 105 | 97 | 181 | 243 | 9 | 112 | 329 | 477 |
| Future Volume (veh/h) | 403 | 140 | 340 | 9 | 105 | 97 | 181 | 243 | 9 | 112 | 329 | 477 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 403 | 140 | 0 | 9 | 105 | 97 | 181 | 243 | 9 | 112 | 329 | 0 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 357 | 124 | | 15 | 171 | 158 | 178 | 1018 | 454 | 143 | 948 | |
| Arrive On Green | 0.27 | 0.27 | 0.00 | 0.10 | 0.10 | 0.10 | 0.10 | 0.29 | 0.29 | 0.08 | 0.27 | 0.00 |
| Sat Flow, veh/h | 1338 | 465 | 1585 | 147 | 1716 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 543 | 0 | 0 | 114 | 0 | 97 | 181 | 243 | 9 | 112 | 329 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1803 | 0 | 1585 | 1863 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 16.0 | 0.0 | 0.0 | 3.5 | 0.0 | 3.5 | 6.0 | 3.1 | 0.2 | 3.7 | 4.5 | 0.0 |
| Cycle Q Clear(g_c), s | 16.0 | 0.0 | 0.0 | 3.5 | 0.0 | 3.5 | 6.0 | 3.1 | 0.2 | 3.7 | 4.5 | 0.0 |
| Prop In Lane | 0.74 | | 1.00 | 0.08 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 481 | 0 | | 185 | 0 | 158 | 178 | 1018 | 454 | 143 | 948 | |
| V/C Ratio(X) | 1.13 | 0.00 | | 0.62 | 0.00 | 0.62 | 1.02 | 0.24 | 0.02 | 0.78 | 0.35 | |
| Avail Cap(c_a), veh/h | 481 | 0 | | 497 | 0 | 423 | 178 | 1018 | 454 | 178 | 948 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 22.0 | 0.0 | 0.0 | 25.9 | 0.0 | 25.9 | 27.0 | 16.4 | 15.3 | 27.1 | 17.8 | 0.0 |
| Incr Delay (d2), s/veh | 81.1 | 0.0 | 0.0 | 3.3 | 0.0 | 3.9 | 71.5 | 0.6 | 0.1 | 16.1 | 1.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 17.0 | 0.0 | 0.0 | 1.6 | 0.0 | 1.4 | 5.9 | 1.2 | 0.1 | 2.1 | 1.8 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 103.1 | 0.0 | 0.0 | 29.2 | 0.0 | 29.8 | 98.5 | 16.9 | 15.4 | 43.2 | 18.8 | 0.0 |
| LnGrp LOS | F | A | | C | A | C | F | B | B | D | B | |
| Approach Vol, veh/h | | 543 | A | | 211 | | | 433 | | | 441 | A |
| Approach Delay, s/veh | | 103.1 | | | 29.5 | | | 51.0 | | | 25.0 | |
| Approach LOS | | F | | | C | | | D | | | C | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 8.8 | 21.2 | | 20.0 | 10.0 | 20.0 | | 10.0 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 5.7 | 5.1 | | 18.0 | 8.0 | 6.5 | | 5.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.1 | | 0.0 | 0.0 | 1.4 | | 0.6 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 58.5 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.5 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 13 | 6 | 10 | 304 | 420 | 13 |
| Future Vol, veh/h | 13 | 6 | 10 | 304 | 420 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 13 | 6 | 10 | 304 | 420 | 13 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 751 | 427 | 433 | 0 | - | 0 |
| Stage 1 | 427 | - | - | - | - | - |
| Stage 2 | 324 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 378 | 628 | 1127 | - | - | - |
| Stage 1 | 658 | - | - | - | - | - |
| Stage 2 | 733 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 374 | 628 | 1127 | - | - | - |
| Mov Cap-2 Maneuver | 374 | - | - | - | - | - |
| Stage 1 | 651 | - | - | - | - | - |
| Stage 2 | 733 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 13.8 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1127 | - | 429 | - | - |
| HCM Lane V/C Ratio | 0.009 | - | 0.044 | - | - |
| HCM Control Delay (s) | 8.2 | 0 | 13.8 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.1 | - | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 95 | 156 | 298 | 64 | 86 | 54 | 200 | 578 | 53 | 63 | 649 | 72 |
| Future Volume (veh/h) | 95 | 156 | 298 | 64 | 86 | 54 | 200 | 578 | 53 | 63 | 649 | 72 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 95 | 156 | 298 | 64 | 86 | 54 | 200 | 578 | 53 | 63 | 649 | 72 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 232 | 290 | 395 | 156 | 166 | 79 | 236 | 1555 | 693 | 86 | 1256 | 560 |
| Arrive On Green | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.13 | 0.44 | 0.44 | 0.05 | 0.35 | 0.35 |
| Sat Flow, veh/h | 491 | 1162 | 1585 | 208 | 667 | 315 | 1781 | 3554 | 1585 | 1781 | 3554 | 1585 |
| Grp Volume(v), veh/h | 251 | 0 | 298 | 204 | 0 | 0 | 200 | 578 | 53 | 63 | 649 | 72 |
| Grp Sat Flow(s),veh/h/ln | 1654 | 0 | 1585 | 1190 | 0 | 0 | 1781 | 1777 | 1585 | 1781 | 1777 | 1585 |
| Q Serve(g_s), s | 0.0 | 0.0 | 7.9 | 1.9 | 0.0 | 0.0 | 5.0 | 4.9 | 0.9 | 1.6 | 6.5 | 1.4 |
| Cycle Q Clear(g_c), s | 5.8 | 0.0 | 7.9 | 7.7 | 0.0 | 0.0 | 5.0 | 4.9 | 0.9 | 1.6 | 6.5 | 1.4 |
| Prop In Lane | 0.38 | | 1.00 | 0.31 | | 0.26 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 522 | 0 | 395 | 401 | 0 | 0 | 236 | 1555 | 693 | 86 | 1256 | 560 |
| V/C Ratio(X) | 0.48 | 0.00 | 0.75 | 0.51 | 0.00 | 0.00 | 0.85 | 0.37 | 0.08 | 0.73 | 0.52 | 0.13 |
| Avail Cap(c_a), veh/h | 686 | 0 | 560 | 544 | 0 | 0 | 236 | 1555 | 693 | 236 | 1256 | 560 |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 14.9 | 0.0 | 15.7 | 15.1 | 0.0 | 0.0 | 19.2 | 8.6 | 7.4 | 21.3 | 11.6 | 9.9 |
| Incr Delay (d2), s/veh | 0.7 | 0.0 | 3.6 | 1.0 | 0.0 | 0.0 | 23.9 | 0.7 | 0.2 | 11.3 | 1.5 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.0 | 0.0 | 2.8 | 1.6 | 0.0 | 0.0 | 3.4 | 1.6 | 0.3 | 0.9 | 2.3 | 0.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.6 | 0.0 | 19.3 | 16.1 | 0.0 | 0.0 | 43.1 | 9.2 | 7.6 | 32.5 | 13.1 | 10.4 |
| LnGrp LOS | B | A | B | B | A | A | D | A | A | C | B | B |
| Approach Vol, veh/h | | 549 | | | 204 | | | 831 | | | 784 | |
| Approach Delay, s/veh | | 17.6 | | | 16.1 | | | 17.3 | | | 14.4 | |
| Approach LOS | | B | | | B | | | B | | | B | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 6.2 | 23.8 | | 15.3 | 10.0 | 20.0 | | 15.3 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 6.0 | 16.0 | | 16.0 | 6.0 | 16.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.6 | 6.9 | | 9.9 | 7.0 | 8.5 | | 9.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.7 | | 1.4 | 0.0 | 2.7 | | 0.6 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 16.3 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 16.5 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 32 | 41 | 66 | 26 | 31 | 42 | 45 | 270 | 41 | 91 | 347 | 55 |
| Future Vol, veh/h | 32 | 41 | 66 | 26 | 31 | 42 | 45 | 270 | 41 | 91 | 347 | 55 |
| Peak Hour 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 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 32 | 41 | 66 | 26 | 31 | 42 | 45 | 270 | 41 | 91 | 347 | 55 |
| Number of Lanes | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 2 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 2 |
| Conflicting Approach Righ | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 2 | 2 |
| HCM Control Delay | 10.6 | 10.5 | 14.6 | 20.8 |
| HCM LOS | B | B | B | C |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 14% | 0% | 44% | 0% | 46% | 0% | 21% | 0% |
| Vol Thru, % | 86% | 0% | 56% | 0% | 54% | 0% | 79% | 0% |
| Vol Right, % | 0% | 100% | 0% | 100% | 0% | 100% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 315 | 41 | 73 | 66 | 57 | 42 | 438 | 55 |
| LT Vol | 45 | 0 | 32 | 0 | 26 | 0 | 91 | 0 |
| Through Vol | 270 | 0 | 41 | 0 | 31 | 0 | 347 | 0 |
| RT Vol | 0 | 41 | 0 | 66 | 0 | 42 | 0 | 55 |
| Lane Flow Rate | 315 | 41 | 73 | 66 | 57 | 42 | 438 | 55 |
| Geometry Grp | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.529 | 0.06 | 0.147 | 0.116 | 0.117 | 0.075 | 0.719 | 0.078 |
| Departure Headway (Hd) | 6.047 | 5.265 | 7.256 | 6.317 | 7.363 | 6.414 | 5.909 | 5.096 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 595 | 678 | 493 | 564 | 485 | 556 | 613 | 701 |
| Service Time | 3.798 | 3.016 | 5.027 | 4.088 | 5.137 | 4.187 | 3.654 | 2.841 |
| HCM Lane V/C Ratio | 0.529 | 0.06 | 0.148 | 0.117 | 0.118 | 0.076 | 0.715 | 0.078 |
| HCM Control Delay | 15.4 | 8.4 | 11.3 | 9.9 | 11.1 | 9.7 | 22.4 | 8.3 |
| HCM Lane LOS | C | A | B | A | B | A | C | A |
| HCM 95th-tile Q | 3.1 | 0.2 | 0.5 | 0.4 | 0.4 | 0.2 | 6 | 0.3 |

| Intersection | | | | | | |
|---|---|---|---|---|---|---|
| Int Delay, s/veh | 0.4 | | | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 247 | 15 | 7 | 278 | 8 | 6 |
| Future Vol, veh/h | 247 | 15 | 7 | 278 | 8 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 247 | 15 | 7 | 278 | 8 | 6 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 262 | 0 | 547 | 255 |
| Stage 1 | - | - | - | - | 255 | - |
| Stage 2 | - | - | - | - | 292 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1302 | - | 498 | 784 |
| Stage 1 | - | - | - | - | 788 | - |
| Stage 2 | - | - | - | - | 758 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1302 | - | 495 | 784 |
| Mov Cap-2 Maneuver | - | - | - | - | 495 | - |
| Stage 1 | - | - | - | - | 783 | - |
| Stage 2 | - | - | - | - | 758 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0.2 | 11.3 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 588 | - | - | 1302 | - |
| HCM Lane V/C Ratio | 0.024 | - | - | 0.005 | - |
| HCM Control Delay (s) | 11.3 | - | - | 7.8 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | 0 | - |

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 118 | 127 | 504 | 106 | 212 | 526 |
| v/c Ratio | 0.38 | 0.33 | 0.34 | 0.15 | 0.59 | 0.21 |
| Control Delay | 20.8 | 6.8 | 12.5 | 4.1 | 24.9 | 3.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 20.8 | 6.8 | 12.5 | 4.1 | 24.9 | 3.7 |
| Queue Length 50th (ft) | 29 | 0 | 54 | 0 | 51 | 23 |
| Queue Length 95th (ft) | 64 | 32 | 97 | 25 | 111 | 48 |
| Internal Link Dist (ft) | 1656 | | 1689 | | | 1325 |
| Turn Bay Length (ft) | | 60 | | 75 | 150 | |
| Base Capacity (vph) | 583 | 606 | 1466 | 717 | 401 | 2528 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.20 | 0.21 | 0.34 | 0.15 | 0.53 | 0.21 |

Intersection Summary

| Lane Group | EBT | EBR | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 356 | 194 | 275 | 102 | 438 | 346 | 16 | 55 | 522 |
| v/c Ratio | 0.99 | 0.41 | 0.86 | 0.25 | 0.96 | 0.25 | 0.02 | 0.42 | 0.61 |
| Control Delay | 82.6 | 8.0 | 62.8 | 3.1 | 68.9 | 19.8 | 0.1 | 49.7 | 17.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 82.6 | 8.0 | 62.8 | 3.1 | 68.9 | 19.8 | 0.1 | 49.7 | 17.6 |
| Queue Length 50th (ft) | 204 | 1 | 153 | 0 | 247 | 71 | 0 | 30 | 60 |
| Queue Length 95th (ft) | #380 | 56 | #285 | 13 | #435 | 105 | 0 | 68 | 112 |
| Internal Link Dist (ft) | 199 | | 154 | | | 208 | | | 252 |
| Turn Bay Length (ft) | | 150 | | 100 | 100 | | 50 | 85 | |
| Base Capacity (vph) | 360 | 471 | 330 | 413 | 455 | 1395 | 690 | 138 | 854 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.99 | 0.41 | 0.83 | 0.25 | 0.96 | 0.25 | 0.02 | 0.40 | 0.61 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 212 | 220 | 391 | 198 | 346 | 62 | 45 | 356 | 80 |
| v/c Ratio | 0.49 | 0.35 | 0.86 | 0.67 | 0.21 | 0.08 | 0.29 | 0.32 | 0.13 |
| Control Delay | 20.5 | 4.3 | 37.0 | 36.8 | 11.4 | 2.1 | 30.8 | 16.5 | 0.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 20.5 | 4.3 | 37.0 | 36.8 | 11.4 | 2.1 | 30.8 | 16.5 | 0.6 |
| Queue Length 50th (ft) | 59 | 0 | 112 | 68 | 43 | 0 | 16 | 51 | 0 |
| Queue Length 95th (ft) | 113 | 39 | #247 | #149 | 70 | 12 | 43 | 83 | 3 |
| Internal Link Dist (ft) | 1015 | | 544 | | 1325 | | | 2204 | |
| Turn Bay Length (ft) | | 100 | | 70 | | 120 | 70 | | 110 |
| Base Capacity (vph) | 507 | 703 | 529 | 314 | 1649 | 786 | 156 | 1129 | 616 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.42 | 0.31 | 0.74 | 0.63 | 0.21 | 0.08 | 0.29 | 0.32 | 0.13 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 188 | 228 | 620 | 115 | 277 | 742 |
| v/c Ratio | 0.50 | 0.44 | 0.53 | 0.19 | 0.74 | 0.34 |
| Control Delay | 21.8 | 5.8 | 16.3 | 4.6 | 34.0 | 5.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 21.8 | 5.8 | 16.3 | 4.6 | 34.0 | 5.5 |
| Queue Length 50th (ft) | 48 | 0 | 75 | 0 | 74 | 42 |
| Queue Length 95th (ft) | 94 | 40 | 136 | 29 | #193 | 91 |
| Internal Link Dist (ft) | 1656 | | 1689 | | | 1325 |
| Turn Bay Length (ft) | | 60 | | 75 | 150 | |
| Base Capacity (vph) | 571 | 665 | 1175 | 602 | 393 | 2213 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.33 | 0.34 | 0.53 | 0.19 | 0.70 | 0.34 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 543 | 340 | 114 | 97 | 181 | 243 | 9 | 112 | 806 |
| v/c Ratio | 1.15 | 0.54 | 0.41 | 0.27 | 1.03 | 0.23 | 0.02 | 0.64 | 0.67 |
| Control Delay | 115.4 | 8.3 | 29.2 | 4.3 | 113.1 | 19.6 | 0.0 | 48.4 | 11.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 115.4 | 8.3 | 29.2 | 4.3 | 113.1 | 19.6 | 0.0 | 48.4 | 11.8 |
| Queue Length 50th (ft) | ~259 | 14 | 41 | 0 | ~80 | 39 | 0 | 42 | 55 |
| Queue Length 95th (ft) | #460 | 80 | 83 | 19 | #201 | 71 | 0 | #119 | 118 |
| Internal Link Dist (ft) | 199 | | 154 | | | 208 | | | 252 |
| Turn Bay Length (ft) | | 150 | | 100 | 100 | | 50 | 85 | |
| Base Capacity (vph) | 473 | 632 | 489 | 520 | 175 | 1075 | 578 | 175 | 1202 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.15 | 0.54 | 0.23 | 0.19 | 1.03 | 0.23 | 0.02 | 0.64 | 0.67 |

**Intersection Summary**

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBT | EBR | WBT | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 251 | 298 | 204 | 200 | 578 | 53 | 63 | 649 | 72 |
| v/c Ratio | 0.62 | 0.47 | 0.49 | 0.87 | 0.37 | 0.07 | 0.28 | 0.53 | 0.12 |
| Control Delay | 22.1 | 4.8 | 15.6 | 62.5 | 12.1 | 1.1 | 23.2 | 14.9 | 2.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 22.1 | 4.8 | 15.6 | 62.5 | 12.1 | 1.1 | 23.2 | 14.9 | 2.2 |
| Queue Length 50th (ft) | 59 | 0 | 36 | 55 | 64 | 0 | 16 | 73 | 0 |
| Queue Length 95th (ft) | 115 | 41 | 82 | #160 | 110 | 6 | 45 | 124 | 13 |
| Internal Link Dist (ft) | 1015 | | 544 | | 1325 | | | 2204 | |
| Turn Bay Length (ft) | | 100 | | 70 | | 120 | 70 | | 110 |
| Base Capacity (vph) | 524 | 741 | 533 | 229 | 1552 | 755 | 229 | 1221 | 617 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.48 | 0.40 | 0.38 | 0.87 | 0.37 | 0.07 | 0.28 | 0.53 | 0.12 |

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 286 | 70 | 194 | 44 | 231 | 102 | 438 | 346 | 16 | 55 | 227 | 295 |
| Future Volume (veh/h) | 286 | 70 | 194 | 44 | 231 | 102 | 438 | 346 | 16 | 55 | 227 | 295 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 286 | 70 | 0 | 44 | 231 | 102 | 438 | 346 | 16 | 55 | 227 | 0 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 292 | 71 | | 50 | 264 | 331 | 460 | 1455 | 649 | 71 | 678 | |
| Arrive On Green | 0.20 | 0.20 | 0.00 | 0.17 | 0.17 | 0.17 | 0.26 | 0.41 | 0.41 | 0.04 | 0.19 | 0.00 |
| Sat Flow, veh/h | 1445 | 354 | 1585 | 297 | 1559 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 356 | 0 | 0 | 275 | 0 | 102 | 438 | 346 | 16 | 55 | 227 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1798 | 0 | 1585 | 1856 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 17.6 | 0.0 | 0.0 | 12.9 | 0.0 | 4.8 | 21.6 | 5.7 | 0.5 | 2.7 | 4.9 | 0.0 |
| Cycle Q Clear(g_c), s | 17.6 | 0.0 | 0.0 | 12.9 | 0.0 | 4.8 | 21.6 | 5.7 | 0.5 | 2.7 | 4.9 | 0.0 |
| Prop In Lane | 0.80 | | 1.00 | 0.16 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 363 | 0 | | 315 | 0 | 331 | 460 | 1455 | 649 | 71 | 678 | |
| V/C Ratio(X) | 0.98 | 0.00 | | 0.87 | 0.00 | 0.31 | 0.95 | 0.24 | 0.02 | 0.78 | 0.33 | |
| Avail Cap(c_a), veh/h | 363 | 0 | | 333 | 0 | 347 | 460 | 1455 | 649 | 140 | 678 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 35.4 | 0.0 | 0.0 | 36.1 | 0.0 | 29.8 | 32.5 | 17.2 | 15.7 | 42.4 | 31.2 | 0.0 |
| Incr Delay (d2), s/veh | 41.8 | 0.0 | 0.0 | 21.0 | 0.0 | 0.5 | 30.2 | 0.4 | 0.1 | 16.7 | 1.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 11.7 | 0.0 | 0.0 | 7.5 | 0.0 | 1.9 | 12.8 | 2.3 | 0.2 | 1.5 | 2.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 77.1 | 0.0 | 0.0 | 57.1 | 0.0 | 30.3 | 62.7 | 17.6 | 15.8 | 59.1 | 32.5 | 0.0 |
| LnGrp LOS | E | A | | E | A | C | E | B | B | E | C | |
| Approach Vol, veh/h | | 356 | A | | 377 | | | 800 | | | 282 | A |
| Approach Delay, s/veh | | 77.1 | | | 49.9 | | | 42.3 | | | 37.7 | |
| Approach LOS | | E | | | D | | | D | | | D | |
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 7.5 | 40.5 | | 22.0 | 27.0 | 21.0 | | 19.1 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 33.0 | | 18.0 | 23.0 | 17.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 4.7 | 7.7 | | 19.6 | 23.6 | 6.9 | | 14.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 2.4 | | 0.0 | 0.0 | 0.9 | | 0.2 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 50.0 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary Senior Housing Cumulative+Project PM (GP)_check.syn
3: S Fortuna Blvd & Kenmar Road 12/12/2018

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 403 | 140 | 340 | 9 | 105 | 97 | 181 | 243 | 9 | 112 | 329 | 477 |
| Future Volume (veh/h) | 403 | 140 | 340 | 9 | 105 | 97 | 181 | 243 | 9 | 112 | 329 | 477 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 403 | 140 | 0 | 9 | 105 | 97 | 181 | 243 | 9 | 112 | 329 | 0 |
| Peak Hour 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 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 453 | 158 | | 14 | 159 | 274 | 221 | 969 | 432 | 143 | 814 | |
| Arrive On Green | 0.34 | 0.34 | 0.00 | 0.09 | 0.09 | 0.09 | 0.12 | 0.27 | 0.27 | 0.08 | 0.23 | 0.00 |
| Sat Flow, veh/h | 1338 | 465 | 1585 | 147 | 1716 | 1585 | 1781 | 3554 | 1585 | 1781 | 3647 | 0 |
| Grp Volume(v), veh/h | 543 | 0 | 0 | 114 | 0 | 97 | 181 | 243 | 9 | 112 | 329 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1803 | 0 | 1585 | 1863 | 0 | 1585 | 1781 | 1777 | 1585 | 1781 | 1777 | 0 |
| Q Serve(g_s), s | 21.2 | 0.0 | 0.0 | 4.4 | 0.0 | 4.0 | 7.4 | 4.0 | 0.3 | 4.6 | 5.8 | 0.0 |
| Cycle Q Clear(g_c), s | 21.2 | 0.0 | 0.0 | 4.4 | 0.0 | 4.0 | 7.4 | 4.0 | 0.3 | 4.6 | 5.8 | 0.0 |
| Prop In Lane | 0.74 | | 1.00 | 0.08 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 611 | 0 | | 173 | 0 | 274 | 221 | 969 | 432 | 143 | 814 | |
| V/C Ratio(X) | 0.89 | 0.00 | | 0.66 | 0.00 | 0.35 | 0.82 | 0.25 | 0.02 | 0.78 | 0.40 | |
| Avail Cap(c_a), veh/h | 729 | 0 | | 401 | 0 | 469 | 264 | 969 | 432 | 192 | 814 | |
| HCM 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 |
| Upstream Filter(I) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 23.2 | 0.0 | 0.0 | 32.5 | 0.0 | 27.0 | 31.7 | 21.1 | 19.8 | 33.5 | 24.3 | 0.0 |
| Incr Delay (d2), s/veh | 11.5 | 0.0 | 0.0 | 4.2 | 0.0 | 0.8 | 15.7 | 0.6 | 0.1 | 13.9 | 1.5 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 10.3 | 0.0 | 0.0 | 2.1 | 0.0 | 1.5 | 4.0 | 1.7 | 0.1 | 2.5 | 2.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 34.7 | 0.0 | 0.0 | 36.8 | 0.0 | 27.8 | 47.4 | 21.7 | 19.8 | 47.4 | 25.8 | 0.0 |
| LnGrp LOS | C | A | | D | A | C | D | C | B | D | C | |
| Approach Vol, veh/h | | 543 | A | | 211 | | | 433 | | | 441 | A |
| Approach Delay, s/veh | | 34.7 | | | 32.7 | | | 32.4 | | | 31.3 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.0 | 24.3 | | 29.2 | 13.2 | 21.0 | | 10.9 | | | | |
| Change Period (Y+Rc), s | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | | | |
| Max Green Setting (Gmax), s | 8.0 | 20.0 | | 30.0 | 11.0 | 17.0 | | 16.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 6.6 | 6.0 | | 23.2 | 9.4 | 7.8 | | 6.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.2 | | 2.0 | 0.1 | 1.4 | | 0.6 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 32.9 |
| HCM 6th LOS | C |

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

GHD Inc

2235 Mercury Way
Suite 150
Santa Rosa CA 95407-5472

T: 1 707 523 1010   F: 1 707 527 8679   E: santarosa@ghd.com



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GHD

WHITCHURCH ENGINEERING
610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment I: SWMM Model Results Report

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)
--------------------------------------------------------------

WARNING 01: wet weather time step reduced to recording interval for Rain Gage Gage1

**********************         Volume         Volume
Rainfall Dependent I/I        acre-feet      10^6 gal
**********************        ---------      ---------
Sewershed Rainfall ......       573.791        186.978
RDII Produced ...........        26.640          8.681
RDII Ratio ..............         0.046


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... GPM
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Starting Date ............ 01/01/2010 00:00:00
Ending Date .............. 01/07/2010 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 30.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.005000 ft


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......       600.358         2.640
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........       340.359         1.497
Surface Runoff ...........       254.436         1.119
Final Storage ............         5.604         0.025
Continuity Error (%) .....        -0.007
```

```
  **************************        Volume         Volume
  Flow Routing Continuity        acre-feet      10^6 gal
  **************************     ---------     ---------
  Dry Weather Inflow .......        17.904         5.834
  Wet Weather Inflow .......       254.426        82.909
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............        26.622         8.675
  External Inflow ..........         0.000         0.000
  External Outflow .........       295.778        96.384
  Flooding Loss ............         0.010         0.003
  Evaporation Loss .........         0.000         0.000
  Exfiltration Loss ........         0.000         0.000
  Initial Stored Volume ....         0.001         0.000
  Final Stored Volume ......         0.318         0.104
  Continuity Error (%) .....         0.952


  *************************
  Highest Continuity Errors
  *************************
  Node 498 (17.55%)
  Node BB (12.92%)
  Node 497 (11.87%)
  Node CC (11.06%)
  Node TT (-7.32%)


  ***************************
  Time-Step Critical Elements
  ***************************
  Link 362 (81.95%)
  Link 204 (5.97%)
  Link 74 (5.77%)
  Link 97 (4.69%)
  Link 334 (1.23%)


  ********************************
  Highest Flow Instability Indexes
  ********************************
  All links are stable.


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :      0.50 sec
  Average Time Step           :      4.09 sec
  Maximum Time Step           :     30.00 sec
  Percent in Steady State     :     75.08
  Average Iterations per Step :      2.19
  Percent Not Converging      :      0.59


  ***************************
  Subcatchment Runoff Summary
  ***************************
```

| Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Total Runoff in | Tota Runof 10^6 ga |
|---|---|---|---|---|---|---|
| MS1 | 2.64 | 0.00 | 0.00 | 1.98 | 0.65 | 0.8 |
| MS2 | 2.64 | 0.00 | 0.00 | 1.85 | 0.78 | 1.7 |
| MS3 | 2.64 | 0.00 | 0.00 | 2.38 | 0.26 | 0.2 |
| MS4 | 2.64 | 0.00 | 0.00 | 2.11 | 0.52 | 1.1 |
| MS5 | 2.64 | 0.00 | 0.00 | 1.32 | 1.29 | 4.0 |
| MS6 | 2.64 | 0.00 | 0.00 | 0.79 | 1.81 | 3.8 |
| MS7 | 2.64 | 0.00 | 0.00 | 0.26 | 2.33 | 2.2 |
| MS8 | 2.64 | 0.00 | 0.00 | 1.72 | 0.90 | 2.8 |
| MS9 | 2.64 | 0.00 | 0.00 | 1.85 | 0.78 | 1.8 |
| MS10 | 2.64 | 0.00 | 0.00 | 1.58 | 1.03 | 0.6 |
| MS11 | 2.64 | 0.00 | 0.00 | 2.11 | 0.52 | 1.4 |
| MS12 | 2.64 | 0.00 | 0.00 | 0.53 | 2.07 | 3.1 |
| MS13 | 2.64 | 0.00 | 0.00 | 1.32 | 1.29 | 2.3 |
| MS14 | 2.64 | 0.00 | 0.00 | 0.79 | 1.81 | 5.0 |
| MS15 | 2.64 | 0.00 | 0.00 | 1.06 | 1.55 | 4.7 |
| MS16 | 2.64 | 0.00 | 0.00 | 2.11 | 0.52 | 1.4 |
| MS17 | 2.64 | 0.00 | 0.00 | 0.13 | 2.45 | 6.9 |
| MS18 | 2.64 | 0.00 | 0.00 | 1.32 | 1.29 | 2.0 |
| MS19 | 2.64 | 0.00 | 0.00 | 2.11 | 0.52 | 2.4 |
| MS20 | 2.64 | 0.00 | 0.00 | 2.51 | 0.13 | 0.2 |
| MS21 | 2.64 | 0.00 | 0.00 | 0.66 | 1.93 | 3.8 |
| MS22 | 2.64 | 0.00 | 0.00 | 2.38 | 0.26 | 0.3 |
| MS23 | 2.64 | 0.00 | 0.00 | 0.66 | 1.94 | 0.4 |
| MS24 | 2.64 | 0.00 | 0.00 | 1.85 | 0.78 | 2.3 |
| MS25 | 2.64 | 0.00 | 0.00 | 1.32 | 1.29 | 5.0 |
| MS26 | 2.64 | 0.00 | 0.00 | 1.98 | 0.65 | 1.0 |
| MS27 | 2.64 | 0.00 | 0.00 | 1.32 | 1.29 | 3.8 |
| MS28 | 2.64 | 0.00 | 0.00 | 1.58 | 1.03 | 3.2 |
| MS29 | 2.64 | 0.00 | 0.00 | 1.85 | 0.78 | 0.7 |
| MS30 | 2.64 | 0.00 | 0.00 | 1.06 | 1.55 | 4.1 |
| MS31 | 2.64 | 0.00 | 0.00 | 1.06 | 1.55 | 2.0 |
| MS32 | 2.64 | 0.00 | 0.00 | 0.79 | 1.81 | 3.5 |
| MS33 | 2.64 | 0.00 | 0.00 | 1.98 | 0.65 | 1.6 |
| MS34 | 2.64 | 0.00 | 0.00 | 1.85 | 0.78 | 1.2 |

******************
Node Depth Summary
******************

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr:min | Reported Max Depth Feet |
|---|---|---|---|---|---|---|
| 114 | JUNCTION | 0.06 | 0.13 | 160.27 | 3 08:10 | 0.13 |
| 130 | JUNCTION | 0.18 | 0.60 | 47.81 | 3 07:05 | 0.60 |
| 138 | JUNCTION | 0.17 | 0.27 | 40.57 | 3 14:04 | 0.27 |
| 146 | JUNCTION | 0.90 | 1.16 | 38.36 | 3 14:26 | 1.16 |
| 161 | JUNCTION | 0.04 | 0.10 | 308.10 | 3 05:05 | 0.10 |
| 162 | JUNCTION | 0.04 | 0.12 | 293.84 | 3 05:05 | 0.12 |
| 163 | JUNCTION | 0.05 | 0.15 | 274.58 | 3 05:05 | 0.15 |
| 164 | JUNCTION | 0.06 | 0.20 | 257.92 | 3 06:00 | 0.20 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 165 | JUNCTION | 0.03 | 0.12 | 243.66 | 3 | 06:00 | 0.12 |
| 166 | JUNCTION | 0.08 | 0.10 | 55.24 | 0 | 12:00 | 0.10 |
| 176 | JUNCTION | 0.07 | 0.21 | 224.93 | 3 | 06:01 | 0.21 |
| 181 | JUNCTION | 0.06 | 0.21 | 233.98 | 3 | 06:00 | 0.21 |
| 182 | JUNCTION | 0.11 | 0.29 | 194.29 | 3 | 06:10 | 0.29 |
| 190 | JUNCTION | 0.01 | 0.07 | 183.37 | 3 | 06:00 | 0.07 |
| 191 | JUNCTION | 0.04 | 0.05 | 61.92 | 1 | 11:22 | 0.05 |
| 193 | JUNCTION | 0.04 | 0.13 | 181.56 | 3 | 06:26 | 0.13 |
| 194 | JUNCTION | 0.05 | 0.14 | 180.10 | 3 | 07:00 | 0.14 |
| 195 | JUNCTION | 0.07 | 0.16 | 178.72 | 3 | 07:05 | 0.16 |
| 196 | JUNCTION | 0.07 | 0.18 | 178.28 | 3 | 08:15 | 0.18 |
| 199 | JUNCTION | 0.16 | 0.44 | 177.67 | 3 | 12:53 | 0.44 |
| 201 | JUNCTION | 0.02 | 0.06 | 175.20 | 3 | 05:05 | 0.06 |
| 202 | JUNCTION | 0.07 | 0.15 | 164.87 | 3 | 06:10 | 0.15 |
| 203 | JUNCTION | 0.06 | 0.13 | 163.25 | 3 | 06:35 | 0.13 |
| 211 | JUNCTION | 0.63 | 4.62 | 141.83 | 3 | 05:05 | 4.60 |
| 212 | JUNCTION | 0.04 | 0.12 | 200.16 | 3 | 06:26 | 0.12 |
| 213 | JUNCTION | 0.06 | 0.18 | 201.69 | 3 | 06:25 | 0.18 |
| 214 | JUNCTION | 0.04 | 0.14 | 202.84 | 3 | 06:10 | 0.14 |
| 215 | JUNCTION | 0.02 | 0.06 | 212.84 | 3 | 05:05 | 0.06 |
| 216 | JUNCTION | 0.04 | 0.13 | 186.03 | 3 | 06:35 | 0.13 |
| 217 | JUNCTION | 0.18 | 0.53 | 171.72 | 3 | 14:01 | 0.53 |
| 218 | JUNCTION | 0.13 | 0.37 | 169.68 | 3 | 14:01 | 0.37 |
| 219 | JUNCTION | 0.12 | 0.33 | 164.94 | 3 | 14:03 | 0.33 |
| 220 | JUNCTION | 0.22 | 0.60 | 155.85 | 3 | 14:05 | 0.59 |
| 221 | JUNCTION | 0.15 | 0.39 | 154.99 | 3 | 14:06 | 0.39 |
| 222 | JUNCTION | 0.16 | 0.41 | 153.38 | 3 | 14:07 | 0.41 |
| 223 | JUNCTION | 0.18 | 0.46 | 153.12 | 3 | 14:08 | 0.46 |
| 224 | JUNCTION | 0.21 | 0.52 | 151.23 | 3 | 14:10 | 0.52 |
| 225 | JUNCTION | 0.40 | 0.88 | 150.23 | 3 | 14:19 | 0.88 |
| 226 | JUNCTION | 0.21 | 0.49 | 149.79 | 3 | 14:40 | 0.49 |
| 227 | JUNCTION | 0.23 | 0.57 | 146.63 | 3 | 15:20 | 0.57 |
| 228 | JUNCTION | 0.27 | 0.62 | 144.83 | 3 | 15:57 | 0.62 |
| 229 | JUNCTION | 0.23 | 0.47 | 141.03 | 3 | 16:04 | 0.47 |
| 230 | JUNCTION | 0.19 | 0.37 | 137.63 | 3 | 16:09 | 0.37 |
| 231 | JUNCTION | 0.19 | 0.39 | 135.36 | 3 | 16:11 | 0.39 |
| 232 | JUNCTION | 0.16 | 0.32 | 129.83 | 3 | 16:17 | 0.32 |
| 233 | JUNCTION | 0.18 | 0.34 | 118.85 | 3 | 16:19 | 0.34 |
| 234 | JUNCTION | 0.29 | 0.58 | 100.78 | 3 | 16:36 | 0.58 |
| 235 | JUNCTION | 0.17 | 0.32 | 116.71 | 3 | 16:24 | 0.32 |
| 236 | JUNCTION | 0.32 | 0.64 | 99.59 | 3 | 16:46 | 0.64 |
| 237 | JUNCTION | 0.15 | 0.27 | 97.48 | 3 | 16:52 | 0.27 |
| 238 | JUNCTION | 0.24 | 0.46 | 37.66 | 3 | 17:05 | 0.46 |
| 239 | JUNCTION | 0.37 | 0.65 | 36.65 | 3 | 17:18 | 0.65 |
| 240 | JUNCTION | 0.13 | 0.29 | 49.04 | 3 | 14:01 | 0.29 |
| 241 | JUNCTION | 0.03 | 0.09 | 230.94 | 3 | 06:03 | 0.09 |
| 242 | JUNCTION | 0.03 | 0.08 | 229.94 | 3 | 06:15 | 0.08 |
| 243 | JUNCTION | 0.03 | 0.09 | 220.14 | 3 | 06:35 | 0.09 |
| 244 | JUNCTION | 0.04 | 0.09 | 208.27 | 3 | 06:45 | 0.09 |
| 245 | JUNCTION | 0.04 | 0.10 | 196.74 | 3 | 07:00 | 0.10 |
| 246 | JUNCTION | 0.04 | 0.09 | 183.92 | 3 | 07:00 | 0.09 |
| 247 | JUNCTION | 0.08 | 0.20 | 176.90 | 3 | 10:05 | 0.20 |
| 248 | JUNCTION | 0.06 | 0.14 | 173.99 | 3 | 08:48 | 0.14 |
| 249 | JUNCTION | 0.13 | 0.29 | 169.30 | 3 | 12:10 | 0.29 |
| 250 | JUNCTION | 0.10 | 0.22 | 168.32 | 3 | 14:00 | 0.22 |
| 251 | JUNCTION | 0.09 | 0.20 | 167.32 | 3 | 13:29 | 0.20 |
| 252 | JUNCTION | 0.10 | 0.20 | 159.20 | 3 | 14:01 | 0.20 |
| 253 | JUNCTION | 0.05 | 0.10 | 178.74 | 3 | 06:26 | 0.10 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 254 | JUNCTION | 0.04 | 0.08 | 193.64 | 3 | 06:15 | 0.08 |
| 255 | JUNCTION | 0.04 | 0.07 | 210.07 | 3 | 06:10 | 0.07 |
| 256 | JUNCTION | 0.09 | 0.11 | 49.38 | 0 | 14:00 | 0.11 |
| 257 | JUNCTION | 0.03 | 0.06 | 217.69 | 3 | 06:03 | 0.06 |
| 266 | JUNCTION | 0.06 | 0.13 | 170.12 | 3 | 06:25 | 0.13 |
| 267 | JUNCTION | 0.06 | 0.13 | 161.72 | 3 | 06:26 | 0.13 |
| 268 | JUNCTION | 0.05 | 0.10 | 185.21 | 3 | 06:10 | 0.10 |
| 269 | JUNCTION | 0.04 | 0.09 | 196.76 | 3 | 06:05 | 0.09 |
| 270 | JUNCTION | 0.04 | 0.06 | 208.12 | 3 | 06:03 | 0.06 |
| 274 | JUNCTION | 0.05 | 0.12 | 206.36 | 3 | 08:00 | 0.12 |
| 275 | JUNCTION | 0.04 | 0.09 | 226.18 | 3 | 06:55 | 0.09 |
| 276 | JUNCTION | 0.06 | 0.14 | 227.35 | 3 | 07:05 | 0.14 |
| 277 | JUNCTION | 0.02 | 0.11 | 228.73 | 3 | 08:48 | 0.11 |
| 280 | JUNCTION | 0.05 | 0.10 | 194.49 | 3 | 07:05 | 0.10 |
| 282 | JUNCTION | 0.09 | 0.19 | 181.48 | 3 | 07:05 | 0.19 |
| 284 | JUNCTION | 0.06 | 0.12 | 180.46 | 3 | 07:05 | 0.12 |
| 286 | JUNCTION | 0.02 | 0.03 | 75.82 | 2 | 11:22 | 0.03 |
| 289 | JUNCTION | 0.22 | 0.47 | 40.54 | 3 | 14:29 | 0.47 |
| 293 | JUNCTION | 0.17 | 0.34 | 143.13 | 3 | 16:01 | 0.34 |
| 294 | JUNCTION | 0.02 | 0.13 | 145.11 | 3 | 06:05 | 0.13 |
| 295 | JUNCTION | 0.02 | 0.11 | 146.69 | 3 | 06:00 | 0.11 |
| 309 | JUNCTION | 0.20 | 0.42 | 39.25 | 3 | 15:07 | 0.42 |
| 310 | JUNCTION | 0.24 | 0.52 | 38.48 | 3 | 15:21 | 0.52 |
| 311 | JUNCTION | 0.23 | 0.26 | 85.15 | 0 | 11:22 | 0.26 |
| 312 | JUNCTION | 0.25 | 0.46 | 38.26 | 3 | 15:06 | 0.46 |
| 313 | JUNCTION | 0.30 | 0.54 | 37.73 | 3 | 15:57 | 0.54 |
| 315 | JUNCTION | 0.30 | 0.64 | 36.17 | 3 | 15:00 | 0.64 |
| 316 | JUNCTION | 0.21 | 0.82 | 40.78 | 3 | 08:15 | 0.82 |
| 334 | JUNCTION | 0.20 | 0.22 | 36.92 | 3 | 16:05 | 0.22 |
| 335 | JUNCTION | 0.20 | 0.22 | 39.32 | 3 | 15:49 | 0.22 |
| 336 | JUNCTION | 0.20 | 0.23 | 41.43 | 3 | 15:16 | 0.23 |
| 353 | JUNCTION | 0.05 | 0.06 | 124.17 | 4 | 11:11 | 0.06 |
| 354 | JUNCTION | 0.07 | 0.08 | 122.35 | 4 | 11:11 | 0.08 |
| 355 | JUNCTION | 0.02 | 0.03 | 125.40 | 4 | 11:10 | 0.03 |
| 358 | JUNCTION | 0.03 | 0.04 | 121.81 | 4 | 11:11 | 0.04 |
| 359 | JUNCTION | 0.07 | 0.10 | 119.38 | 4 | 11:09 | 0.10 |
| 360 | JUNCTION | 0.02 | 0.04 | 122.06 | 4 | 08:20 | 0.04 |
| 361 | JUNCTION | 0.02 | 0.04 | 123.83 | 4 | 08:17 | 0.04 |
| 364 | JUNCTION | 0.01 | 0.03 | 125.52 | 4 | 08:15 | 0.03 |
| 371 | JUNCTION | 0.14 | 0.26 | 50.61 | 3 | 17:01 | 0.26 |
| 373 | JUNCTION | 0.02 | 0.03 | 143.46 | 4 | 11:10 | 0.03 |
| 374 | JUNCTION | 0.05 | 0.06 | 128.38 | 4 | 11:11 | 0.06 |
| 375 | JUNCTION | 0.06 | 0.08 | 126.42 | 4 | 11:11 | 0.08 |
| 377 | JUNCTION | 0.07 | 0.09 | 126.10 | 4 | 11:11 | 0.09 |
| 378 | JUNCTION | 0.12 | 0.16 | 123.88 | 4 | 12:02 | 0.16 |
| 379 | JUNCTION | 0.08 | 0.10 | 122.98 | 4 | 11:11 | 0.10 |
| 381 | JUNCTION | 0.08 | 0.11 | 119.41 | 4 | 12:00 | 0.11 |
| 382 | JUNCTION | 0.12 | 0.16 | 112.02 | 4 | 12:01 | 0.16 |
| 383 | JUNCTION | 0.10 | 0.14 | 111.30 | 4 | 12:05 | 0.14 |
| 384 | JUNCTION | 0.11 | 0.15 | 109.61 | 4 | 15:00 | 0.15 |
| 385 | JUNCTION | 0.11 | 0.15 | 108.18 | 4 | 15:00 | 0.15 |
| 386 | JUNCTION | 0.12 | 0.17 | 106.77 | 4 | 14:00 | 0.17 |
| 387 | JUNCTION | 0.11 | 0.15 | 104.73 | 4 | 13:00 | 0.15 |
| 388 | JUNCTION | 0.18 | 0.33 | 67.73 | 3 | 16:58 | 0.33 |
| 389 | JUNCTION | 0.08 | 0.11 | 108.32 | 4 | 11:11 | 0.11 |
| 390 | JUNCTION | 0.06 | 0.09 | 115.49 | 4 | 11:11 | 0.09 |
| 391 | JUNCTION | 0.07 | 0.09 | 118.56 | 4 | 11:10 | 0.09 |
| 392 | JUNCTION | 0.09 | 0.11 | 55.62 | 3 | 14:04 | 0.11 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 393 | JUNCTION | 0.52 | 0.85 | 37.76 | 3 | 18:10 | 0.85 |
| 403 | JUNCTION | 0.12 | 0.16 | 80.17 | 4 | 12:05 | 0.16 |
| 409 | JUNCTION | 0.13 | 0.18 | 92.46 | 4 | 13:00 | 0.18 |
| 411 | JUNCTION | 0.18 | 0.25 | 94.65 | 4 | 13:00 | 0.25 |
| 414 | JUNCTION | 0.17 | 0.23 | 49.33 | 4 | 13:00 | 0.23 |
| 415 | JUNCTION | 0.21 | 0.30 | 42.05 | 4 | 15:00 | 0.30 |
| 416 | JUNCTION | 0.17 | 0.23 | 39.85 | 4 | 15:00 | 0.23 |
| 418 | JUNCTION | 0.29 | 0.42 | 99.05 | 4 | 13:00 | 0.42 |
| 419 | JUNCTION | 0.13 | 0.19 | 100.29 | 4 | 12:00 | 0.19 |
| 420 | JUNCTION | 0.14 | 0.19 | 101.12 | 4 | 11:11 | 0.19 |
| 428 | JUNCTION | 0.16 | 0.23 | 98.40 | 4 | 12:05 | 0.23 |
| 432 | JUNCTION | 0.13 | 0.18 | 102.62 | 4 | 11:11 | 0.18 |
| 439 | JUNCTION | 0.02 | 0.08 | 36.09 | 3 | 06:05 | 0.08 |
| 440 | JUNCTION | 0.13 | 0.19 | 103.69 | 4 | 11:11 | 0.19 |
| 444 | JUNCTION | 0.13 | 0.18 | 104.42 | 4 | 11:11 | 0.18 |
| 447 | JUNCTION | 0.11 | 0.16 | 105.13 | 4 | 11:11 | 0.16 |
| 450 | JUNCTION | 0.12 | 0.18 | 105.67 | 4 | 11:11 | 0.18 |
| 453 | JUNCTION | 0.10 | 0.14 | 106.54 | 4 | 11:11 | 0.14 |
| 454 | JUNCTION | 0.09 | 0.13 | 108.37 | 4 | 11:11 | 0.13 |
| 456 | JUNCTION | 0.09 | 0.13 | 109.29 | 4 | 11:11 | 0.13 |
| 459 | JUNCTION | 0.09 | 0.13 | 110.82 | 4 | 11:11 | 0.13 |
| 474 | JUNCTION | 0.01 | 0.02 | 164.06 | 4 | 11:05 | 0.02 |
| 475 | JUNCTION | 0.02 | 0.03 | 156.42 | 4 | 11:10 | 0.03 |
| 476 | JUNCTION | 0.05 | 0.07 | 141.46 | 4 | 11:11 | 0.07 |
| 478 | JUNCTION | 0.04 | 0.05 | 140.89 | 4 | 11:11 | 0.05 |
| 479 | JUNCTION | 0.08 | 0.10 | 132.94 | 4 | 11:11 | 0.10 |
| 480 | JUNCTION | 0.05 | 0.06 | 134.30 | 4 | 11:11 | 0.06 |
| 481 | JUNCTION | 0.06 | 0.08 | 131.34 | 4 | 12:00 | 0.08 |
| 482 | JUNCTION | 0.09 | 0.12 | 126.05 | 4 | 12:00 | 0.12 |
| 487 | JUNCTION | 0.10 | 0.13 | 35.45 | 3 | 13:00 | 0.13 |
| 489 | JUNCTION | 0.10 | 0.14 | 34.54 | 3 | 06:35 | 0.14 |
| 490 | JUNCTION | 0.10 | 0.15 | 33.58 | 3 | 06:35 | 0.15 |
| 493 | JUNCTION | 0.07 | 0.08 | 57.41 | 3 | 14:00 | 0.08 |
| 494 | JUNCTION | 0.10 | 0.11 | 56.21 | 3 | 08:15 | 0.11 |
| 495 | JUNCTION | 10.26 | 18.16 | 50.16 | 3 | 17:34 | 18.15 |
| 496 | JUNCTION | 0.09 | 0.10 | 55.27 | 3 | 14:08 | 0.10 |
| 497 | JUNCTION | 0.01 | 0.04 | 58.09 | 3 | 12:00 | 0.04 |
| 498 | JUNCTION | 0.01 | 0.08 | 58.34 | 3 | 10:45 | 0.08 |
| 500 | JUNCTION | 0.07 | 0.11 | 34.54 | 3 | 06:25 | 0.11 |
| 502 | JUNCTION | 0.06 | 0.06 | 58.16 | 3 | 13:00 | 0.06 |
| 515 | JUNCTION | 0.00 | 0.03 | 60.87 | 3 | 06:00 | 0.03 |
| 518 | JUNCTION | 0.09 | 0.11 | 54.30 | 3 | 14:44 | 0.11 |
| 521 | JUNCTION | 0.15 | 0.16 | 57.10 | 0 | 13:00 | 0.16 |
| 522 | JUNCTION | 0.20 | 0.22 | 52.04 | 3 | 06:35 | 0.22 |
| 523 | JUNCTION | 0.10 | 0.14 | 52.16 | 3 | 06:26 | 0.14 |
| 524 | JUNCTION | 0.07 | 0.09 | 35.37 | 3 | 06:05 | 0.09 |
| 525 | JUNCTION | 0.21 | 0.23 | 81.67 | 0 | 11:22 | 0.23 |
| 526 | JUNCTION | 0.18 | 0.21 | 92.48 | 0 | 11:22 | 0.21 |
| 527 | JUNCTION | 0.20 | 0.22 | 81.08 | 0 | 11:22 | 0.22 |
| 528 | JUNCTION | 0.20 | 0.22 | 80.52 | 1 | 12:00 | 0.22 |
| 529 | JUNCTION | 0.18 | 0.20 | 79.32 | 1 | 13:00 | 0.20 |
| 530 | JUNCTION | 0.12 | 0.13 | 77.74 | 0 | 13:00 | 0.13 |
| 531 | JUNCTION | 0.13 | 0.14 | 67.65 | 2 | 13:00 | 0.14 |
| 534 | JUNCTION | 0.09 | 0.11 | 53.41 | 3 | 16:14 | 0.11 |
| 535 | JUNCTION | 0.10 | 0.12 | 52.63 | 3 | 16:42 | 0.12 |
| 537 | JUNCTION | 0.04 | 0.05 | 51.85 | 3 | 13:00 | 0.05 |
| 538 | JUNCTION | 0.04 | 0.04 | 54.33 | 0 | 11:22 | 0.04 |
| 539 | JUNCTION | 0.04 | 0.04 | 53.91 | 3 | 07:05 | 0.04 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 540 | JUNCTION | 0.05 | 0.05 | 50.47 | 3 | 14:02 | 0.05 |
| 541 | JUNCTION | 0.23 | 0.25 | 48.57 | 3 | 14:06 | 0.25 |
| 542 | JUNCTION | 0.21 | 0.23 | 46.99 | 3 | 14:07 | 0.23 |
| 543 | JUNCTION | 0.21 | 0.23 | 46.10 | 3 | 14:09 | 0.23 |
| 544 | JUNCTION | 0.22 | 0.25 | 45.36 | 3 | 14:17 | 0.25 |
| 547 | JUNCTION | 0.22 | 0.25 | 43.62 | 3 | 14:34 | 0.25 |
| 548 | JUNCTION | 0.24 | 0.27 | 42.59 | 3 | 14:56 | 0.27 |
| 557 | JUNCTION | 0.15 | 0.17 | 53.60 | 3 | 16:00 | 0.17 |
| 560 | JUNCTION | 0.34 | 0.60 | 34.94 | 3 | 17:31 | 0.60 |
| 561 | JUNCTION | 0.21 | 0.29 | 32.71 | 3 | 17:28 | 0.29 |
| 562 | JUNCTION | 0.00 | 0.00 | 31.62 | 0 | 00:00 | 0.00 |
| 563 | JUNCTION | 0.25 | 0.28 | 33.62 | 3 | 16:22 | 0.28 |
| 564 | JUNCTION | 0.23 | 0.26 | 34.86 | 3 | 16:16 | 0.26 |
| 575 | JUNCTION | 0.09 | 0.18 | 51.02 | 3 | 04:10 | 0.18 |
| 576 | JUNCTION | 0.08 | 0.14 | 52.24 | 3 | 06:03 | 0.14 |
| 577 | JUNCTION | 0.21 | 0.35 | 50.58 | 3 | 06:10 | 0.35 |
| 578 | JUNCTION | 0.23 | 0.40 | 50.30 | 3 | 06:10 | 0.40 |
| 580 | JUNCTION | 0.25 | 0.41 | 49.82 | 3 | 06:25 | 0.40 |
| 581 | JUNCTION | 0.19 | 0.31 | 49.37 | 3 | 06:35 | 0.31 |
| 582 | JUNCTION | 0.22 | 0.36 | 49.03 | 3 | 10:10 | 0.36 |
| 583 | JUNCTION | 0.16 | 0.25 | 48.32 | 3 | 12:06 | 0.25 |
| 584 | JUNCTION | 0.20 | 0.32 | 47.81 | 3 | 14:00 | 0.32 |
| 593 | JUNCTION | 0.06 | 0.11 | 59.62 | 3 | 04:10 | 0.11 |
| 604 | JUNCTION | 0.10 | 0.25 | 175.24 | 3 | 12:53 | 0.25 |
| 612 | JUNCTION | 0.45 | 1.41 | 37.69 | 3 | 06:45 | 1.41 |
| 614 | JUNCTION | 0.34 | 0.77 | 41.54 | 3 | 08:15 | 0.77 |
| 618 | JUNCTION | 0.09 | 0.20 | 162.38 | 3 | 08:00 | 0.20 |
| 619 | JUNCTION | 0.11 | 0.23 | 163.44 | 3 | 08:00 | 0.23 |
| 620 | JUNCTION | 0.07 | 0.15 | 158.04 | 3 | 08:00 | 0.15 |
| 622 | JUNCTION | 0.01 | 0.07 | 239.20 | 3 | 06:25 | 0.07 |
| 623 | JUNCTION | 0.02 | 0.08 | 242.23 | 3 | 06:15 | 0.08 |
| 624 | JUNCTION | 0.51 | 0.90 | 42.23 | 3 | 07:05 | 0.90 |
| 625 | JUNCTION | 0.48 | 0.79 | 42.55 | 3 | 08:00 | 0.79 |
| 633 | JUNCTION | 0.10 | 0.21 | 47.57 | 3 | 05:05 | 0.21 |
| 638 | JUNCTION | 0.15 | 0.34 | 44.27 | 3 | 06:10 | 0.34 |
| 639 | JUNCTION | 0.53 | 0.81 | 42.81 | 3 | 16:44 | 0.81 |
| 640 | JUNCTION | 0.16 | 0.30 | 43.15 | 3 | 06:15 | 0.30 |
| 642 | JUNCTION | 0.20 | 0.36 | 42.96 | 3 | 06:35 | 0.36 |
| 644 | JUNCTION | 0.14 | 0.26 | 42.21 | 3 | 06:55 | 0.26 |
| 645 | JUNCTION | 0.21 | 0.36 | 42.01 | 3 | 12:39 | 0.36 |
| 646 | JUNCTION | 0.31 | 0.48 | 40.91 | 3 | 14:03 | 0.48 |
| 654 | JUNCTION | 0.15 | 0.44 | 50.81 | 3 | 14:01 | 0.44 |
| 655 | JUNCTION | 0.18 | 0.45 | 43.82 | 3 | 14:04 | 0.45 |
| 656 | JUNCTION | 0.21 | 0.53 | 43.73 | 3 | 14:05 | 0.53 |
| 657 | JUNCTION | 0.21 | 0.43 | 43.05 | 3 | 14:07 | 0.43 |
| 658 | JUNCTION | 0.22 | 0.46 | 42.58 | 3 | 14:07 | 0.46 |
| 659 | JUNCTION | 0.21 | 0.45 | 42.01 | 3 | 14:10 | 0.45 |
| 661 | JUNCTION | 0.24 | 0.51 | 39.81 | 3 | 14:49 | 0.51 |
| 662 | JUNCTION | 0.18 | 0.29 | 38.99 | 3 | 14:06 | 0.29 |
| 665 | JUNCTION | 0.12 | 0.15 | 51.25 | 1 | 12:00 | 0.15 |
| 667 | JUNCTION | 0.11 | 0.26 | 64.86 | 3 | 12:06 | 0.26 |
| 668 | JUNCTION | 0.86 | 1.25 | 49.31 | 3 | 13:00 | 1.25 |
| 669 | JUNCTION | 0.17 | 0.40 | 45.50 | 3 | 14:03 | 0.40 |
| 680 | JUNCTION | 0.24 | 0.86 | 50.25 | 3 | 07:05 | 0.86 |
| 684 | JUNCTION | 0.21 | 0.73 | 51.36 | 3 | 07:05 | 0.73 |
| 689 | JUNCTION | 0.26 | 0.94 | 37.14 | 3 | 10:45 | 0.94 |
| 690 | JUNCTION | 0.43 | 1.25 | 37.15 | 3 | 14:00 | 1.25 |
| 691 | JUNCTION | 0.28 | 0.64 | 37.24 | 3 | 14:01 | 0.64 |

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|---|---|---|---|---|---|---|---|
| 692 | JUNCTION | 0.46 | 1.51 | 38.11 | 3 | 12:18 | 1.51 |
| 693 | JUNCTION | 0.27 | 0.57 | 37.25 | 3 | 14:01 | 0.56 |
| 694 | JUNCTION | 0.81 | 3.38 | 39.78 | 3 | 05:05 | 3.38 |
| 695 | JUNCTION | 0.31 | 1.11 | 38.86 | 3 | 10:00 | 1.11 |
| 696 | JUNCTION | 0.21 | 0.34 | 38.29 | 3 | 16:24 | 0.34 |
| 697 | JUNCTION | 0.30 | 1.06 | 40.16 | 3 | 09:00 | 1.06 |
| 698 | JUNCTION | 0.21 | 0.33 | 39.62 | 3 | 16:02 | 0.33 |
| 705 | JUNCTION | 0.14 | 0.48 | 53.98 | 3 | 07:05 | 0.48 |
| 706 | JUNCTION | 0.15 | 0.51 | 55.27 | 3 | 06:55 | 0.51 |
| 707 | JUNCTION | 0.12 | 0.37 | 57.62 | 3 | 06:25 | 0.37 |
| 715 | JUNCTION | 0.23 | 0.37 | 46.00 | 3 | 14:03 | 0.37 |
| 716 | JUNCTION | 0.24 | 0.38 | 45.49 | 3 | 14:04 | 0.38 |
| 717 | JUNCTION | 0.14 | 0.49 | 43.05 | 3 | 06:35 | 0.49 |
| 719 | JUNCTION | 0.22 | 0.35 | 44.33 | 3 | 14:07 | 0.35 |
| 720 | JUNCTION | 0.21 | 0.34 | 46.45 | 3 | 14:02 | 0.34 |
| 721 | JUNCTION | 0.20 | 0.32 | 46.75 | 3 | 14:01 | 0.32 |
| 722 | JUNCTION | 0.27 | 0.43 | 47.16 | 3 | 14:01 | 0.43 |
| 724 | JUNCTION | 0.04 | 0.06 | 63.02 | 0 | 11:22 | 0.06 |
| 725 | JUNCTION | 0.02 | 0.02 | 84.05 | 1 | 11:22 | 0.02 |
| 727 | JUNCTION | 0.05 | 0.07 | 60.57 | 0 | 12:00 | 0.07 |
| 728 | JUNCTION | 0.15 | 0.55 | 43.65 | 3 | 06:15 | 0.55 |
| 729 | JUNCTION | 0.04 | 0.05 | 62.24 | 1 | 11:22 | 0.05 |
| 730 | JUNCTION | 0.05 | 0.07 | 58.31 | 1 | 11:21 | 0.07 |
| 731 | JUNCTION | 0.10 | 0.34 | 66.72 | 3 | 06:45 | 0.34 |
| 732 | JUNCTION | 0.15 | 0.56 | 61.00 | 3 | 06:55 | 0.56 |
| 733 | JUNCTION | 0.14 | 0.49 | 62.29 | 3 | 06:50 | 0.49 |
| 734 | JUNCTION | 0.13 | 0.46 | 64.02 | 3 | 06:50 | 0.46 |
| 735 | JUNCTION | 0.13 | 0.46 | 58.37 | 3 | 06:55 | 0.46 |
| 740 | JUNCTION | 0.33 | 0.61 | 44.31 | 3 | 15:57 | 0.61 |
| 742 | JUNCTION | 0.03 | 0.11 | 77.31 | 3 | 06:03 | 0.11 |
| 743 | JUNCTION | 0.08 | 0.27 | 65.34 | 3 | 06:03 | 0.27 |
| 744 | JUNCTION | 0.06 | 0.18 | 66.92 | 3 | 06:05 | 0.18 |
| 745 | JUNCTION | 0.43 | 0.79 | 44.67 | 3 | 14:35 | 0.79 |
| 746 | JUNCTION | 0.04 | 0.11 | 70.27 | 3 | 06:03 | 0.11 |
| 747 | JUNCTION | 0.07 | 0.21 | 68.61 | 3 | 05:04 | 0.21 |
| 751 | JUNCTION | 0.07 | 0.17 | 327.85 | 3 | 07:05 | 0.17 |
| 757 | JUNCTION | 0.27 | 0.48 | 45.35 | 3 | 14:11 | 0.48 |
| 765 | JUNCTION | 0.09 | 0.19 | 311.95 | 3 | 08:48 | 0.19 |
| 767 | JUNCTION | 0.07 | 0.16 | 298.89 | 3 | 09:00 | 0.16 |
| 768 | JUNCTION | 0.06 | 0.14 | 278.57 | 3 | 09:00 | 0.14 |
| 769 | JUNCTION | 0.07 | 0.17 | 235.83 | 3 | 09:00 | 0.17 |
| 770 | JUNCTION | 0.08 | 0.18 | 211.60 | 3 | 09:00 | 0.18 |
| 771 | JUNCTION | 0.12 | 0.27 | 181.14 | 3 | 10:00 | 0.27 |
| 772 | JUNCTION | 0.07 | 0.16 | 177.29 | 3 | 09:00 | 0.16 |
| 773 | JUNCTION | 0.09 | 0.21 | 137.31 | 3 | 08:48 | 0.21 |
| 774 | JUNCTION | 0.09 | 0.22 | 120.48 | 3 | 10:05 | 0.22 |
| 775 | JUNCTION | 0.10 | 0.23 | 100.45 | 3 | 10:25 | 0.23 |
| 776 | JUNCTION | 0.14 | 0.37 | 82.66 | 3 | 11:35 | 0.37 |
| 777 | JUNCTION | 0.11 | 0.25 | 79.59 | 3 | 11:35 | 0.25 |
| 800 | JUNCTION | 0.31 | 0.59 | 46.51 | 3 | 14:06 | 0.58 |
| 801 | JUNCTION | 0.25 | 0.44 | 46.86 | 3 | 14:05 | 0.44 |
| 802 | JUNCTION | 0.23 | 0.41 | 48.60 | 3 | 14:04 | 0.41 |
| 803 | JUNCTION | 0.22 | 0.40 | 49.21 | 3 | 14:03 | 0.40 |
| 804 | JUNCTION | 0.22 | 0.40 | 50.46 | 3 | 14:02 | 0.40 |
| 809 | JUNCTION | 0.05 | 0.15 | 102.11 | 3 | 06:35 | 0.15 |
| 810 | JUNCTION | 0.13 | 0.18 | 53.36 | 3 | 06:05 | 0.18 |
| 811 | JUNCTION | 0.13 | 0.18 | 54.63 | 3 | 06:05 | 0.18 |
| 813 | JUNCTION | 0.04 | 0.10 | 60.69 | 3 | 06:03 | 0.10 |

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|---|---|---|---|---|---|---|---|
| 814 | JUNCTION | 0.11 | 0.15 | 56.98 | 3 | 06:05 | 0.15 |
| 815 | JUNCTION | 0.49 | 1.35 | 37.15 | 3 | 08:05 | 1.35 |
| 816 | JUNCTION | 0.53 | 1.42 | 37.07 | 3 | 12:06 | 1.42 |
| 817 | JUNCTION | 0.69 | 1.50 | 36.91 | 3 | 12:00 | 1.50 |
| 818 | JUNCTION | 0.21 | 0.39 | 52.13 | 3 | 14:00 | 0.39 |
| 819 | JUNCTION | 0.11 | 0.15 | 54.21 | 3 | 14:55 | 0.15 |
| 834 | JUNCTION | 0.37 | 0.89 | 36.27 | 3 | 14:00 | 0.89 |
| 835 | JUNCTION | 1.02 | 1.51 | 36.12 | 3 | 14:04 | 1.50 |
| 836 | JUNCTION | 0.39 | 0.60 | 36.76 | 3 | 18:13 | 0.60 |
| 838 | JUNCTION | 0.54 | 1.01 | 36.09 | 3 | 14:01 | 1.01 |
| 840 | JUNCTION | 0.45 | 0.75 | 38.75 | 3 | 18:06 | 0.75 |
| 853 | JUNCTION | 0.02 | 0.06 | 232.49 | 3 | 05:05 | 0.06 |
| 855 | JUNCTION | 0.21 | 0.52 | 146.82 | 3 | 15:01 | 0.52 |
| 859 | JUNCTION | 0.07 | 0.10 | 120.43 | 4 | 11:11 | 0.10 |
| 860 | JUNCTION | 0.12 | 0.17 | 121.38 | 4 | 12:00 | 0.17 |
| 861 | JUNCTION | 0.04 | 0.07 | 129.00 | 4 | 10:10 | 0.07 |
| 862 | JUNCTION | 0.04 | 0.06 | 131.99 | 4 | 11:05 | 0.06 |
| 863 | JUNCTION | 0.07 | 0.09 | 132.51 | 4 | 11:05 | 0.09 |
| 892 | JUNCTION | 0.11 | 0.31 | 183.81 | 3 | 07:05 | 0.31 |
| 904 | JUNCTION | 0.23 | 0.26 | 51.89 | 3 | 06:45 | 0.26 |
| 906 | JUNCTION | 0.34 | 0.39 | 51.06 | 3 | 13:14 | 0.39 |
| 907 | JUNCTION | 0.40 | 0.45 | 50.85 | 3 | 14:02 | 0.44 |
| 908 | JUNCTION | 0.22 | 0.24 | 50.24 | 3 | 14:04 | 0.24 |
| 909 | JUNCTION | 0.21 | 0.24 | 49.44 | 3 | 14:05 | 0.24 |
| 910 | JUNCTION | 0.22 | 0.35 | 44.89 | 3 | 14:06 | 0.35 |
| A | JUNCTION | 0.17 | 0.64 | 54.94 | 3 | 07:05 | 0.64 |
| AA | JUNCTION | 0.11 | 0.26 | 64.66 | 3 | 11:35 | 0.26 |
| B | JUNCTION | 0.05 | 0.07 | 57.17 | 1 | 14:00 | 0.07 |
| BB | JUNCTION | 0.12 | 0.21 | 55.21 | 3 | 16:17 | 0.21 |
| C | JUNCTION | 0.06 | 0.09 | 56.69 | 3 | 05:05 | 0.09 |
| CC | JUNCTION | 0.09 | 0.17 | 56.17 | 3 | 13:29 | 0.17 |
| D | JUNCTION | 0.09 | 0.11 | 53.31 | 2 | 14:00 | 0.11 |
| DD | JUNCTION | 0.04 | 0.08 | 56.58 | 3 | 06:25 | 0.08 |
| E | JUNCTION | 0.37 | 1.34 | 40.84 | 3 | 08:15 | 1.34 |
| EE | JUNCTION | 0.03 | 0.05 | 57.05 | 3 | 05:05 | 0.05 |
| F | JUNCTION | 0.46 | 1.32 | 37.02 | 3 | 10:00 | 1.32 |
| FF | JUNCTION | 0.02 | 0.02 | 57.52 | 4 | 12:05 | 0.02 |
| GG | JUNCTION | 0.03 | 0.03 | 56.03 | 0 | 11:22 | 0.03 |
| H | JUNCTION | 0.50 | 0.96 | 35.96 | 3 | 14:01 | 0.96 |
| J | JUNCTION | 0.11 | 0.36 | 60.76 | 3 | 06:15 | 0.36 |
| K | JUNCTION | 0.10 | 0.33 | 64.63 | 3 | 06:10 | 0.33 |
| KK | JUNCTION | 0.41 | 0.61 | 32.71 | 3 | 17:35 | 0.61 |
| L | JUNCTION | 0.23 | 0.36 | 40.57 | 3 | 15:26 | 0.36 |
| M | JUNCTION | 0.21 | 0.34 | 41.64 | 3 | 14:57 | 0.34 |
| MM | JUNCTION | 7.24 | 21.00 | 56.00 | 0 | 02:12 | 15.13 |
| N | JUNCTION | 0.21 | 0.34 | 42.80 | 3 | 14:18 | 0.34 |
| NN | JUNCTION | 0.20 | 0.32 | 39.72 | 3 | 14:05 | 0.32 |
| O | JUNCTION | 0.21 | 0.34 | 43.91 | 3 | 14:08 | 0.34 |
| P | JUNCTION | 0.16 | 0.24 | 51.03 | 3 | 06:05 | 0.24 |
| PP | JUNCTION | 0.11 | 0.30 | 189.20 | 3 | 06:25 | 0.30 |
| Q | JUNCTION | 0.05 | 0.08 | 180.08 | 3 | 10:25 | 0.08 |
| QQ | JUNCTION | 0.06 | 0.19 | 213.83 | 3 | 06:02 | 0.19 |
| R | JUNCTION | 0.05 | 0.10 | 169.70 | 3 | 08:00 | 0.10 |
| RR | JUNCTION | 0.03 | 0.10 | 182.60 | 3 | 06:10 | 0.10 |
| S | JUNCTION | 0.08 | 0.15 | 148.75 | 3 | 10:00 | 0.15 |
| SS | JUNCTION | 0.11 | 0.13 | 52.83 | 3 | 16:23 | 0.13 |
| T | JUNCTION | 0.08 | 0.18 | 138.38 | 3 | 08:48 | 0.18 |
| TT | JUNCTION | 0.01 | 0.03 | 59.83 | 3 | 06:10 | 0.03 |

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|---|---|---|---|---|---|---|---|
| U | JUNCTION | 0.09 | 0.19 | 130.39 | 3 | 09:00 | 0.19 |
| V | JUNCTION | 0.09 | 0.19 | 124.29 | 3 | 08:15 | 0.19 |
| W | JUNCTION | 0.10 | 0.22 | 121.52 | 3 | 10:00 | 0.22 |
| X | JUNCTION | 0.10 | 0.23 | 106.43 | 3 | 10:25 | 0.23 |
| Y | JUNCTION | 0.11 | 0.24 | 95.14 | 3 | 10:39 | 0.24 |
| Z | JUNCTION | 0.11 | 0.25 | 85.85 | 3 | 12:00 | 0.25 |
| 441 | JUNCTION | 0.13 | 0.18 | 103.21 | 4 | 11:11 | 0.18 |
| UU | JUNCTION | 12.95 | 20.00 | 55.00 | 3 | 04:00 | 19.87 |
| JJ | JUNCTION | 0.00 | 0.00 | 35.00 | 0 | 00:00 | 0.00 |
| 1 | JUNCTION | 0.08 | 0.18 | 35.16 | 3 | 14:02 | 0.18 |
| WW | JUNCTION | 0.00 | 0.00 | 32.50 | 0 | 00:00 | 0.00 |
| VV | JUNCTION | 12.03 | 26.44 | 58.06 | 0 | 02:12 | 23.94 |
| 643 | JUNCTION | 0.36 | 0.61 | 42.83 | 3 | 16:55 | 0.61 |
| 292 | JUNCTION | 0.30 | 0.42 | 42.91 | 3 | 17:20 | 0.42 |
| 147 | JUNCTION | 0.21 | 0.30 | 44.87 | 4 | 13:00 | 0.30 |
| 145 | JUNCTION | 0.31 | 0.46 | 46.46 | 4 | 12:05 | 0.46 |
| 566 | JUNCTION | 0.09 | 0.12 | 56.39 | 3 | 14:05 | 0.12 |
| 565 | JUNCTION | 0.06 | 0.10 | 52.67 | 3 | 14:09 | 0.10 |
| ZZ | JUNCTION | 0.06 | 0.11 | 42.11 | 3 | 14:09 | 0.11 |
| 3 | JUNCTION | 0.00 | 0.00 | 61.33 | 0 | 00:00 | 0.00 |
| 4 | JUNCTION | 0.05 | 0.06 | 68.31 | 1 | 11:22 | 0.06 |
| 7 | JUNCTION | 0.04 | 0.04 | 75.21 | 0 | 11:22 | 0.04 |
| 8 | JUNCTION | 0.05 | 0.06 | 75.75 | 2 | 11:22 | 0.06 |
| 9 | JUNCTION | 0.04 | 0.05 | 76.55 | 1 | 11:22 | 0.05 |
| 12 | JUNCTION | 0.00 | 0.00 | 68.00 | 0 | 00:00 | 0.00 |
| WWTF | OUTFALL | 4.00 | 4.00 | 35.00 | 0 | 00:00 | 4.00 |
| EelRiver | OUTFALL | 0.00 | 0.00 | 30.00 | 0 | 00:00 | 0.00 |

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Node Inflow Summary
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| Node | Type | Maximum Lateral Inflow GPM | Maximum Total Inflow GPM | Time of Max Occurrence days | hr:min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal |
|---|---|---|---|---|---|---|---|
| 114 | JUNCTION | 23.09 | 69.99 | 3 | 07:00 | 0.0384 | 0.141 |
| 130 | JUNCTION | 233.01 | 2050.58 | 3 | 06:50 | 0.212 | 1.97 |
| 138 | JUNCTION | 25.31 | 197.51 | 3 | 14:03 | 0.041 | 0.662 |
| 146 | JUNCTION | 25.32 | 217.39 | 3 | 14:06 | 0.041 | 0.767 |
| 161 | JUNCTION | 45.21 | 45.21 | 3 | 05:00 | 0.0579 | 0.0582 |
| 162 | JUNCTION | 42.56 | 87.77 | 3 | 05:05 | 0.0233 | 0.084 |
| 163 | JUNCTION | 42.56 | 130.29 | 3 | 05:05 | 0.0233 | 0.111 |
| 164 | JUNCTION | 42.56 | 172.69 | 3 | 05:05 | 0.0233 | 0.138 |
| 165 | JUNCTION | 0.40 | 172.32 | 3 | 06:00 | 0.00277 | 0.145 |
| 166 | JUNCTION | 4.72 | 25.62 | 4 | 12:05 | 0.0225 | 0.14 |
| 176 | JUNCTION | 21.14 | 212.64 | 3 | 06:00 | 0.0306 | 0.197 |
| 181 | JUNCTION | 20.24 | 192.25 | 3 | 05:05 | 0.0189 | 0.165 |
| 182 | JUNCTION | 26.51 | 257.44 | 3 | 06:02 | 0.096 | 0.307 |
| 190 | JUNCTION | 8.54 | 8.54 | 3 | 05:00 | 0.00468 | 0.00474 |
| 191 | JUNCTION | 1.67 | 3.95 | 0 | 11:22 | 0.00797 | 0.019 |
| 193 | JUNCTION | 8.89 | 25.74 | 3 | 06:05 | 0.00925 | 0.0263 |
| 194 | JUNCTION | 8.82 | 33.58 | 3 | 06:15 | 0.00835 | 0.0353 |
| 195 | JUNCTION | 9.58 | 41.36 | 3 | 06:26 | 0.0182 | 0.0[illegible] |
| 196 | JUNCTION | 8.82 | 48.10 | 3 | 06:35 | 0.00835 | 0.0621 |

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| 199 | JUNCTION | 20.24 | 307.85 | 3 | 06:35 | 0.0189 | 0.364 |
| 201 | JUNCTION | 14.69 | 14.69 | 3 | 05:00 | 0.0188 | 0.0188 |
| 202 | JUNCTION | 16.12 | 30.81 | 3 | 05:05 | 0.0373 | 0.0571 |
| 203 | JUNCTION | 15.86 | 45.87 | 3 | 06:10 | 0.034 | 0.0928 |
| 211 | JUNCTION | 14.36 | 235.30 | 3 | 07:05 | 0.0229 | 0.409 |
| 212 | JUNCTION | 20.24 | 76.96 | 3 | 06:15 | 0.0189 | 0.0713 |
| 213 | JUNCTION | 20.24 | 58.31 | 3 | 06:03 | 0.0189 | 0.0509 |
| 214 | JUNCTION | 19.97 | 39.78 | 3 | 05:05 | 0.0153 | 0.0303 |
| 215 | JUNCTION | 19.83 | 19.83 | 3 | 05:00 | 0.0135 | 0.0136 |
| 216 | JUNCTION | 19.90 | 95.19 | 3 | 06:15 | 0.0144 | 0.0868 |
| 217 | JUNCTION | 20.17 | 400.38 | 3 | 07:05 | 0.018 | 0.482 |
| 218 | JUNCTION | 14.21 | 373.35 | 3 | 14:01 | 0.0124 | 0.474 |
| 219 | JUNCTION | 14.46 | 375.92 | 3 | 14:02 | 0.0157 | 0.478 |
| 220 | JUNCTION | 15.08 | 407.59 | 3 | 14:02 | 0.0239 | 0.581 |
| 221 | JUNCTION | 14.39 | 395.93 | 3 | 14:05 | 0.0148 | 0.558 |
| 222 | JUNCTION | 13.84 | 397.11 | 3 | 14:06 | 0.00758 | 0.553 |
| 223 | JUNCTION | 15.98 | 403.08 | 3 | 14:07 | 0.0356 | 0.583 |
| 224 | JUNCTION | 9.31 | 533.16 | 3 | 14:06 | 0.0147 | 0.89 |
| 225 | JUNCTION | 13.59 | 527.48 | 3 | 14:10 | 0.0101 | 0.872 |
| 226 | JUNCTION | 13.66 | 555.47 | 3 | 14:18 | 0.011 | 0.978 |
| 227 | JUNCTION | 14.01 | 555.98 | 3 | 14:59 | 0.0155 | 0.99 |
| 228 | JUNCTION | 13.94 | 621.62 | 3 | 15:04 | 0.0146 | 1.23 |
| 229 | JUNCTION | 23.52 | 650.23 | 3 | 16:01 | 0.0129 | 1.41 |
| 230 | JUNCTION | 23.78 | 653.82 | 3 | 16:04 | 0.0163 | 1.42 |
| 231 | JUNCTION | 24.58 | 658.56 | 3 | 16:09 | 0.0268 | 1.44 |
| 232 | JUNCTION | 23.52 | 661.93 | 3 | 16:12 | 0.0129 | 1.45 |
| 233 | JUNCTION | 113.87 | 689.70 | 3 | 16:17 | 0.158 | 1.6 |
| 234 | JUNCTION | 23.75 | 701.69 | 3 | 16:24 | 0.016 | 1.67 |
| 235 | JUNCTION | 26.62 | 698.24 | 3 | 16:19 | 0.0535 | 1.65 |
| 236 | JUNCTION | 24.28 | 702.83 | 3 | 16:36 | 0.0229 | 1.68 |
| 237 | JUNCTION | 23.52 | 703.37 | 3 | 16:48 | 0.0129 | 1.67 |
| 238 | JUNCTION | 23.52 | 711.42 | 3 | 17:02 | 0.0129 | 1.69 |
| 239 | JUNCTION | 26.37 | 810.15 | 3 | 17:09 | 0.0188 | 2.55 |
| 240 | JUNCTION | 14.03 | 317.13 | 3 | 10:45 | 0.0193 | 0.591 |
| 241 | JUNCTION | 8.54 | 17.32 | 3 | 05:05 | 0.00468 | 0.0137 |
| 242 | JUNCTION | 8.89 | 25.71 | 3 | 06:03 | 0.00925 | 0.0237 |
| 243 | JUNCTION | 9.17 | 34.40 | 3 | 06:10 | 0.0128 | 0.0372 |
| 244 | JUNCTION | 9.37 | 42.67 | 3 | 06:15 | 0.0156 | 0.0533 |
| 245 | JUNCTION | 9.31 | 50.78 | 3 | 06:26 | 0.0147 | 0.0683 |
| 246 | JUNCTION | 9.37 | 58.57 | 3 | 06:35 | 0.0156 | 0.0841 |
| 247 | JUNCTION | 8.54 | 110.96 | 3 | 06:40 | 0.00468 | 0.151 |
| 248 | JUNCTION | 8.96 | 113.22 | 3 | 07:05 | 0.0101 | 0.159 |
| 249 | JUNCTION | 10.36 | 120.54 | 3 | 07:05 | 0.0281 | 0.187 |
| 250 | JUNCTION | 8.89 | 120.35 | 3 | 07:05 | 0.00925 | 0.194 |
| 251 | JUNCTION | 9.37 | 160.06 | 3 | 07:05 | 0.0156 | 0.295 |
| 252 | JUNCTION | 9.44 | 159.59 | 3 | 12:39 | 0.0164 | 0.308 |
| 253 | JUNCTION | 9.51 | 38.62 | 3 | 06:10 | 0.0173 | 0.0871 |
| 254 | JUNCTION | 9.37 | 29.48 | 3 | 06:03 | 0.0156 | 0.0689 |
| 255 | JUNCTION | 10.83 | 20.33 | 3 | 06:03 | 0.0335 | 0.0525 |
| 256 | JUNCTION | 0.00 | 33.87 | 0 | 12:00 | 0 | 0.186 |
| 257 | JUNCTION | 9.58 | 9.58 | 3 | 05:00 | 0.0182 | 0.0183 |
| 266 | JUNCTION | 14.17 | 57.57 | 3 | 06:05 | 0.0176 | 0.0994 |
| 267 | JUNCTION | 14.21 | 70.89 | 3 | 06:10 | 0.0182 | 0.119 |
| 268 | JUNCTION | 14.21 | 43.94 | 3 | 06:03 | 0.0182 | 0.0804 |
| 269 | JUNCTION | 13.87 | 30.20 | 3 | 05:05 | 0.0137 | 0.0608 |
| 270 | JUNCTION | 16.40 | 16.40 | 3 | 06:00 | 0.0461 | 0.0462 |
| 274 | JUNCTION | 15.32 | 63.49 | 3 | 06:26 | 0.0326 | 0.0933 |
| 275 | JUNCTION | 13.66 | 50.14 | 3 | 06:26 | 0.011 | 0.0601 |

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|---|---|---|---|---|---|---|---|
| 276 | JUNCTION | 15.32 | 38.77 | 3 | 06:26 | 0.0326 | 0.0486 |
| 277 | JUNCTION | 0.00 | 25.22 | 3 | 06:25 | 0 | 0.0163 |
| 280 | JUNCTION | 14.49 | 73.83 | 3 | 06:35 | 0.0218 | 0.115 |
| 282 | JUNCTION | 15.52 | 86.53 | 3 | 06:35 | 0.0353 | 0.151 |
| 284 | JUNCTION | 14.08 | 97.77 | 3 | 06:40 | 0.0164 | 0.167 |
| 286 | JUNCTION | 4.12 | 4.12 | 0 | 11:00 | 0.0196 | 0.0196 |
| 289 | JUNCTION | 0.22 | 359.66 | 3 | 14:10 | 0.00105 | 0.814 |
| 293 | JUNCTION | 36.26 | 647.15 | 3 | 15:59 | 0.167 | 1.4 |
| 294 | JUNCTION | 23.52 | 46.58 | 3 | 05:05 | 0.0129 | 0.0275 |
| 295 | JUNCTION | 23.52 | 23.52 | 3 | 05:00 | 0.0129 | 0.013 |
| 309 | JUNCTION | 0.13 | 353.12 | 3 | 14:53 | 0.000967 | 0.794 |
| 310 | JUNCTION | 0.13 | 351.91 | 3 | 15:09 | 0.000967 | 0.79 |
| 311 | JUNCTION | 6.80 | 97.43 | 0 | 11:22 | 0.0121 | 0.675 |
| 312 | JUNCTION | 101.31 | 558.21 | 3 | 14:53 | 0.0462 | 1.6 |
| 313 | JUNCTION | 101.40 | 572.44 | 3 | 15:04 | 0.0471 | 1.64 |
| 315 | JUNCTION | 101.52 | 576.74 | 3 | 15:49 | 0.0483 | 1.68 |
| 316 | JUNCTION | 130.16 | 2171.40 | 3 | 07:00 | 0.116 | 2.09 |
| 334 | JUNCTION | 0.64 | 165.09 | 3 | 15:59 | 0.00124 | 1.13 |
| 335 | JUNCTION | 0.64 | 165.09 | 3 | 15:23 | 0.00124 | 1.13 |
| 336 | JUNCTION | 0.64 | 165.11 | 3 | 14:59 | 0.00124 | 1.13 |
| 353 | JUNCTION | 3.46 | 5.23 | 4 | 11:05 | 0.0182 | 0.0278 |
| 354 | JUNCTION | 3.46 | 8.69 | 4 | 11:11 | 0.0182 | 0.046 |
| 355 | JUNCTION | 3.86 | 3.86 | 4 | 11:00 | 0.021 | 0.021 |
| 358 | JUNCTION | 2.15 | 4.25 | 4 | 11:05 | 0.00919 | 0.0205 |
| 359 | JUNCTION | 5.82 | 14.92 | 4 | 11:05 | 0.0344 | 0.0711 |
| 360 | JUNCTION | 1.63 | 4.89 | 4 | 08:15 | 0.00552 | 0.0164 |
| 361 | JUNCTION | 1.63 | 3.26 | 4 | 08:15 | 0.00552 | 0.011 |
| 364 | JUNCTION | 1.63 | 1.63 | 4 | 08:00 | 0.00552 | 0.00[illegible] |
| 371 | JUNCTION | 23.68 | 708.62 | 3 | 16:59 | 0.0151 | 1.[illegible]9 |
| 373 | JUNCTION | 3.43 | 3.43 | 4 | 11:00 | 0.0186 | 0.0186 |
| 374 | JUNCTION | 2.24 | 5.66 | 4 | 11:10 | 0.0104 | 0.0289 |
| 375 | JUNCTION | 3.29 | 8.94 | 4 | 11:11 | 0.0176 | 0.0465 |
| 377 | JUNCTION | 2.63 | 11.57 | 4 | 11:11 | 0.0131 | 0.0595 |
| 378 | JUNCTION | 2.89 | 35.34 | 4 | 11:11 | 0.0149 | 0.177 |
| 379 | JUNCTION | 2.37 | 37.65 | 4 | 11:11 | 0.0113 | 0.187 |
| 381 | JUNCTION | 1.98 | 39.62 | 4 | 11:11 | 0.00859 | 0.196 |
| 382 | JUNCTION | 2.11 | 41.71 | 4 | 11:11 | 0.00949 | 0.205 |
| 383 | JUNCTION | 1.72 | 43.40 | 4 | 11:11 | 0.00678 | 0.211 |
| 384 | JUNCTION | 1.59 | 44.96 | 4 | 12:05 | 0.00588 | 0.216 |
| 385 | JUNCTION | 1.98 | 46.88 | 4 | 12:05 | 0.00859 | 0.224 |
| 386 | JUNCTION | 2.15 | 71.60 | 4 | 12:05 | 0.00919 | 0.338 |
| 387 | JUNCTION | 2.15 | 73.69 | 4 | 12:05 | 0.00919 | 0.346 |
| 388 | JUNCTION | 23.52 | 705.96 | 3 | 16:53 | 0.0129 | 1.68 |
| 389 | JUNCTION | 2.68 | 22.68 | 4 | 11:11 | 0.0128 | 0.107 |
| 390 | JUNCTION | 2.55 | 20.01 | 4 | 11:10 | 0.0119 | 0.0943 |
| 391 | JUNCTION | 2.55 | 17.47 | 4 | 11:10 | 0.0119 | 0.0827 |
| 392 | JUNCTION | 7.06 | 22.84 | 3 | 11:00 | 0.0443 | 0.121 |
| 393 | JUNCTION | 14.62 | 1010.42 | 3 | 18:06 | 0.00894 | 3.88 |
| 403 | JUNCTION | 6.32 | 169.62 | 4 | 12:05 | 0.0348 | 0.803 |
| 409 | JUNCTION | 3.44 | 163.41 | 4 | 12:05 | 0.0149 | 0.769 |
| 411 | JUNCTION | 4.23 | 160.03 | 4 | 12:05 | 0.0203 | 0.755 |
| 414 | JUNCTION | 3.84 | 173.39 | 4 | 12:05 | 0.0176 | 0.82 |
| 415 | JUNCTION | 3.18 | 176.48 | 4 | 12:05 | 0.0131 | 0.831 |
| 416 | JUNCTION | 3.31 | 179.64 | 4 | 12:05 | 0.014 | 0.842 |
| 418 | JUNCTION | 2.15 | 150.46 | 4 | 12:01 | 0.00919 | 0.709 |
| 419 | JUNCTION | 2.15 | 74.73 | 4 | 11:11 | 0.00919 | 0.356 |
| 420 | JUNCTION | 5.16 | 72.60 | 4 | 11:11 | 0.0299 | 0.[illegible] |
| 428 | JUNCTION | 5.54 | 155.88 | 4 | 12:05 | 0.0293 | 0.7[illegible]6 |

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|---|---|---|---|---|---|---|---|
| 432 | JUNCTION | 5.82 | 67.45 | 4 | 11:11 | 0.0344 | 0.318 |
| 439 | JUNCTION | 10.50 | 10.50 | 3 | 04:00 | 0.00447 | 0.00455 |
| 440 | JUNCTION | 2.94 | 59.63 | 4 | 11:11 | 0.0146 | 0.276 |
| 444 | JUNCTION | 3.46 | 56.69 | 4 | 11:11 | 0.0182 | 0.262 |
| 447 | JUNCTION | 3.72 | 53.24 | 4 | 11:11 | 0.02 | 0.244 |
| 450 | JUNCTION | 3.59 | 49.52 | 4 | 11:11 | 0.0191 | 0.225 |
| 453 | JUNCTION | 5.82 | 45.93 | 4 | 11:11 | 0.0344 | 0.207 |
| 454 | JUNCTION | 2.81 | 40.12 | 4 | 11:11 | 0.0137 | 0.173 |
| 456 | JUNCTION | 2.28 | 37.32 | 4 | 11:11 | 0.0101 | 0.16 |
| 459 | JUNCTION | 2.02 | 35.04 | 4 | 11:11 | 0.00828 | 0.151 |
| 474 | JUNCTION | 2.12 | 2.12 | 4 | 11:00 | 0.00956 | 0.00956 |
| 475 | JUNCTION | 2.24 | 4.36 | 4 | 11:05 | 0.0104 | 0.0199 |
| 476 | JUNCTION | 2.50 | 6.86 | 4 | 11:10 | 0.0122 | 0.0321 |
| 478 | JUNCTION | 2.11 | 8.96 | 4 | 11:10 | 0.00949 | 0.0415 |
| 479 | JUNCTION | 2.63 | 16.97 | 4 | 11:11 | 0.0131 | 0.0864 |
| 480 | JUNCTION | 5.38 | 5.38 | 4 | 11:00 | 0.032 | 0.032 |
| 481 | JUNCTION | 1.85 | 18.80 | 4 | 11:11 | 0.00768 | 0.0939 |
| 482 | JUNCTION | 2.11 | 20.91 | 4 | 11:11 | 0.00949 | 0.103 |
| 487 | JUNCTION | 18.77 | 24.98 | 3 | 10:00 | 0.0916 | 0.0963 |
| 489 | JUNCTION | 10.61 | 26.32 | 3 | 06:10 | 0.00633 | 0.107 |
| 490 | JUNCTION | 10.61 | 47.87 | 3 | 06:15 | 0.00633 | 0.165 |
| 493 | JUNCTION | 5.11 | 9.77 | 3 | 10:10 | 0.0308 | 0.0635 |
| 494 | JUNCTION | 2.68 | 11.42 | 3 | 06:26 | 0.00918 | 0.0731 |
| 495 | JUNCTION | 10.50 | 60.99 | 3 | 06:15 | 0.00447 | 0.189 |
| 496 | JUNCTION | 2.30 | 22.09 | 3 | 14:05 | 0.00469 | 0.125 |
| 497 | JUNCTION | 2.02 | 5.82 | 3 | 06:35 | 0.00101 | 0.0038 |
| 498 | JUNCTION | 2.02 | 5.87 | 3 | 06:03 | 0.00101 | 0.00336 |
| 500 | JUNCTION | 10.56 | 18.65 | 3 | 04:10 | 0.00543 | 0.0458 |
| 502 | JUNCTION | 5.37 | 5.37 | 3 | 10:00 | 0.0326 | 0.0326 |
| 515 | JUNCTION | 2.02 | 2.02 | 3 | 05:00 | 0.00101 | 0.00103 |
| 518 | JUNCTION | 2.91 | 23.77 | 3 | 14:08 | 0.0119 | 0.137 |
| 521 | JUNCTION | 0.77 | 118.82 | 0 | 11:22 | 0.0028 | 0.859 |
| 522 | JUNCTION | 0.64 | 156.30 | 3 | 06:15 | 0.00124 | 1.02 |
| 523 | JUNCTION | 20.29 | 42.29 | 3 | 06:15 | 0.012 | 0.155 |
| 524 | JUNCTION | 12.43 | 12.43 | 3 | 03:20 | 0.0384 | 0.0385 |
| 525 | JUNCTION | 7.21 | 99.52 | 0 | 11:22 | 0.0175 | 0.698 |
| 526 | JUNCTION | 98.14 | 98.14 | 3 | 11:00 | 0.664 | 0.664 |
| 527 | JUNCTION | 12.33 | 109.43 | 0 | 11:22 | 0.0713 | 0.773 |
| 528 | JUNCTION | 6.18 | 109.57 | 0 | 11:22 | 0.00404 | 0.779 |
| 529 | JUNCTION | 6.18 | 109.70 | 0 | 11:22 | 0.00404 | 0.785 |
| 530 | JUNCTION | 6.18 | 109.83 | 0 | 11:22 | 0.00404 | 0.791 |
| 531 | JUNCTION | 6.18 | 118.46 | 0 | 11:22 | 0.00404 | 0.855 |
| 534 | JUNCTION | 2.09 | 24.09 | 3 | 16:03 | 0.00198 | 0.14 |
| 535 | JUNCTION | 2.09 | 24.71 | 3 | 16:29 | 0.00198 | 0.143 |
| 537 | JUNCTION | 1.16 | 4.37 | 3 | 10:00 | 0.0067 | 0.0275 |
| 538 | JUNCTION | 1.28 | 2.86 | 3 | 10:00 | 0.00754 | 0.0193 |
| 539 | JUNCTION | 0.64 | 3.29 | 3 | 06:26 | 0.00124 | 0.0207 |
| 540 | JUNCTION | 0.94 | 5.04 | 3 | 07:00 | 0.00484 | 0.0324 |
| 541 | JUNCTION | 1.41 | 157.69 | 3 | 14:05 | 0.00844 | 1.07 |
| 542 | JUNCTION | 1.54 | 158.16 | 3 | 14:06 | 0.00935 | 1.08 |
| 543 | JUNCTION | 0.87 | 158.32 | 3 | 14:07 | 0.00394 | 1.08 |
| 544 | JUNCTION | 3.48 | 161.28 | 3 | 14:09 | 0.0228 | 1.1 |
| 547 | JUNCTION | 3.74 | 164.18 | 3 | 14:17 | 0.0246 | 1.12 |
| 548 | JUNCTION | 1.92 | 165.24 | 3 | 14:34 | 0.012 | 1.13 |
| 557 | JUNCTION | 2.09 | 23.98 | 3 | 14:38 | 0.00198 | 0.139 |
| 560 | JUNCTION | 26.22 | 811.60 | 3 | 17:21 | 0.0168 | 2.55 |
| 561 | JUNCTION | 5.71 | 167.00 | 3 | 16:32 | 0.00406 | 1.13 |
| 562 | JUNCTION | 5.64 | 1019.24 | 3 | 17:35 | 0.00309 | 3.81 |

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| 563 | JUNCTION | 0.64 | 164.60 | 3 | 16:17 | 0.00124 | 1.13 |
| 564 | JUNCTION | 0.71 | 165.02 | 3 | 16:05 | 0.00214 | 1.13 |
| 575 | JUNCTION | 36.76 | 86.20 | 3 | 04:04 | 0.042 | 0.17 |
| 576 | JUNCTION | 37.89 | 66.53 | 3 | 04:04 | 0.0572 | 0.127 |
| 577 | JUNCTION | 5.25 | 207.20 | 3 | 06:03 | 0.00577 | 0.648 |
| 578 | JUNCTION | 5.25 | 207.24 | 3 | 06:05 | 0.00577 | 0.651 |
| 580 | JUNCTION | 5.25 | 206.91 | 3 | 06:10 | 0.00577 | 0.654 |
| 581 | JUNCTION | 5.25 | 206.93 | 3 | 06:25 | 0.00577 | 0.655 |
| 582 | JUNCTION | 8.45 | 212.23 | 3 | 10:00 | 0.0456 | 0.698 |
| 583 | JUNCTION | 6.55 | 215.08 | 3 | 10:00 | 0.0221 | 0.717 |
| 584 | JUNCTION | 6.35 | 217.81 | 3 | 12:00 | 0.0196 | 0.734 |
| 593 | JUNCTION | 38.89 | 38.89 | 3 | 02:55 | 0.0697 | 0.0698 |
| 604 | JUNCTION | 20.52 | 298.72 | 3 | 07:05 | 0.0225 | 0.379 |
| 612 | JUNCTION | 247.19 | 1913.09 | 3 | 06:15 | 0.234 | 3.76 |
| 614 | JUNCTION | 247.71 | 1499.19 | 3 | 06:35 | 0.245 | 3.33 |
| 618 | JUNCTION | 14.24 | 119.69 | 3 | 06:40 | 0.0185 | 0.204 |
| 619 | JUNCTION | 14.15 | 109.70 | 3 | 06:35 | 0.0173 | 0.185 |
| 620 | JUNCTION | 15.39 | 131.38 | 3 | 06:40 | 0.0335 | 0.237 |
| 622 | JUNCTION | 13.38 | 25.58 | 3 | 06:10 | 0.00733 | 0.0156 |
| 623 | JUNCTION | 13.38 | 13.38 | 3 | 05:00 | 0.00733 | 0.00742 |
| 624 | JUNCTION | 247.82 | 795.38 | 3 | 06:35 | 0.247 | 2.58 |
| 625 | JUNCTION | 248.69 | 586.86 | 3 | 06:35 | 0.264 | 2.33 |
| 633 | JUNCTION | 26.32 | 103.03 | 3 | 04:10 | 0.0526 | 0.21 |
| 638 | JUNCTION | 25.54 | 121.21 | 3 | 05:05 | 0.0437 | 0.258 |
| 639 | JUNCTION | 248.22 | 509.50 | 3 | 16:10 | 0.255 | 2.1 |
| 640 | JUNCTION | 31.14 | 143.81 | 3 | 06:05 | 0.108 | 0.368 |
| 642 | JUNCTION | 25.46 | 164.82 | 3 | 06:10 | 0.0428 | 0.411 |
| 644 | JUNCTION | 25.31 | 181.33 | 3 | 06:26 | 0.041 | 0.[illegible] |
| 645 | JUNCTION | 35.05 | 208.60 | 3 | 06:26 | 0.153 | 0.6[illegible]3 |
| 646 | JUNCTION | 25.70 | 210.94 | 3 | 06:40 | 0.0455 | 0.642 |
| 654 | JUNCTION | 14.71 | 316.24 | 3 | 10:39 | 0.0264 | 0.564 |
| 655 | JUNCTION | 14.03 | 326.40 | 3 | 14:03 | 0.0193 | 0.605 |
| 656 | JUNCTION | 14.15 | 329.85 | 3 | 14:04 | 0.0213 | 0.605 |
| 657 | JUNCTION | 13.82 | 363.80 | 3 | 14:05 | 0.0659 | 0.84 |
| 658 | JUNCTION | 0.22 | 359.86 | 3 | 14:07 | 0.00105 | 0.822 |
| 659 | JUNCTION | 2.55 | 361.51 | 3 | 14:07 | 0.0121 | 0.827 |
| 661 | JUNCTION | 0.43 | 354.77 | 3 | 14:30 | 0.00203 | 0.801 |
| 662 | JUNCTION | 25.31 | 210.89 | 3 | 14:05 | 0.041 | 0.732 |
| 665 | JUNCTION | 8.38 | 33.94 | 0 | 11:22 | 0.0399 | 0.183 |
| 667 | JUNCTION | 14.63 | 306.62 | 3 | 08:15 | 0.0256 | 0.54 |
| 668 | JUNCTION | 14.17 | 308.57 | 3 | 14:01 | 0.021 | 0.573 |
| 669 | JUNCTION | 14.03 | 322.50 | 3 | 11:00 | 0.0193 | 0.605 |
| 680 | JUNCTION | 231.44 | 1829.28 | 3 | 06:45 | 0.195 | 1.75 |
| 684 | JUNCTION | 145.70 | 1606.19 | 3 | 06:45 | 0.144 | 1.55 |
| 689 | JUNCTION | 233.56 | 2776.28 | 3 | 07:05 | 0.218 | 2.81 |
| 690 | JUNCTION | 9.48 | 246.60 | 3 | 14:03 | 0.00519 | 0.922 |
| 691 | JUNCTION | 9.48 | 242.12 | 3 | 16:38 | 0.00519 | 0.921 |
| 692 | JUNCTION | 129.09 | 2692.45 | 3 | 07:05 | 0.105 | 2.66 |
| 693 | JUNCTION | 7.65 | 243.55 | 3 | 16:25 | 0.0357 | 0.91 |
| 694 | JUNCTION | 247.33 | 1670.94 | 3 | 06:25 | 0.237 | 3.57 |
| 695 | JUNCTION | 230.65 | 2653.71 | 3 | 07:05 | 0.187 | 2.59 |
| 696 | JUNCTION | 7.11 | 243.81 | 3 | 16:05 | 0.0291 | 0.868 |
| 697 | JUNCTION | 236.34 | 2482.73 | 3 | 07:05 | 0.246 | 2.43 |
| 698 | JUNCTION | 5.25 | 240.24 | 3 | 15:47 | 0.00577 | 0.844 |
| 705 | JUNCTION | 143.83 | 468.27 | 3 | 06:40 | 0.124 | 0.455 |
| 706 | JUNCTION | 36.84 | 329.08 | 3 | 06:15 | 0.0323 | 0.331 |
| 707 | JUNCTION | 36.86 | 293.61 | 3 | 06:10 | 0.0325 | 0.[illegible] |
| 715 | JUNCTION | 9.11 | 227.42 | 3 | 14:02 | 0.0538 | 0.7[illegible]3 |

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| 716 | JUNCTION | 5.25 | 227.22 | 3 | 14:03 | 0.00577 | 0.791 |
| 717 | JUNCTION | 247.42 | 488.70 | 3 | 06:10 | 0.239 | 0.493 |
| 719 | JUNCTION | 14.91 | 241.05 | 3 | 14:06 | 0.0974 | 0.864 |
| 720 | JUNCTION | 5.46 | 219.76 | 3 | 14:01 | 0.00855 | 0.743 |
| 721 | JUNCTION | 5.46 | 218.75 | 3 | 14:01 | 0.00855 | 0.738 |
| 722 | JUNCTION | 5.25 | 218.37 | 3 | 14:00 | 0.00577 | 0.736 |
| 724 | JUNCTION | 6.58 | 6.58 | 0 | 11:00 | 0.0314 | 0.0313 |
| 725 | JUNCTION | 2.27 | 2.27 | 0 | 11:00 | 0.0108 | 0.0108 |
| 727 | JUNCTION | 1.93 | 12.46 | 0 | 11:22 | 0.0092 | 0.0615 |
| 728 | JUNCTION | 247.19 | 246.49 | 3 | 06:00 | 0.234 | 0.235 |
| 729 | JUNCTION | 1.86 | 5.98 | 0 | 11:22 | 0.00887 | 0.0289 |
| 730 | JUNCTION | 2.48 | 8.46 | 0 | 11:22 | 0.0118 | 0.0418 |
| 731 | JUNCTION | 143.92 | 289.14 | 3 | 06:26 | 0.125 | 0.27 |
| 732 | JUNCTION | 144.02 | 716.97 | 3 | 06:35 | 0.126 | 0.663 |
| 733 | JUNCTION | 143.40 | 574.07 | 3 | 06:35 | 0.12 | 0.531 |
| 734 | JUNCTION | 143.55 | 431.97 | 3 | 06:35 | 0.121 | 0.401 |
| 735 | JUNCTION | 146.04 | 861.00 | 3 | 06:40 | 0.147 | 0.82 |
| 740 | JUNCTION | 11.24 | 412.26 | 3 | 14:24 | 0.0172 | 1.28 |
| 742 | JUNCTION | 36.38 | 36.18 | 3 | 05:05 | 0.0271 | 0.0273 |
| 743 | JUNCTION | 36.54 | 184.27 | 3 | 06:03 | 0.029 | 0.184 |
| 744 | JUNCTION | 37.97 | 148.06 | 3 | 06:03 | 0.0451 | 0.152 |
| 745 | JUNCTION | 11.68 | 412.71 | 3 | 14:11 | 0.0235 | 1.28 |
| 746 | JUNCTION | 36.94 | 36.76 | 3 | 06:00 | 0.0335 | 0.0337 |
| 747 | JUNCTION | 37.42 | 74.04 | 3 | 06:03 | 0.0388 | 0.074 |
| 751 | JUNCTION | 129.28 | 129.28 | 3 | 07:00 | 0.225 | 0.225 |
| 757 | JUNCTION | 18.30 | 410.76 | 3 | 14:07 | 0.0699 | 1.27 |
| 765 | JUNCTION | 14.91 | 143.03 | 3 | 07:05 | 0.0284 | 0.255 |
| 767 | JUNCTION | 14.63 | 156.05 | 3 | 07:05 | 0.0256 | 0.279 |
| 768 | JUNCTION | 14.63 | 169.61 | 3 | 07:05 | 0.0256 | 0.304 |
| 769 | JUNCTION | 14.27 | 183.10 | 3 | 07:05 | 0.022 | 0.326 |
| 770 | JUNCTION | 14.18 | 196.40 | 3 | 07:05 | 0.0211 | 0.346 |
| 771 | JUNCTION | 14.27 | 209.58 | 3 | 07:05 | 0.022 | 0.368 |
| 772 | JUNCTION | 14.18 | 221.78 | 3 | 07:05 | 0.0211 | 0.387 |
| 773 | JUNCTION | 14.45 | 249.75 | 3 | 07:05 | 0.0238 | 0.43 |
| 774 | JUNCTION | 14.45 | 262.59 | 3 | 08:15 | 0.0238 | 0.45 |
| 775 | JUNCTION | 14.48 | 274.98 | 3 | 08:15 | 0.0241 | 0.473 |
| 776 | JUNCTION | 14.54 | 286.84 | 3 | 08:15 | 0.0247 | 0.497 |
| 777 | JUNCTION | 14.27 | 295.61 | 3 | 08:15 | 0.022 | 0.517 |
| 800 | JUNCTION | 12.02 | 399.12 | 3 | 14:05 | 0.0283 | 1.22 |
| 801 | JUNCTION | 34.94 | 393.92 | 3 | 14:04 | 0.164 | 1.2 |
| 802 | JUNCTION | 17.49 | 367.72 | 3 | 14:03 | 0.0648 | 1.05 |
| 803 | JUNCTION | 24.06 | 355.97 | 3 | 14:02 | 0.0688 | 0.988 |
| 804 | JUNCTION | 30.37 | 343.56 | 3 | 14:00 | 0.108 | 0.931 |
| 809 | JUNCTION | 145.30 | 145.29 | 3 | 06:25 | 0.14 | 0.14 |
| 810 | JUNCTION | 41.09 | 109.49 | 3 | 06:03 | 0.097 | 0.435 |
| 811 | JUNCTION | 41.55 | 85.66 | 3 | 06:03 | 0.103 | 0.34 |
| 813 | JUNCTION | 37.03 | 37.03 | 3 | 04:00 | 0.0457 | 0.0457 |
| 814 | JUNCTION | 49.01 | 67.21 | 3 | 04:04 | 0.195 | 0.241 |
| 815 | JUNCTION | 8.28 | 4559.54 | 3 | 07:05 | 0.0108 | 7.37 |
| 816 | JUNCTION | 11.19 | 1234.79 | 3 | 06:10 | 0.0154 | 2.95 |
| 817 | JUNCTION | 14.66 | 4504.71 | 3 | 10:05 | 0.00894 | 7.45 |
| 818 | JUNCTION | 35.84 | 335.07 | 3 | 11:00 | 0.141 | 0.834 |
| 819 | JUNCTION | 38.83 | 57.69 | 3 | 11:00 | 0.158 | 0.244 |
| 834 | JUNCTION | 14.66 | 4405.81 | 3 | 13:29 | 0.00894 | 7.35 |
| 835 | JUNCTION | 101.31 | 619.48 | 3 | 16:07 | 0.0462 | 1.65 |
| 836 | JUNCTION | 14.55 | 1010.99 | 3 | 18:10 | 0.00797 | 3.87 |
| 838 | JUNCTION | 14.63 | 2773.92 | 3 | 14:01 | 0.00893 | 5.71 |
| 840 | JUNCTION | 14.71 | 1048.79 | 3 | 17:35 | 0.01 | 3.99 |

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|---|---|---|---|---|---|---|---|
| 853 | JUNCTION | 8.82 | 8.82 | 3 | 05:00 | 0.00835 | 0.00841 |
| 855 | JUNCTION | 14.93 | 555.25 | 3 | 14:38 | 0.0275 | 0.985 |
| 859 | JUNCTION | 1.89 | 33.03 | 4 | 11:11 | 0.00738 | 0.143 |
| 860 | JUNCTION | 2.02 | 31.14 | 4 | 11:10 | 0.00828 | 0.137 |
| 861 | JUNCTION | 6.13 | 20.46 | 4 | 10:10 | 0.0227 | 0.0825 |
| 862 | JUNCTION | 6.13 | 14.33 | 4 | 11:05 | 0.0227 | 0.0598 |
| 863 | JUNCTION | 8.21 | 8.21 | 4 | 11:00 | 0.0371 | 0.0371 |
| 892 | JUNCTION | 20.86 | 294.09 | 3 | 06:15 | 0.027 | 0.346 |
| 904 | JUNCTION | 0.90 | 157.02 | 3 | 06:26 | 0.00436 | 1.02 |
| 906 | JUNCTION | 0.70 | 157.57 | 3 | 06:35 | 0.00202 | 1.03 |
| 907 | JUNCTION | 0.77 | 155.87 | 3 | 12:53 | 0.0028 | 1.03 |
| 908 | JUNCTION | 0.64 | 151.41 | 3 | 14:02 | 0.00124 | 1.02 |
| 909 | JUNCTION | 1.72 | 152.03 | 3 | 14:04 | 0.0106 | 1.03 |
| 910 | JUNCTION | 5.25 | 227.70 | 3 | 14:05 | 0.00577 | 0.782 |
| A | JUNCTION | 143.04 | 1002.32 | 3 | 06:40 | 0.116 | 0.941 |
| AA | JUNCTION | 44.76 | 264.06 | 3 | 07:05 | 0.0582 | 0.457 |
| B | JUNCTION | 0.00 | 8.46 | 0 | 11:22 | 0 | 0.0432 |
| BB | JUNCTION | 21.94 | 40.84 | 3 | 09:00 | 0.0508 | 0.0981 |
| C | JUNCTION | 12.67 | 17.19 | 3 | 05:00 | 0.00694 | 0.071 |
| CC | JUNCTION | 20.99 | 30.22 | 3 | 07:00 | 0.0373 | 0.0533 |
| D | JUNCTION | 0.00 | 25.59 | 1 | 12:00 | 0 | 0.142 |
| DD | JUNCTION | 3.27 | 9.36 | 3 | 06:00 | 0.00514 | 0.016 |
| E | JUNCTION | 129.09 | 2272.40 | 3 | 07:05 | 0.105 | 2.19 |
| EE | JUNCTION | 5.78 | 6.25 | 3 | 05:05 | 0.00586 | 0.0104 |
| F | JUNCTION | 230.65 | 3430.62 | 3 | 08:15 | 0.187 | 4.53 |
| FF | JUNCTION | 1.80 | 1.80 | 3 | 11:00 | 0.00938 | 0.00938 |
| GG | JUNCTION | 1.15 | 1.77 | 0 | 11:22 | 0.00664 | 0.0117 |
| H | JUNCTION | 14.55 | 1923.67 | 3 | 14:01 | 0.00797 | 3[illegible] |
| J | JUNCTION | 37.87 | 257.81 | 3 | 06:05 | 0.044 | 0.261 |
| K | JUNCTION | 36.38 | 220.38 | 3 | 06:03 | 0.0271 | 0.213 |
| KK | JUNCTION | 5.64 | 1022.95 | 3 | 17:31 | 0.00309 | 3.82 |
| L | JUNCTION | 5.25 | 240.44 | 3 | 14:59 | 0.00577 | 0.845 |
| M | JUNCTION | 5.25 | 243.24 | 3 | 14:23 | 0.00577 | 0.847 |
| MM | JUNCTION | 10.50 | 1046.47 | 3 | 17:35 | 0.00447 | 4 |
| N | JUNCTION | 5.25 | 242.79 | 3 | 14:09 | 0.00577 | 0.853 |
| NN | JUNCTION | 25.22 | 204.01 | 3 | 14:04 | 0.04 | 0.697 |
| O | JUNCTION | 5.25 | 241.67 | 3 | 14:07 | 0.00577 | 0.859 |
| P | JUNCTION | 36.63 | 130.29 | 3 | 06:03 | 0.0402 | 0.473 |
| PP | JUNCTION | 19.62 | 275.17 | 3 | 06:10 | 0.0107 | 0.319 |
| Q | JUNCTION | 26.36 | 26.36 | 3 | 09:00 | 0.0736 | 0.0735 |
| QQ | JUNCTION | 19.62 | 231.51 | 3 | 06:01 | 0.0107 | 0.21 |
| R | JUNCTION | 22.52 | 47.28 | 3 | 06:50 | 0.0293 | 0.103 |
| RR | JUNCTION | 9.03 | 17.43 | 3 | 05:05 | 0.011 | 0.0163 |
| S | JUNCTION | 24.11 | 93.35 | 3 | 07:00 | 0.0528 | 0.193 |
| SS | JUNCTION | 2.02 | 24.32 | 3 | 16:14 | 0.00101 | 0.141 |
| T | JUNCTION | 22.52 | 114.50 | 3 | 07:00 | 0.0293 | 0.222 |
| TT | JUNCTION | 2.02 | 4.01 | 3 | 05:05 | 0.00101 | 0.00217 |
| U | JUNCTION | 23.24 | 136.51 | 3 | 07:05 | 0.0405 | 0.261 |
| V | JUNCTION | 22.52 | 157.53 | 3 | 07:05 | 0.0293 | 0.29 |
| W | JUNCTION | 23.60 | 180.36 | 3 | 07:05 | 0.0456 | 0.334 |
| X | JUNCTION | 20.28 | 198.30 | 3 | 07:05 | 0.0264 | 0.359 |
| Y | JUNCTION | 20.28 | 214.02 | 3 | 07:05 | 0.0264 | 0.382 |
| Z | JUNCTION | 20.28 | 229.69 | 3 | 08:15 | 0.0264 | 0.405 |
| 441 | JUNCTION | 2.02 | 61.64 | 4 | 11:11 | 0.00828 | 0.284 |
| UU | JUNCTION | 36.56 | 76.72 | 3 | 04:10 | 0.058 | 0.158 |
| JJ | JUNCTION | 40.16 | 40.16 | 3 | 04:10 | 0.0994 | 0.0995 |
| 1 | JUNCTION | 14.55 | 5375.50 | 3 | 14:02 | 0.00797 | 1[illegible] |
| WW | JUNCTION | 11.25 | 54.23 | 3 | 06:26 | 0.0177 | 0.185 |

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|---|---|---|---|---|---|---|---|
| VV | JUNCTION | 5.64 | 1019.90 | 3 | 17:35 | 0.00309 | 3.81 |
| 643 | JUNCTION | 4.41 | 120.50 | 4 | 12:05 | 0.0244 | 0.607 |
| 292 | JUNCTION | 0.16 | 116.69 | 4 | 12:05 | 0.000902 | 0.59 |
| 147 | JUNCTION | 3.82 | 116.88 | 4 | 12:05 | 0.0211 | 0.59 |
| 145 | JUNCTION | 113.36 | 113.36 | 4 | 12:00 | 0.573 | 0.573 |
| 566 | JUNCTION | 30.84 | 30.84 | 3 | 11:00 | 0.125 | 0.125 |
| 565 | JUNCTION | 15.47 | 42.58 | 3 | 14:05 | 0.0193 | 0.143 |
| ZZ | JUNCTION | 15.47 | 56.75 | 3 | 14:09 | 0.0193 | 0.162 |
| 3 | JUNCTION | 0.00 | 8.50 | 0 | 11:22 | 0 | 0.0586 |
| 4 | JUNCTION | 2.22 | 8.50 | 0 | 11:22 | 0.0153 | 0.0585 |
| 7 | JUNCTION | 1.96 | 6.27 | 0 | 11:22 | 0.0135 | 0.0432 |
| 8 | JUNCTION | 1.05 | 4.31 | 0 | 11:22 | 0.0072 | 0.0296 |
| 9 | JUNCTION | 0.65 | 3.27 | 0 | 11:00 | 0.0045 | 0.0225 |
| 12 | JUNCTION | 2.61 | 2.61 | 0 | 11:00 | 0.018 | 0.018 |
| WWTF | OUTFALL | 0.00 | 5375.27 | 3 | 14:02 | 0 | 12.6 |
| EelRiver | OUTFALL | 209742.16 | 209736.80 | 3 | 04:00 | 82.9 | 83.8 |

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

| Node | Type | Hours Surcharged | Max. Height Above Crown Feet | Min. Depth Below Rim Feet |
|---|---|---|---|---|
| 146 | JUNCTION | 67.93 | 0.329 | 11.398 |
| 211 | JUNCTION | 16.00 | 4.120 | 0.000 |
| 495 | JUNCTION | 143.50 | 17.655 | 26.755 |
| 612 | JUNCTION | 1.58 | 0.156 | 2.904 |
| 668 | JUNCTION | 66.96 | 0.418 | 3.549 |
| 690 | JUNCTION | 8.04 | 0.251 | 3.279 |
| 694 | JUNCTION | 8.97 | 2.134 | 3.146 |
| 816 | JUNCTION | 7.93 | 0.168 | 6.282 |
| 835 | JUNCTION | 15.99 | 0.345 | 7.218 |
| MM | JUNCTION | 141.81 | 20.000 | 0.000 |
| UU | JUNCTION | 143.02 | 19.670 | 0.000 |
| JJ | JUNCTION | 144.00 | 0.000 | 10.000 |
| VV | JUNCTION | 142.75 | 25.442 | 0.000 |
| 12 | JUNCTION | 144.00 | 0.000 | 6.000 |

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Node Flooding Summary
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Flooding refers to all water that overflows a node, whether it ponds or not.

| Node | Hours Flooded | Maximum Rate GPM | Time of Max Occurrence days hr:min | Total Flood Volume 10^6 gal | Maximum Ponded Depth Feet |
|---|---|---|---|---|---|
| 211 | 0.92 | 56.55 | 3 05:05 | 0.003 | 0.000 |
| MM | 0.01 | 80.55 | 0 02:12 | 0.000 | 15.000 |
| UU | 0.07 | 0.32 | 3 04:00 | 0.000 | 10.000 |

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Outfall Loading Summary
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| Outfall Node | Flow Freq Pcnt | Avg Flow GPM | Max Flow GPM | Total Volume 10^6 gal |
|---|---|---|---|---|
| WWTF | 99.97 | 1669.04 | 5375.27 | 12.606 |
| EelRiver | 53.77 | 24460.08 | 209736.80 | 83.771 |
| System | 76.87 | 26129.11 | 210490.10 | 96.377 |

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Link Flow Summary
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| Link | Type | Maximum \|Flow\| GPM | Time of Max Occurrence days | hr:min | Maximum \|Veloc\| ft/sec | Max/ Full Flow | Max/ Full Depth |
|---|---|---|---|---|---|---|---|
| 1 | CONDUIT | 128.18 | 3 | 08:00 | 4.92 | 0.24 | 0.36 |
| 2 | CONDUIT | 141.74 | 3 | 10:00 | 4.99 | 0.30 | 0.36 |
| 3 | CONDUIT | 155.31 | 3 | 10:00 | 6.83 | 0.22 | 0.30 |
| 4 | CONDUIT | 169.14 | 3 | 09:00 | 7.37 | 0.17 | 0.31 |
| 5 | CONDUIT | 182.52 | 3 | 09:00 | 6.88 | 0.24 | 0.34 |
| 6 | CONDUIT | 195.65 | 3 | 09:00 | 5.09 | 0.27 | 0.45 |
| 7 | CONDUIT | 208.17 | 3 | 10:05 | 5.67 | 0.51 | 0.43 |
| 8 | CONDUIT | 221.38 | 3 | 09:00 | 3.58 | 0.22 | 0.66 |
| 9 | CONDUIT | 235.32 | 3 | 07:05 | 3.49 | 4.29 | 0.71 |
| 10 | CONDUIT | 248.60 | 3 | 09:00 | 6.72 | 0.38 | 0.44 |
| 11 | CONDUIT | 261.12 | 3 | 10:05 | 6.81 | 0.41 | 0.45 |
| 12 | CONDUIT | 273.25 | 3 | 10:25 | 5.24 | 0.42 | 0.59 |
| 13 | CONDUIT | 283.87 | 3 | 12:00 | 4.96 | 0.82 | 0.62 |
| 14 | CONDUIT | 294.35 | 3 | 11:35 | 6.44 | 0.51 | 0.51 |
| 15 | CONDUIT | 304.44 | 3 | 12:10 | 5.26 | 0.54 | 0.70 |
| 16 | CONDUIT | 301.54 | 3 | 14:01 | 3.51 | 0.88 | 0.94 |
| 17 | CONDUIT | 308.58 | 3 | 14:01 | 1.76 | 0.37 | 0.67 |
| 18 | CONDUIT | 315.21 | 3 | 14:01 | 3.47 | 0.26 | 0.41 |
| 19 | CONDUIT | 319.60 | 3 | 14:03 | 2.67 | 0.46 | 0.51 |
| 20 | CONDUIT | 322.74 | 3 | 14:04 | 2.16 | 0.52 | 0.59 |
| 21 | CONDUIT | 329.69 | 3 | 14:05 | 2.26 | 0.69 | 0.58 |
| 22 | CONDUIT | 359.69 | 3 | 14:07 | 2.69 | 0.53 | 0.54 |
| 23 | CONDUIT | 359.57 | 3 | 14:07 | 2.63 | 0.59 | 0.55 |
| 24 | CONDUIT | 359.50 | 3 | 14:10 | 2.66 | 0.57 | 0.55 |
| 25 | CONDUIT | 354.45 | 3 | 14:30 | 2.38 | 0.61 | 0.59 |
| 26 | CONDUIT | 353.00 | 3 | 14:53 | 2.51 | 0.67 | 0.56 |
| 27 | CONDUIT | 351.79 | 3 | 15:09 | 2.48 | 0.51 | 0.56 |
| 28 | CONDUIT | 351.48 | 3 | 15:28 | 2.36 | 0.74 | 0.59 |
| 30 | CONDUIT | 96.80 | 3 | 06:00 | 2.34 | 0.36 | 0.54 |
| 31 | CONDUIT | 115.36 | 3 | 06:10 | 1.93 | 0.76 | 0.64 |
| 34 | CONDUIT | 142.72 | 3 | 06:15 | 1.42 | 0.20 | 0.33 |
| 35 | CONDUIT | 161.22 | 3 | 06:45 | 1.73 | 0.23 | 0.31 |

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|---|---|---|---|---|---|---|---|
| 36 | CONDUIT | 179.00 | 3 | 06:55 | 2.00 | 0.14 | 0.30 |
| 37 | CONDUIT | 196.10 | 3 | 12:39 | 1.46 | 0.27 | 0.41 |
| 38 | CONDUIT | 190.10 | 3 | 14:03 | 1.58 | 0.45 | 0.37 |
| 40 | CONDUIT | 209.99 | 3 | 14:06 | 1.20 | 0.25 | 0.67 |
| 41 | CONDUIT | 217.45 | 3 | 14:06 | 1.14 | 0.40 | 0.78 |
| 42 | CONDUIT | 557.17 | 3 | 15:07 | 2.90 | 0.33 | 0.43 |
| 43 | CONDUIT | 563.21 | 3 | 15:59 | 2.37 | 0.43 | 0.50 |
| 44 | CONDUIT | 606.53 | 3 | 16:07 | 1.54 | 0.43 | 0.77 |
| 45 | CONDUIT | 6.58 | 0 | 11:22 | 0.99 | 0.03 | 0.13 |
| 46 | CONDUIT | 3.94 | 0 | 11:22 | 0.64 | 0.02 | 0.12 |
| 50 | CONDUIT | 4.12 | 0 | 11:22 | 1.54 | 0.01 | 0.08 |
| 51 | CONDUIT | 5.98 | 0 | 11:22 | 1.00 | 0.02 | 0.12 |
| 54 | CONDUIT | 33.87 | 0 | 12:00 | 1.88 | 0.17 | 0.26 |
| 55 | CONDUIT | 33.75 | 0 | 14:00 | 1.61 | 0.11 | 0.53 |
| 56 | CONDUIT | 145.24 | 3 | 06:35 | 4.12 | 0.19 | 0.49 |
| 57 | CONDUIT | 288.57 | 3 | 06:45 | 2.94 | 0.52 | 0.60 |
| 58 | CONDUIT | 430.96 | 3 | 06:55 | 3.60 | 0.83 | 0.71 |
| 59 | CONDUIT | 573.31 | 3 | 06:50 | 3.55 | 0.65 | 0.63 |
| 60 | CONDUIT | 715.64 | 3 | 07:05 | 4.61 | 0.76 | 0.61 |
| 61 | CONDUIT | 859.88 | 3 | 07:00 | 5.04 | 0.59 | 0.66 |
| 62 | CONDUIT | 999.32 | 3 | 07:05 | 4.65 | 0.93 | 0.82 |
| 63 | CONDUIT | 8.46 | 0 | 11:22 | 1.18 | 0.04 | 0.14 |
| 64 | CONDUIT | 8.45 | 0 | 14:00 | 0.91 | 0.04 | 0.16 |
| 65 | CONDUIT | 12.45 | 0 | 12:00 | 1.54 | 0.05 | 0.15 |
| 66 | CONDUIT | 16.16 | 3 | 06:00 | 1.66 | 0.06 | 0.17 |
| 67 | CONDUIT | 25.59 | 1 | 12:00 | 1.94 | 0.08 | 0.21 |
| 68 | CONDUIT | 25.57 | 0 | 14:00 | 1.47 | 0.11 | 0.26 |
| 69 | CONDUIT | 196.72 | 3 | 14:04 | 2.28 | 0.16 | 0.29 |
| 70 | CONDUIT | 203.48 | 3 | 14:05 | 2.27 | 0.21 | 0.30 |
| 71 | CONDUIT | 1600.93 | 3 | 08:00 | 4.61 | 0.71 | 0.68 |
| 72 | CONDUIT | 1822.14 | 3 | 08:00 | 5.79 | 0.86 | 0.63 |
| 73 | CONDUIT | 2043.90 | 3 | 08:00 | 6.98 | 0.53 | 0.61 |
| 74 | CONDUIT | 2148.38 | 3 | 08:15 | 3.67 | 0.38 | 0.72 |
| 75 | CONDUIT | 2254.44 | 3 | 08:48 | 3.31 | 1.21 | 0.80 |
| 76 | CONDUIT | 2435.41 | 3 | 09:00 | 3.98 | 0.85 | 0.72 |
| 77 | CONDUIT | 2580.86 | 3 | 10:05 | 3.53 | 0.90 | 0.87 |
| 78 | CONDUIT | 2609.57 | 3 | 13:00 | 3.39 | 1.28 | 0.74 |
| 79 | CONDUIT | 2733.27 | 3 | 11:35 | 3.82 | 0.44 | 0.69 |
| 80 | CONDUIT | 3244.76 | 3 | 12:39 | 3.27 | 0.85 | 0.67 |
| 81 | CONDUIT | 3383.56 | 3 | 10:05 | 3.20 | 0.63 | 0.70 |
| 82 | CONDUIT | 1216.53 | 3 | 12:28 | 2.44 | 4.63 | 0.85 |
| 83 | CONDUIT | 3187.10 | 3 | 13:52 | 3.09 | 1.91 | 0.48 |
| 85 | CONDUIT | 619.84 | 3 | 16:06 | 8.64 | 0.30 | 0.93 |
| 87 | CONDUIT | 1920.76 | 3 | 14:01 | 3.03 | 0.40 | 0.46 |
| 90 | CONDUIT | 2454.34 | 3 | 14:00 | 3.20 | 0.25 | 0.38 |
| 91 | CONDUIT | 1177.69 | 3 | 06:10 | 2.22 | 0.88 | 1.00 |
| 92 | CONDUIT | 1223.85 | 3 | 06:10 | 2.60 | 0.81 | 1.00 |
| 94 | CONDUIT | 240.81 | 3 | 16:38 | 1.90 | 0.32 | 0.60 |
| 95 | CONDUIT | 244.70 | 3 | 14:03 | 1.37 | 0.33 | 0.82 |
| 96 | CONDUIT | 270.55 | 3 | 14:09 | 1.09 | 0.45 | 1.00 |
| 97 | CONDUIT | 1895.45 | 3 | 07:00 | 4.06 | 1.00 | 1.00 |
| 98 | CONDUIT | 1671.23 | 3 | 06:25 | 3.14 | 3.15 | 1.00 |
| 99 | CONDUIT | 36.11 | 3 | 06:05 | 1.78 | 0.10 | 0.29 |
| 100 | CONDUIT | 74.10 | 3 | 06:01 | 2.40 | 0.35 | 0.39 |
| 101 | CONDUIT | 36.76 | 3 | 06:03 | 1.78 | 0.11 | 0.32 |
| 102 | CONDUIT | 147.95 | 3 | 06:05 | 3.91 | 0.28 | 0.45 |
| 103 | CONDUIT | 184.23 | 3 | 06:05 | 3.35 | 0.57 | 0.60 |
| 104 | CONDUIT | 220.14 | 3 | 06:10 | 3.46 | 0.77 | 0.69 |

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|---|---|---|---|---|---|---|---|
| 105 | CONDUIT | 257.21 | 3 | 06:15 | 3.77 | 0.86 | 0.73 |
| 106 | CONDUIT | 292.88 | 3 | 06:25 | 2.94 | 0.59 | 0.66 |
| 107 | CONDUIT | 325.02 | 3 | 07:05 | 2.62 | 0.92 | 0.74 |
| 108 | CONDUIT | 463.06 | 3 | 07:05 | 3.23 | 0.87 | 0.86 |
| 109 | CONDUIT | 238.70 | 3 | 16:25 | 2.08 | 0.24 | 0.39 |
| 110 | CONDUIT | 239.74 | 3 | 16:05 | 2.35 | 0.24 | 0.33 |
| 111 | CONDUIT | 239.31 | 3 | 15:47 | 2.20 | 0.27 | 0.35 |
| 112 | CONDUIT | 239.54 | 3 | 14:59 | 2.19 | 0.25 | 0.35 |
| 113 | CONDUIT | 242.36 | 3 | 14:23 | 2.33 | 0.24 | 0.34 |
| 114 | CONDUIT | 241.81 | 3 | 14:10 | 2.31 | 0.25 | 0.34 |
| 115 | CONDUIT | 240.67 | 3 | 14:07 | 2.24 | 0.26 | 0.34 |
| 116 | CONDUIT | 226.76 | 3 | 14:06 | 2.07 | 0.26 | 0.35 |
| 117 | CONDUIT | 226.70 | 3 | 14:05 | 1.93 | 0.30 | 0.37 |
| 118 | CONDUIT | 226.18 | 3 | 14:03 | 1.88 | 0.29 | 0.38 |
| 119 | CONDUIT | 219.41 | 3 | 14:02 | 1.97 | 0.25 | 0.35 |
| 120 | CONDUIT | 218.32 | 3 | 14:01 | 2.43 | 0.31 | 0.39 |
| 121 | CONDUIT | 217.31 | 3 | 14:01 | 1.81 | 0.35 | 0.37 |
| 122 | CONDUIT | 217.34 | 3 | 14:00 | 1.82 | 0.22 | 0.37 |
| 123 | CONDUIT | 214.65 | 3 | 12:10 | 2.91 | 0.19 | 0.34 |
| 124 | CONDUIT | 211.42 | 3 | 10:25 | 2.62 | 0.37 | 0.36 |
| 125 | CONDUIT | 206.55 | 3 | 06:35 | 2.26 | 0.29 | 0.40 |
| 126 | CONDUIT | 205.10 | 3 | 06:25 | 2.05 | 0.44 | 0.43 |
| 127 | CONDUIT | 204.63 | 3 | 06:10 | 1.76 | 0.46 | 0.48 |
| 128 | CONDUIT | 204.15 | 3 | 06:10 | 1.92 | 0.37 | 0.45 |
| 129 | CONDUIT | 80.28 | 3 | 04:10 | 1.42 | 0.10 | 0.32 |
| 130 | CONDUIT | 53.27 | 3 | 06:03 | 2.19 | 0.18 | 0.32 |
| 131 | CONDUIT | 29.19 | 3 | 04:10 | 1.68 | 0.11 | 0.25 |
| 133 | CONDUIT | 105.89 | 3 | 06:05 | 1.81 | 0.05 | 0.18 |
| 134 | CONDUIT | 80.61 | 3 | 06:10 | 1.72 | 0.05 | 0.15 |
| 135 | CONDUIT | 56.14 | 3 | 06:10 | 1.35 | 0.04 | 0.14 |
| 136 | CONDUIT | 24.62 | 3 | 06:03 | 0.89 | 0.01 | 0.11 |
| 138 | CONDUIT | 1450.08 | 3 | 11:35 | 4.45 | 0.87 | 0.89 |
| 139 | CONDUIT | 780.38 | 3 | 07:05 | 2.65 | 1.11 | 0.84 |
| 140 | CONDUIT | 559.47 | 3 | 08:00 | 1.97 | 0.89 | 0.84 |
| 141 | CONDUIT | 499.90 | 3 | 16:40 | 1.73 | 1.07 | 0.77 |
| 142 | CONDUIT | 392.53 | 3 | 15:57 | 1.80 | 0.89 | 0.84 |
| 143 | CONDUIT | 483.25 | 3 | 06:35 | 2.53 | 0.66 | 0.76 |
| 144 | CONDUIT | 243.86 | 3 | 06:25 | 1.51 | 0.75 | 0.63 |
| 145 | CONDUIT | 407.10 | 3 | 14:24 | 1.93 | 1.41 | 0.83 |
| 146 | CONDUIT | 406.43 | 3 | 14:11 | 2.07 | 0.63 | 0.76 |
| 147 | CONDUIT | 397.19 | 3 | 14:07 | 2.42 | 0.78 | 0.64 |
| 148 | CONDUIT | 392.02 | 3 | 14:05 | 2.51 | 0.56 | 0.62 |
| 149 | CONDUIT | 365.66 | 3 | 14:04 | 2.92 | 0.48 | 0.51 |
| 150 | CONDUIT | 354.87 | 3 | 14:03 | 3.02 | 0.47 | 0.49 |
| 151 | CONDUIT | 340.22 | 3 | 14:02 | 2.92 | 0.47 | 0.48 |
| 152 | CONDUIT | 321.64 | 3 | 14:00 | 2.82 | 0.45 | 0.48 |
| 153 | CONDUIT | 53.45 | 3 | 14:56 | 1.46 | 0.19 | 0.53 |
| 154 | CONDUIT | 254.53 | 3 | 11:35 | 4.24 | 0.54 | 0.65 |
| 155 | CONDUIT | 223.60 | 3 | 12:06 | 4.96 | 0.49 | 0.51 |
| 156 | CONDUIT | 210.93 | 3 | 10:39 | 4.92 | 0.47 | 0.49 |
| 157 | CONDUIT | 194.94 | 3 | 10:25 | 4.77 | 0.43 | 0.47 |
| 158 | CONDUIT | 178.73 | 3 | 10:00 | 4.67 | 0.39 | 0.45 |
| 159 | CONDUIT | 156.92 | 3 | 08:15 | 4.64 | 0.31 | 0.41 |
| 160 | CONDUIT | 135.42 | 3 | 09:00 | 4.38 | 0.31 | 0.38 |
| 161 | CONDUIT | 113.47 | 3 | 08:48 | 3.83 | 0.27 | 0.37 |
| 162 | CONDUIT | 92.35 | 3 | 10:00 | 3.66 | 0.20 | 0.33 |
| 163 | CONDUIT | 69.32 | 3 | 08:15 | 3.37 | 0.15 | 0.28 |
| 164 | CONDUIT | 46.91 | 3 | 08:00 | 2.94 | 0.10 | 0.24 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 165 | CONDUIT | 25.32 | 3 | 10:25 | 2.31 | 0.05 | 0.18 |
| 166 | CONDUIT | 25.04 | 3 | 15:00 | 0.90 | 0.27 | 0.35 |
| 167 | CONDUIT | 20.17 | 3 | 14:00 | 0.74 | 0.26 | 0.36 |
| 168 | CONDUIT | 9.27 | 3 | 06:25 | 0.70 | 0.06 | 0.26 |
| 170 | CONDUIT | 0.78 | 4 | 12:05 | 0.48 | 0.00 | 0.07 |
| 171 | CONDUIT | 6.22 | 3 | 05:05 | 1.00 | 0.03 | 0.14 |
| 172 | CONDUIT | 0.86 | 4 | 12:05 | 0.45 | 0.00 | 0.06 |
| 173 | CONDUIT | 1.77 | 0 | 11:22 | 0.62 | 0.01 | 0.07 |
| 174 | CONDUIT | 2.83 | 0 | 11:22 | 0.86 | 0.01 | 0.08 |
| 175 | CONDUIT | 3.22 | 3 | 08:00 | 0.82 | 0.01 | 0.09 |
| 176 | CONDUIT | 4.17 | 3 | 13:14 | 0.92 | 0.02 | 0.10 |
| 177 | CONDUIT | 4.82 | 3 | 14:02 | 0.75 | 0.02 | 0.30 |
| 178 | CONDUIT | 156.85 | 3 | 14:06 | 2.40 | 0.14 | 0.24 |
| 179 | CONDUIT | 157.72 | 3 | 14:07 | 2.55 | 0.12 | 0.23 |
| 180 | CONDUIT | 158.17 | 3 | 14:09 | 2.44 | 0.12 | 0.24 |
| 181 | CONDUIT | 160.84 | 3 | 14:17 | 2.37 | 0.13 | 0.25 |
| 182 | CONDUIT | 163.58 | 3 | 14:35 | 2.24 | 0.14 | 0.26 |
| 183 | CONDUIT | 164.89 | 3 | 15:00 | 2.42 | 0.15 | 0.25 |
| 184 | CONDUIT | 164.87 | 3 | 15:23 | 2.80 | 0.11 | 0.22 |
| 185 | CONDUIT | 164.88 | 3 | 16:00 | 2.85 | 0.11 | 0.22 |
| 186 | CONDUIT | 164.70 | 3 | 16:05 | 2.52 | 0.11 | 0.24 |
| 187 | CONDUIT | 164.40 | 3 | 16:17 | 2.13 | 0.15 | 0.27 |
| 188 | CONDUIT | 166.08 | 3 | 16:32 | 2.25 | 0.17 | 0.28 |
| 189 | CONDUIT | 169.06 | 3 | 16:56 | 1.68 | 0.12 | 0.45 |
| 190 | CONDUIT | 808.72 | 3 | 17:31 | 3.63 | 0.67 | 0.61 |
| 191 | CONDUIT | 808.11 | 3 | 17:21 | 3.50 | 0.74 | 0.62 |
| 192 | CONDUIT | 711.23 | 3 | 17:05 | 3.58 | 0.43 | 0.55 |
| 193 | CONDUIT | 708.39 | 3 | 17:02 | 6.29 | 0.14 | 0.36 |
| 194 | CONDUIT | 705.27 | 3 | 16:59 | 8.10 | 0.22 | 0.30 |
| 195 | CONDUIT | 702.84 | 3 | 16:53 | 7.80 | 0.16 | 0.30 |
| 196 | CONDUIT | 700.21 | 3 | 16:48 | 4.47 | 0.66 | 0.46 |
| 197 | CONDUIT | 698.30 | 3 | 16:36 | 3.12 | 0.63 | 0.61 |
| 198 | CONDUIT | 697.89 | 3 | 16:24 | 4.58 | 0.22 | 0.45 |
| 199 | CONDUIT | 689.64 | 3 | 16:20 | 6.84 | 0.24 | 0.33 |
| 200 | CONDUIT | 661.37 | 3 | 16:17 | 6.54 | 0.22 | 0.33 |
| 201 | CONDUIT | 658.44 | 3 | 16:12 | 5.90 | 0.30 | 0.35 |
| 202 | CONDUIT | 653.27 | 3 | 16:09 | 5.34 | 0.29 | 0.38 |
| 203 | CONDUIT | 649.84 | 3 | 16:05 | 4.60 | 0.43 | 0.42 |
| 204 | CONDUIT | 1018.58 | 3 | 17:35 | 11.07 | 0.67 | 0.31 |
| 205 | CONDUIT | 1009.43 | 3 | 18:10 | 3.23 | 0.83 | 0.62 |
| 206 | CONDUIT | 1008.71 | 3 | 18:06 | 3.35 | 0.91 | 0.80 |
| 210 | CONDUIT | 1019.99 | 3 | 17:35 | 2.89 | 1.22 | 1.00 |
| 211 | CONDUIT | 60.92 | 3 | 06:15 | 0.69 | 0.15 | 1.00 |
| 213 | CONDUIT | 15.93 | 3 | 06:25 | 0.86 | 0.11 | 0.26 |
| 214 | CONDUIT | 9.39 | 3 | 06:10 | 0.96 | 0.07 | 0.20 |
| 215 | CONDUIT | 25.26 | 3 | 06:35 | 1.18 | 0.17 | 0.29 |
| 216 | CONDUIT | 20.22 | 3 | 13:14 | 1.10 | 0.14 | 0.27 |
| 217 | CONDUIT | 6.95 | 3 | 06:10 | 0.55 | 0.06 | 0.21 |
| 218 | CONDUIT | 179.55 | 4 | 15:00 | 2.14 | 0.17 | 0.49 |
| 219 | CONDUIT | 176.37 | 4 | 16:00 | 2.61 | 0.26 | 0.32 |
| 220 | CONDUIT | 173.32 | 4 | 13:00 | 2.96 | 0.26 | 0.40 |
| 221 | CONDUIT | 169.59 | 4 | 12:05 | 4.38 | 0.13 | 0.30 |
| 222 | CONDUIT | 163.38 | 4 | 13:00 | 5.16 | 0.15 | 0.26 |
| 223 | CONDUIT | 159.99 | 4 | 13:00 | 3.69 | 0.27 | 0.32 |
| 224 | CONDUIT | 155.84 | 4 | 13:00 | 3.10 | 0.25 | 0.36 |
| 225 | CONDUIT | 150.41 | 4 | 13:00 | 1.98 | 0.61 | 0.49 |
| 226 | CONDUIT | 74.71 | 4 | 12:00 | 1.08 | 0.17 | 0.46 |
| 227 | CONDUIT | 72.58 | 4 | 12:00 | 1.97 | 0.18 | 0.29 |

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|---|---|---|---|---|---|---|---|
| 228 | CONDUIT | 67.44 | 4 | 11:11 | 1.89 | 0.16 | 0.28 |
| 230 | CONDUIT | 56.69 | 4 | 11:11 | 1.62 | 0.15 | 0.27 |
| 231 | CONDUIT | 53.23 | 4 | 11:11 | 1.74 | 0.12 | 0.25 |
| 232 | CONDUIT | 49.51 | 4 | 11:11 | 1.62 | 0.15 | 0.25 |
| 233 | CONDUIT | 45.93 | 4 | 11:11 | 1.58 | 0.10 | 0.24 |
| 234 | CONDUIT | 40.12 | 4 | 11:11 | 1.74 | 0.08 | 0.20 |
| 235 | CONDUIT | 37.32 | 4 | 11:11 | 1.77 | 0.08 | 0.19 |
| 236 | CONDUIT | 35.04 | 4 | 12:00 | 1.92 | 0.15 | 0.26 |
| 237 | CONDUIT | 33.02 | 4 | 12:00 | 2.18 | 0.08 | 0.23 |
| 238 | CONDUIT | 31.14 | 4 | 12:00 | 1.65 | 0.21 | 0.27 |
| 239 | CONDUIT | 8.68 | 4 | 12:00 | 0.54 | 0.06 | 0.26 |
| 240 | CONDUIT | 20.46 | 4 | 10:10 | 1.42 | 0.04 | 0.24 |
| 241 | CONDUIT | 14.33 | 4 | 11:05 | 2.21 | 0.03 | 0.13 |
| 242 | CONDUIT | 8.21 | 4 | 11:05 | 0.98 | 0.06 | 0.15 |
| 243 | CONDUIT | 73.67 | 4 | 13:00 | 1.42 | 0.19 | 0.57 |
| 244 | CONDUIT | 71.56 | 4 | 14:00 | 2.90 | 0.25 | 0.32 |
| 245 | CONDUIT | 22.67 | 4 | 12:00 | 1.14 | 0.10 | 0.28 |
| 246 | CONDUIT | 20.01 | 4 | 11:11 | 1.67 | 0.06 | 0.19 |
| 247 | CONDUIT | 17.47 | 4 | 11:11 | 1.69 | 0.07 | 0.17 |
| 248 | CONDUIT | 14.92 | 4 | 11:10 | 1.32 | 0.08 | 0.19 |
| 249 | CONDUIT | 4.25 | 4 | 11:11 | 0.57 | 0.02 | 0.14 |
| 252 | CONDUIT | 1.77 | 4 | 11:10 | 0.50 | 0.01 | 0.09 |
| 253 | CONDUIT | 46.81 | 4 | 15:00 | 1.26 | 0.05 | 0.16 |
| 254 | CONDUIT | 44.92 | 4 | 15:00 | 1.37 | 0.05 | 0.15 |
| 255 | CONDUIT | 43.39 | 4 | 13:00 | 1.40 | 0.04 | 0.14 |
| 256 | CONDUIT | 41.69 | 4 | 12:01 | 1.89 | 0.21 | 0.30 |
| 257 | CONDUIT | 39.60 | 4 | 12:00 | 2.08 | 0.10 | 0.27 |
| 258 | CONDUIT | 37.64 | 4 | 12:00 | 2.73 | 0.10 | 0.21 |
| 259 | CONDUIT | 35.29 | 4 | 12:02 | 1.86 | 0.21 | 0.27 |
| 260 | CONDUIT | 11.56 | 4 | 12:00 | 0.72 | 0.06 | 0.25 |
| 261 | CONDUIT | 8.94 | 4 | 11:11 | 0.96 | 0.05 | 0.16 |
| 262 | CONDUIT | 5.66 | 4 | 11:11 | 0.78 | 0.03 | 0.14 |
| 263 | CONDUIT | 3.43 | 4 | 11:10 | 1.23 | 0.01 | 0.09 |
| 265 | CONDUIT | 1.63 | 4 | 08:15 | 0.63 | 0.01 | 0.07 |
| 266 | CONDUIT | 4.89 | 4 | 08:20 | 0.73 | 0.01 | 0.14 |
| 267 | CONDUIT | 3.26 | 4 | 08:17 | 1.00 | 0.01 | 0.08 |
| 268 | CONDUIT | 20.89 | 4 | 12:00 | 1.03 | 0.12 | 0.28 |
| 269 | CONDUIT | 18.80 | 4 | 12:00 | 1.53 | 0.05 | 0.20 |
| 270 | CONDUIT | 16.96 | 4 | 12:00 | 1.53 | 0.09 | 0.18 |
| 271 | CONDUIT | 8.96 | 4 | 11:11 | 1.02 | 0.02 | 0.16 |
| 272 | CONDUIT | 6.85 | 4 | 11:11 | 1.15 | 0.04 | 0.12 |
| 273 | CONDUIT | 4.36 | 4 | 11:10 | 0.92 | 0.01 | 0.10 |
| 274 | CONDUIT | 2.12 | 4 | 11:05 | 1.11 | 0.00 | 0.05 |
| 276 | CONDUIT | 5.38 | 4 | 11:11 | 0.90 | 0.03 | 0.16 |
| 277 | CONDUIT | 646.66 | 3 | 16:01 | 6.17 | 0.25 | 0.40 |
| 278 | CONDUIT | 45.73 | 3 | 06:05 | 1.42 | 0.08 | 0.30 |
| 279 | CONDUIT | 23.08 | 3 | 06:00 | 1.30 | 0.06 | 0.18 |
| 280 | CONDUIT | 615.14 | 3 | 16:00 | 4.23 | 0.85 | 0.57 |
| 281 | CONDUIT | 553.80 | 3 | 15:20 | 2.97 | 0.82 | 0.72 |
| 282 | CONDUIT | 552.60 | 3 | 15:00 | 3.27 | 0.68 | 0.66 |
| 283 | CONDUIT | 550.16 | 3 | 14:41 | 3.56 | 0.66 | 0.61 |
| 284 | CONDUIT | 525.41 | 3 | 14:20 | 2.04 | 2.19 | 0.69 |
| 285 | CONDUIT | 524.50 | 3 | 14:10 | 2.47 | 0.71 | 0.81 |
| 286 | CONDUIT | 400.61 | 3 | 14:08 | 2.69 | 0.58 | 0.59 |
| 287 | CONDUIT | 396.63 | 3 | 14:07 | 3.11 | 0.47 | 0.52 |
| 288 | CONDUIT | 394.38 | 3 | 14:06 | 3.43 | 0.44 | 0.48 |
| 289 | CONDUIT | 392.23 | 3 | 14:05 | 2.62 | 0.78 | 0.59 |
| 290 | CONDUIT | 372.80 | 3 | 14:03 | 3.33 | 0.49 | 0.69 |

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|---|---|---|---|---|---|---|---|
| 291 | CONDUIT | 372.08 | 3 | 14:02 | 4.50 | 0.58 | 0.52 |
| 292 | CONDUIT | 369.94 | 3 | 14:01 | 3.31 | 0.91 | 0.67 |
| 293 | CONDUIT | 94.44 | 3 | 06:35 | 1.83 | 0.08 | 0.48 |
| 294 | CONDUIT | 76.33 | 3 | 06:26 | 3.77 | 0.08 | 0.19 |
| 295 | CONDUIT | 57.54 | 3 | 06:25 | 2.12 | 0.15 | 0.23 |
| 296 | CONDUIT | 38.57 | 3 | 06:10 | 1.36 | 0.10 | 0.24 |
| 297 | CONDUIT | 19.81 | 3 | 05:05 | 1.68 | 0.02 | 0.15 |
| 298 | CONDUIT | 129.55 | 3 | 08:00 | 2.04 | 0.12 | 0.54 |
| 299 | CONDUIT | 117.87 | 3 | 08:05 | 3.60 | 0.17 | 0.26 |
| 300 | CONDUIT | 107.45 | 3 | 08:10 | 2.46 | 0.25 | 0.32 |
| 301 | CONDUIT | 97.16 | 3 | 07:05 | 2.91 | 0.07 | 0.27 |
| 302 | CONDUIT | 85.47 | 3 | 08:00 | 3.16 | 0.15 | 0.23 |
| 303 | CONDUIT | 72.54 | 3 | 08:00 | 2.89 | 0.05 | 0.22 |
| 304 | CONDUIT | 61.02 | 3 | 08:00 | 3.46 | 0.07 | 0.17 |
| 305 | CONDUIT | 49.29 | 3 | 06:55 | 3.01 | 0.04 | 0.16 |
| 306 | CONDUIT | 37.74 | 3 | 07:05 | 2.08 | 0.09 | 0.17 |
| 307 | CONDUIT | 24.44 | 3 | 08:48 | 1.25 | 0.05 | 0.18 |
| 308 | CONDUIT | 25.22 | 3 | 06:25 | 2.67 | 0.02 | 0.13 |
| 309 | CONDUIT | 70.35 | 3 | 06:26 | 2.02 | 0.15 | 0.57 |
| 310 | CONDUIT | 57.14 | 3 | 06:25 | 3.15 | 0.15 | 0.26 |
| 311 | CONDUIT | 43.72 | 3 | 06:10 | 2.86 | 0.09 | 0.23 |
| 312 | CONDUIT | 29.95 | 3 | 06:05 | 2.66 | 0.06 | 0.19 |
| 313 | CONDUIT | 16.40 | 3 | 06:03 | 2.12 | 0.03 | 0.15 |
| 314 | CONDUIT | 157.89 | 3 | 14:01 | 2.36 | 0.19 | 0.52 |
| 315 | CONDUIT | 156.05 | 3 | 14:00 | 4.06 | 0.19 | 0.29 |
| 316 | CONDUIT | 38.23 | 3 | 06:26 | 2.07 | 0.09 | 0.29 |
| 317 | CONDUIT | 29.30 | 3 | 06:15 | 2.73 | 0.06 | 0.18 |
| 318 | CONDUIT | 20.23 | 3 | 06:10 | 2.52 | 0.04 | 0.15 |
| 319 | CONDUIT | 9.50 | 3 | 06:03 | 1.59 | 0.03 | 0.12 |
| 321 | CONDUIT | 44.93 | 3 | 06:35 | 1.31 | 0.14 | 0.62 |
| 323 | CONDUIT | 30.26 | 3 | 06:15 | 1.55 | 0.18 | 0.27 |
| 324 | CONDUIT | 14.69 | 3 | 05:05 | 1.48 | 0.03 | 0.20 |
| 326 | CONDUIT | 294.65 | 3 | 13:00 | 3.22 | 0.29 | 0.58 |
| 327 | CONDUIT | 288.41 | 3 | 13:29 | 3.54 | 0.69 | 0.52 |
| 328 | CONDUIT | 289.96 | 3 | 07:05 | 3.41 | 0.44 | 0.56 |
| 329 | CONDUIT | 273.99 | 3 | 06:25 | 4.04 | 0.41 | 0.46 |
| 330 | CONDUIT | 256.24 | 3 | 06:10 | 3.89 | 0.39 | 0.44 |
| 331 | CONDUIT | 230.93 | 3 | 06:02 | 4.73 | 0.18 | 0.36 |
| 332 | CONDUIT | 212.37 | 3 | 06:01 | 5.33 | 0.21 | 0.30 |
| 333 | CONDUIT | 191.78 | 3 | 06:00 | 4.52 | 0.22 | 0.32 |
| 334 | CONDUIT | 172.22 | 3 | 06:00 | 6.93 | 0.12 | 0.33 |
| 335 | CONDUIT | 172.08 | 3 | 06:00 | 7.15 | 0.29 | 0.32 |
| 336 | CONDUIT | 130.13 | 3 | 05:05 | 4.64 | 0.21 | 0.36 |
| 338 | CONDUIT | 45.21 | 3 | 05:05 | 3.29 | 0.08 | 0.22 |
| 339 | CONDUIT | 87.74 | 3 | 05:05 | 4.47 | 0.13 | 0.28 |
| 340 | CONDUIT | 118.04 | 3 | 14:00 | 2.79 | 0.24 | 0.31 |
| 341 | CONDUIT | 116.10 | 3 | 13:00 | 2.10 | 0.35 | 0.38 |
| 342 | CONDUIT | 111.66 | 3 | 08:48 | 2.57 | 0.10 | 0.32 |
| 343 | CONDUIT | 106.49 | 3 | 10:10 | 3.29 | 0.18 | 0.26 |
| 344 | CONDUIT | 58.13 | 3 | 07:00 | 2.28 | 0.04 | 0.22 |
| 345 | CONDUIT | 50.05 | 3 | 07:05 | 3.62 | 0.05 | 0.14 |
| 346 | CONDUIT | 42.09 | 3 | 06:45 | 3.11 | 0.04 | 0.14 |
| 347 | CONDUIT | 33.76 | 3 | 06:35 | 2.74 | 0.04 | 0.13 |
| 348 | CONDUIT | 25.47 | 3 | 06:15 | 2.29 | 0.03 | 0.13 |
| 349 | CONDUIT | 16.99 | 3 | 06:05 | 1.42 | 0.04 | 0.13 |
| 350 | CONDUIT | 8.78 | 3 | 05:05 | 0.98 | 0.02 | 0.12 |
| 351 | CONDUIT | 45.69 | 3 | 08:48 | 1.46 | 0.28 | 0.38 |
| 352 | CONDUIT | 40.28 | 3 | 08:00 | 1.50 | 0.23 | 0.34 |

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|---|---|---|---|---|---|---|---|
| 353 | CONDUIT | 32.45 | 3 | 07:00 | 1.44 | 0.17 | 0.30 |
| 354 | CONDUIT | 25.18 | 3 | 06:35 | 1.38 | 0.14 | 0.26 |
| 355 | CONDUIT | 17.07 | 3 | 06:10 | 1.18 | 0.09 | 0.23 |
| 356 | CONDUIT | 8.40 | 3 | 06:00 | 0.87 | 0.05 | 0.18 |
| 357 | CONDUIT | 151.71 | 3 | 14:05 | 2.26 | 0.13 | 0.25 |
| 358 | CONDUIT | 150.55 | 3 | 14:04 | 2.30 | 0.13 | 0.24 |
| 359 | CONDUIT | 151.17 | 3 | 14:02 | 1.41 | 0.30 | 0.34 |
| 360 | CONDUIT | 155.38 | 3 | 13:14 | 1.14 | 0.32 | 0.41 |
| 361 | CONDUIT | 156.92 | 3 | 06:45 | 1.73 | 0.15 | 0.32 |
| 362 | CONDUIT | 156.15 | 3 | 06:35 | 2.39 | 0.11 | 0.24 |
| 363 | CONDUIT | 41.99 | 3 | 06:26 | 0.94 | 0.04 | 0.18 |
| 364 | CONDUIT | 24.66 | 3 | 16:42 | 1.07 | 0.03 | 0.13 |
| 365 | CONDUIT | 24.31 | 3 | 16:29 | 0.99 | 0.03 | 0.12 |
| 366 | CONDUIT | 24.03 | 3 | 16:15 | 1.03 | 0.02 | 0.12 |
| 367 | CONDUIT | 23.66 | 3 | 16:03 | 0.80 | 0.05 | 0.14 |
| 368 | CONDUIT | 23.49 | 3 | 14:46 | 0.77 | 0.03 | 0.14 |
| 369 | CONDUIT | 21.93 | 3 | 14:08 | 1.08 | 0.02 | 0.11 |
| 370 | CONDUIT | 21.21 | 3 | 14:05 | 1.04 | 0.02 | 0.11 |
| 371 | CONDUIT | 4.71 | 3 | 12:06 | 0.41 | 0.00 | 0.08 |
| 372 | CONDUIT | 4.15 | 3 | 11:35 | 0.46 | 0.01 | 0.06 |
| 373 | CONDUIT | 3.91 | 3 | 06:10 | 0.75 | 0.00 | 0.06 |
| 374 | CONDUIT | 1.99 | 3 | 06:00 | 0.67 | 0.00 | 0.03 |
| 375 | CONDUIT | 2.27 | 0 | 11:22 | 1.24 | 0.00 | 0.07 |
| 376 | CONDUIT | 2.09 | 4 | 11:10 | 0.78 | 0.01 | 0.07 |
| 377 | CONDUIT | 118.80 | 0 | 14:00 | 2.90 | 0.08 | 0.23 |
| 378 | CONDUIT | 118.45 | 0 | 14:00 | 3.92 | 0.06 | 0.18 |
| 379 | CONDUIT | 109.83 | 0 | 14:00 | 4.23 | 0.06 | 0.16 |
| 380 | CONDUIT | 109.69 | 0 | 14:00 | 3.18 | 0.11 | 0.20 |
| 381 | CONDUIT | 109.56 | 0 | 13:00 | 2.30 | 0.15 | 0.25 |
| 382 | CONDUIT | 109.43 | 0 | 11:22 | 2.15 | 0.15 | 0.26 |
| 383 | CONDUIT | 99.52 | 0 | 11:22 | 1.91 | 0.16 | 0.27 |
| 384 | CONDUIT | 97.42 | 0 | 12:00 | 2.27 | 0.51 | 0.49 |
| 385 | CONDUIT | 96.11 | 0 | 11:22 | 3.24 | 0.36 | 0.47 |
| 386 | CONDUIT | 12.70 | 3 | 06:25 | 1.26 | 0.03 | 0.12 |
| 387 | CONDUIT | 5.23 | 4 | 11:11 | 0.67 | 0.03 | 0.14 |
| 388 | CONDUIT | 4.80 | 3 | 13:14 | 0.62 | 0.03 | 0.14 |
| 389 | CONDUIT | 9.08 | 3 | 14:00 | 0.87 | 0.06 | 0.19 |
| 390 | CONDUIT | 11.27 | 3 | 13:52 | 0.80 | 0.10 | 0.22 |
| 391 | CONDUIT | 2775.87 | 3 | 14:02 | 6.88 | 0.73 | 0.24 |
| 392 | CONDUIT | 1922.34 | 3 | 14:02 | 5.83 | 2.06 | 0.28 |
| 393 | CONDUIT | 61.64 | 4 | 12:00 | 1.84 | 0.15 | 0.27 |
| 394 | CONDUIT | 59.62 | 4 | 12:00 | 1.70 | 0.17 | 0.27 |
| 395 | CONDUIT | 76.70 | 3 | 04:10 | 2.61 | 0.49 | 0.81 |
| 396 | CONDUIT | 1046.82 | 3 | 17:35 | 3.23 | 1.93 | 0.87 |
| 397 | CONDUIT | 5375.27 | 3 | 14:02 | 2.17 | 0.02 | 0.53 |
| 398 | CONDUIT | 46.94 | 3 | 06:35 | 5.59 | 0.13 | 0.15 |
| 399 | CONDUIT | 1010.44 | 3 | 18:12 | 8.70 | 0.58 | 0.36 |
| 400 | CONDUIT | 113.06 | 4 | 13:00 | 1.59 | 0.95 | 0.75 |
| 401 | CONDUIT | 116.53 | 4 | 14:00 | 1.74 | 0.66 | 0.71 |
| 402 | CONDUIT | 116.19 | 4 | 18:25 | 1.10 | 0.70 | 0.77 |
| 403 | CONDUIT | 118.66 | 4 | 14:00 | 0.83 | 0.44 | 0.85 |
| 29 | CONDUIT | 28.30 | 3 | 14:05 | 3.54 | 0.12 | 0.22 |
| 32 | CONDUIT | 42.51 | 3 | 14:09 | 3.20 | 0.09 | 0.21 |
| 33 | CONDUIT | 56.73 | 3 | 14:10 | 2.71 | 0.10 | 0.61 |
| 132 | CONDUIT | 126.07 | 3 | 06:10 | 1.32 | 0.09 | 0.25 |
| 48 | CONDUIT | 3.27 | 0 | 11:22 | 0.74 | 0.02 | 0.10 |
| 49 | CONDUIT | 4.31 | 0 | 11:22 | 0.96 | 0.02 | 0.10 |
| 52 | CONDUIT | 6.27 | 0 | 11:22 | 1.37 | 0.01 | 0.10 |

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|---|---|---|---|---|---|---|---|
| 212 | CONDUIT | 8.50 | 0 11:22 | 4.09 | 0.02 | 0.06 |
| NORTH_MAIN | PUMP | 40.16 | 3 04:10 | | | |
| 47 | PUMP | 54.23 | 3 06:26 | | | |
| CAMPTON_HEIGHTS | PUMP | 1019.24 | 3 17:35 | | | |
| 169 | PUMP | 2.61 | 0 11:00 | | | |
| 207 | PUMP | 8.50 | 0 11:22 | | | |

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Flow Classification Summary
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| Conduit | Adjusted /Actual Length | ---------- Fraction of Time in Flow Class ---------- Dry | Up Dry | Down Dry | Sub Crit | Sup Crit | Up Crit | Down Crit | Norm Ltd | Inlet Ctrl |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| 2 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 5 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 6 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 7 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8 | 1.00 | 0.00 | 0.00 | 0.00 | 0.89 | 0.11 | 0.00 | 0.00 | 1.00 | 0.00 |
| 9 | 1.00 | 0.00 | 0.00 | 0.00 | 0.89 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 11 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 12 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 13 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 15 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 16 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 17 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 18 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 19 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 20 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 | 0.00 | 0.00 | 0.91 | 0.00 |
| 21 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.63 | 0.00 |
| 22 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 23 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.21 | 0.00 |
| 24 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.93 | 0.00 |
| 25 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 26 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 27 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 28 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.54 | 0.00 |
| 30 | 1.00 | 0.00 | 0.00 | 0.00 | 0.97 | 0.03 | 0.00 | 0.00 | 0.99 | 0.00 |
| 31 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.93 | 0.00 |
| 34 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 35 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 36 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 37 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 38 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 40 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 41 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 42 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 43 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 |
| 44 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.92 | 0.00 |
| 45 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.98 | 0.00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 46 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 50 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.97 | 0.00 | 0.00 | 1.00 | 0.00 |
| 51 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 54 | 1.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.95 | 0.00 | 0.00 | 0.00 | 0.00 |
| 55 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.01 | 0.00 | 0.00 | 1.00 | 0.00 |
| 56 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 57 | 1.00 | 0.00 | 0.00 | 0.00 | 0.96 | 0.04 | 0.00 | 0.00 | 0.98 | 0.00 |
| 58 | 1.00 | 0.00 | 0.00 | 0.00 | 0.18 | 0.82 | 0.00 | 0.00 | 0.97 | 0.00 |
| 59 | 1.00 | 0.00 | 0.00 | 0.00 | 0.59 | 0.41 | 0.00 | 0.00 | 0.97 | 0.00 |
| 60 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 61 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 62 | 1.00 | 0.00 | 0.00 | 0.00 | 0.57 | 0.43 | 0.00 | 0.00 | 0.98 | 0.00 |
| 63 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.32 | 0.00 |
| 64 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 65 | 1.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.86 | 0.00 | 0.00 | 0.98 | 0.00 |
| 66 | 1.00 | 0.00 | 0.00 | 0.00 | 0.86 | 0.14 | 0.00 | 0.00 | 0.98 | 0.00 |
| 67 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 68 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 69 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 70 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 71 | 1.00 | 0.00 | 0.00 | 0.00 | 0.21 | 0.79 | 0.00 | 0.00 | 0.98 | 0.00 |
| 72 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 73 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 74 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 75 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.73 | 0.00 |
| 77 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 78 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| 79 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.93 | 0.00 |
| 80 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.53 | 0.00 |
| 82 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 87 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 90 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 |
| 91 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.53 | 0.00 |
| 92 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.51 | 0.00 |
| 94 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 |
| 95 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 96 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 |
| 97 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.91 | 0.00 |
| 98 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99 | 1.00 | 0.00 | 0.46 | 0.00 | 0.52 | 0.02 | 0.00 | 0.00 | 0.50 | 0.00 |
| 100 | 1.00 | 0.00 | 0.00 | 0.00 | 0.47 | 0.53 | 0.00 | 0.00 | 0.02 | 0.00 |
| 101 | 1.00 | 0.00 | 0.00 | 0.00 | 0.98 | 0.02 | 0.00 | 0.00 | 1.00 | 0.00 |
| 102 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 103 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| 104 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| 105 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| 106 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.98 | 0.00 |
| 107 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 |
| 108 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 109 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 110 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| 111 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 112 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.0 |
| 113 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.93 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|
| 114 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 |
| 115 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 116 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.81 | 0.00 |
| 117 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 118 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 119 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 120 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 121 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 122 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 123 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 124 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 125 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 126 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 127 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| 128 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 129 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 130 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 131 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 133 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 134 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 135 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 136 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 138 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 139 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 140 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.91 | 0.00 |
| 141 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 142 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 143 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 144 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 145 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 146 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 147 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 148 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 149 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| 150 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.93 | 0.00 |
| 151 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 152 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 153 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 154 | 1.00 | 0.00 | 0.00 | 0.00 | 0.49 | 0.51 | 0.00 | 0.00 | 1.00 | 0.00 |
| 155 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 156 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.71 | 0.00 |
| 157 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.93 | 0.00 |
| 158 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.91 | 0.00 |
| 159 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 160 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.02 | 0.00 |
| 161 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 162 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 163 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 164 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 165 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.52 | 0.00 |
| 166 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.54 | 0.00 |
| 167 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 168 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 170 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 171 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 172 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 173 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 174 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.76 | 0.00 |

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| 175 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 176 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 177 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 178 | 1.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.88 | 0.00 | 0.00 | 0.00 | 0.00 |
| 179 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 180 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 181 | 1.00 | 0.00 | 0.00 | 0.00 | 0.90 | 0.10 | 0.00 | 0.00 | 0.95 | 0.00 |
| 182 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 183 | 1.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.83 | 0.00 | 0.00 | 0.00 | 0.00 |
| 184 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 185 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 186 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 187 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 188 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 189 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| 190 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 191 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 192 | 1.00 | 0.00 | 0.00 | 0.00 | 0.98 | 0.02 | 0.00 | 0.00 | 1.00 | 0.00 |
| 193 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 194 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 195 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 196 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 197 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 198 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 199 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 200 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 201 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 202 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 203 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 204 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 205 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 206 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 210 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 211 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 213 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 214 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 215 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 |
| 216 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 217 | 1.00 | 0.00 | 0.46 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 218 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 219 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 220 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 221 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 222 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 223 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 224 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 225 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 226 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 227 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 228 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 230 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 231 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 232 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 233 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 234 | 1.00 | 0.00 | 0.00 | 0.00 | 0.97 | 0.03 | 0.00 | 0.00 | 1.00 | 0.00 |
| 235 | 1.00 | 0.00 | 0.00 | 0.00 | 0.51 | 0.49 | 0.00 | 0.00 | 0.77 | 0.00 |
| 236 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 237 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |

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| 238 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 239 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 240 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 241 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 242 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 243 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 244 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 245 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 246 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 247 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 248 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 249 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 252 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 253 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 254 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| 255 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 256 | 1.00 | 0.00 | 0.00 | 0.00 | 0.61 | 0.39 | 0.00 | 0.00 | 0.00 | 0.00 |
| 257 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 258 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 259 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 260 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 261 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 262 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 263 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 265 | 1.00 | 0.47 | 0.00 | 0.00 | 0.53 | 0.00 | 0.00 | 0.00 | 0.47 | 0.00 |
| 266 | 1.00 | 0.00 | 0.47 | 0.00 | 0.53 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 267 | 1.00 | 0.47 | 0.00 | 0.00 | 0.03 | 0.50 | 0.00 | 0.00 | 0.47 | 0.00 |
| 268 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 269 | 1.00 | 0.00 | 0.00 | 0.00 | 0.18 | 0.82 | 0.00 | 0.00 | 1.00 | 0.00 |
| 270 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 271 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 272 | 1.00 | 0.00 | 0.00 | 0.00 | 0.88 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 |
| 273 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 274 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 276 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 277 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 278 | 1.00 | 0.00 | 0.46 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 279 | 1.00 | 0.46 | 0.00 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.47 | 0.00 |
| 280 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 281 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 282 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.55 | 0.00 |
| 283 | 1.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.98 | 0.00 | 0.00 | 0.93 | 0.00 |
| 284 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 285 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 286 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 287 | 1.00 | 0.00 | 0.00 | 0.00 | 0.89 | 0.11 | 0.00 | 0.00 | 0.92 | 0.00 |
| 288 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 289 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 290 | 1.00 | 0.00 | 0.00 | 0.00 | 0.89 | 0.11 | 0.00 | 0.00 | 1.00 | 0.00 |
| 291 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 292 | 1.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.90 | 0.00 | 0.00 | 0.00 | 0.00 |
| 293 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 294 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.15 | 0.00 |
| 295 | 1.00 | 0.00 | 0.00 | 0.00 | 0.82 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 |
| 296 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 297 | 1.00 | 0.00 | 0.00 | 0.00 | 0.97 | 0.03 | 0.00 | 0.00 | 1.00 | 0.00 |
| 298 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 299 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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| 300 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.97 | 0.00 | 0.00 | 0.00 | 0.00 |
| 301 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 302 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 303 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 304 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 305 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 306 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 307 | 1.00 | 0.00 | 0.47 | 0.00 | 0.53 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 308 | 1.00 | 0.46 | 0.00 | 0.00 | 0.02 | 0.52 | 0.00 | 0.00 | 0.46 | 0.00 |
| 309 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 310 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.13 | 0.00 |
| 311 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 312 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 313 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 314 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 315 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.92 | 0.00 |
| 316 | 1.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.80 | 0.00 | 0.00 | 1.00 | 0.00 |
| 317 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 318 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 319 | 1.00 | 0.00 | 0.00 | 0.00 | 0.51 | 0.49 | 0.00 | 0.00 | 1.00 | 0.00 |
| 321 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 323 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 324 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.01 | 0.00 | 0.00 | 1.00 | 0.00 |
| 326 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.97 | 0.00 | 0.00 | 1.00 | 0.00 |
| 327 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 328 | 1.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.88 | 0.00 | 0.00 | 1.00 | 0.00 |
| 329 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| 330 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.24 | 0.00 |
| 331 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 332 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 333 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| 334 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 335 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 336 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 338 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.18 | 0.00 |
| 339 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 340 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.51 | 0.00 |
| 341 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 342 | 1.00 | 0.00 | 0.00 | 0.00 | 0.81 | 0.19 | 0.00 | 0.00 | 1.00 | 0.00 |
| 343 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 344 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 345 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.03 | 0.00 |
| 346 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 347 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 348 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 349 | 1.00 | 0.00 | 0.00 | 0.00 | 0.90 | 0.10 | 0.00 | 0.00 | 0.58 | 0.00 |
| 350 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 351 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 352 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 353 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 354 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 355 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 356 | 1.00 | 0.00 | 0.46 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 357 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 358 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 359 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 360 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 361 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |

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| 362 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 363 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 364 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 |
| 365 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 366 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 367 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 368 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 369 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 370 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 371 | 1.00 | 0.00 | 0.62 | 0.00 | 0.38 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 372 | 1.00 | 0.46 | 0.00 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 373 | 1.00 | 0.46 | 0.29 | 0.00 | 0.24 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 |
| 374 | 1.00 | 0.46 | 0.00 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.47 | 0.00 |
| 375 | 1.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.05 | 0.00 | 0.00 | 1.00 | 0.00 |
| 376 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 377 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 378 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 379 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 380 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 381 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 382 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 383 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 384 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 385 | 1.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.30 | 0.00 | 0.00 | 1.00 | 0.00 |
| 386 | 1.00 | 0.46 | 0.00 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 387 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 388 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 389 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 390 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 |
| 391 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.99 | 0.00 | 0.00 | 0.00 | 0.00 |
| 392 | 1.00 | 0.00 | 0.00 | 0.00 | 0.45 | 0.55 | 0.00 | 0.00 | 0.00 | 0.00 |
| 393 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.89 | 0.00 |
| 394 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 395 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 396 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 397 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 398 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 399 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.99 | 0.00 | 0.00 | 0.01 | 0.00 |
| 400 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 401 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 402 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.58 | 0.00 |
| 403 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 |
| 29 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 32 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.19 | 0.00 |
| 33 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 132 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 48 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 49 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 52 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 212 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**************************
Conduit Surcharge Summary
**************************

-----------------------------------------------------------------------------
Hours Hours

| Conduit | Hours Full Both Ends | Hours Full Upstream | Hours Full Dnstream | Hours Above Full Normal Flow | Capacity Limited |
|---|---|---|---|---|---|
| 8 | 0.01 | 0.01 | 15.99 | 0.01 | 0.01 |
| 9 | 0.01 | 15.99 | 0.01 | 66.93 | 0.01 |
| 16 | 0.01 | 0.01 | 143.09 | 0.01 | 0.01 |
| 17 | 0.01 | 0.01 | 66.96 | 0.01 | 0.01 |
| 40 | 0.01 | 0.01 | 67.93 | 0.01 | 0.01 |
| 41 | 0.01 | 0.01 | 67.93 | 0.01 | 0.01 |
| 44 | 0.01 | 0.01 | 15.99 | 0.01 | 0.01 |
| 75 | 0.01 | 0.01 | 0.01 | 7.99 | 0.01 |
| 77 | 0.01 | 0.01 | 3.84 | 0.01 | 0.01 |
| 78 | 0.01 | 0.01 | 0.01 | 7.91 | 0.01 |
| 82 | 0.01 | 8.19 | 0.01 | 66.95 | 0.01 |
| 83 | 0.01 | 0.01 | 0.01 | 9.23 | 0.01 |
| 85 | 0.01 | 0.01 | 15.99 | 0.01 | 0.01 |
| 91 | 7.93 | 7.93 | 8.19 | 0.01 | 0.01 |
| 92 | 7.64 | 7.64 | 7.93 | 0.01 | 0.01 |
| 95 | 0.01 | 0.01 | 8.04 | 0.01 | 0.01 |
| 96 | 8.04 | 8.04 | 8.23 | 0.01 | 0.01 |
| 97 | 1.58 | 1.58 | 7.64 | 1.08 | 0.42 |
| 98 | 1.58 | 8.97 | 1.58 | 48.92 | 1.58 |
| 108 | 0.01 | 0.01 | 7.97 | 0.01 | 0.01 |
| 138 | 0.01 | 0.01 | 13.07 | 0.01 | 0.01 |
| 139 | 0.01 | 0.01 | 0.01 | 7.96 | 0.01 |
| 141 | 0.01 | 0.01 | 0.01 | 2.95 | 0.01 |
| 145 | 0.01 | 0.01 | 0.01 | 3.76 | 0.01 |
| 210 | 141.81 | 141.81 | 142.75 | 4.04 | 0.01 |
| 211 | 142.31 | 142.31 | 143.50 | 0.01 | 0.01 |
| 284 | 0.01 | 0.01 | 0.01 | 11.65 | 0.01 |
| 285 | 0.01 | 0.01 | 1.93 | 0.01 | 0.01 |
| 321 | 0.01 | 0.01 | 2.89 | 0.01 | 0.01 |
| 392 | 0.01 | 0.01 | 0.01 | 10.86 | 0.01 |
| 395 | 0.01 | 0.01 | 143.02 | 0.01 | 0.01 |
| 396 | 0.01 | 0.01 | 141.81 | 34.13 | 0.01 |
| 397 | 0.01 | 0.01 | 144.00 | 0.01 | 0.01 |
| 33 | 0.01 | 0.01 | 15.22 | 0.01 | 0.01 |

***************
Pumping Summary
***************

| Pump | Percent Utilized | Number of Start-Ups | Min Flow GPM | Avg Flow GPM | Max Flow GPM | Total Volume 10^6 gal | |
|---|---|---|---|---|---|---|---|
| NORTH_MAIN | 100.00 | 1 | 0.00 | 12.40 | 40.16 | 0.100 | |
| 47 | 100.00 | 1 | 0.00 | 23.77 | 54.23 | 0.185 | |
| CAMPTON_HEIGHTS | 99.91 | 1 | 0.00 | 467.70 | 1019.24 | 3.807 | 1 |
| 169 | 100.00 | 1 | 0.00 | 2.12 | 2.61 | 0.018 | |
| 207 | 99.98 | 3 | 0.00 | 6.81 | 8.50 | 0.059 | |

Analysis begun on: Tue Mar 26 14:39:20 2019
Analysis ended on: Tue Mar 26 14:39:35 2019
Total elapsed time: 00:00:15

WHITCHURCH
ENGINEERING

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

# Attachment J: EPANET Water Service Report and Performance

WHITCHURCH ENGINEERING

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

10/24/2018, Rev 0.

ATTN: City of Fortuna, Merritt Perry

RE: EPANET Preliminary Potable Water and Fire Service Model for a Proposed PUD
Planned Unit Development Adjacent to Redwood Memorial Hospital
Redwood Way, Fortuna CA
APN: 202-082-005, 202-121-002

JN: FIT1801

To Mr. Perry,

WEI has analyzed the anticipated potable water and fire service demand generated by the proposed Planned Unit Development (PUD) located adjacent to Redwood Memorial Hospital to determine the feasibility of a connection to the City of Fortuna potable water system located in Redwood Way and St. Joseph Drive. This letter includes the anticipated water demand, analysis procedure through EPANET, and performance of the model. The EPANET model is utilized with the subdivision's water demand to analyze the City of Fortuna's water system response and assure adjacent water pressures remained practical.

The water demands for this proposed development includes domestic water use, landscaping irrigation and fire suppression. The PUD includes 59 residencies each of which were estimate to include domestic water usage of 4 GPM per unit which totals to 244 GPM.

Sprinklered fire flow applies to largest room in the building with more than 1 sprinkler according to NAHB Research Center. Domestic usage is based on one low flow shower and one outdoor hose running per unit.

The assumed sprinklered fire-flow includes 2 sprinklers at 13 GPM for a single residence. Half of the proposed houses sprinklers flow is 767 GPM.

In addition, 500 GPM is added to the base demand of nodes F-2 and F-4 inside the proposed subdivision to simulate multiple fire hydrant operation. All these values are simultaneously factored into the model for a total proposed development *emergency* usage of **2,037 GPM**.

The proposed water supply route will include a 6-inch pipe connected to J-193 at the corner of Redwood Way and Springville Avenue and run through the proposed site through 5 demand nodes then finally connect to J-224 around the corner of Renner Drive just off Rohnerville Road. A pressure reducing valve (PRV) installed next to J-224 to prevent back flow and add make up water if the supply from J-193 dropped below 50 psi.

The properties of J-225 were adjusted to reflect a peak domestic usage of 75 GPM instead of the 3,000+GPM for fire suppression at the new hospital site.

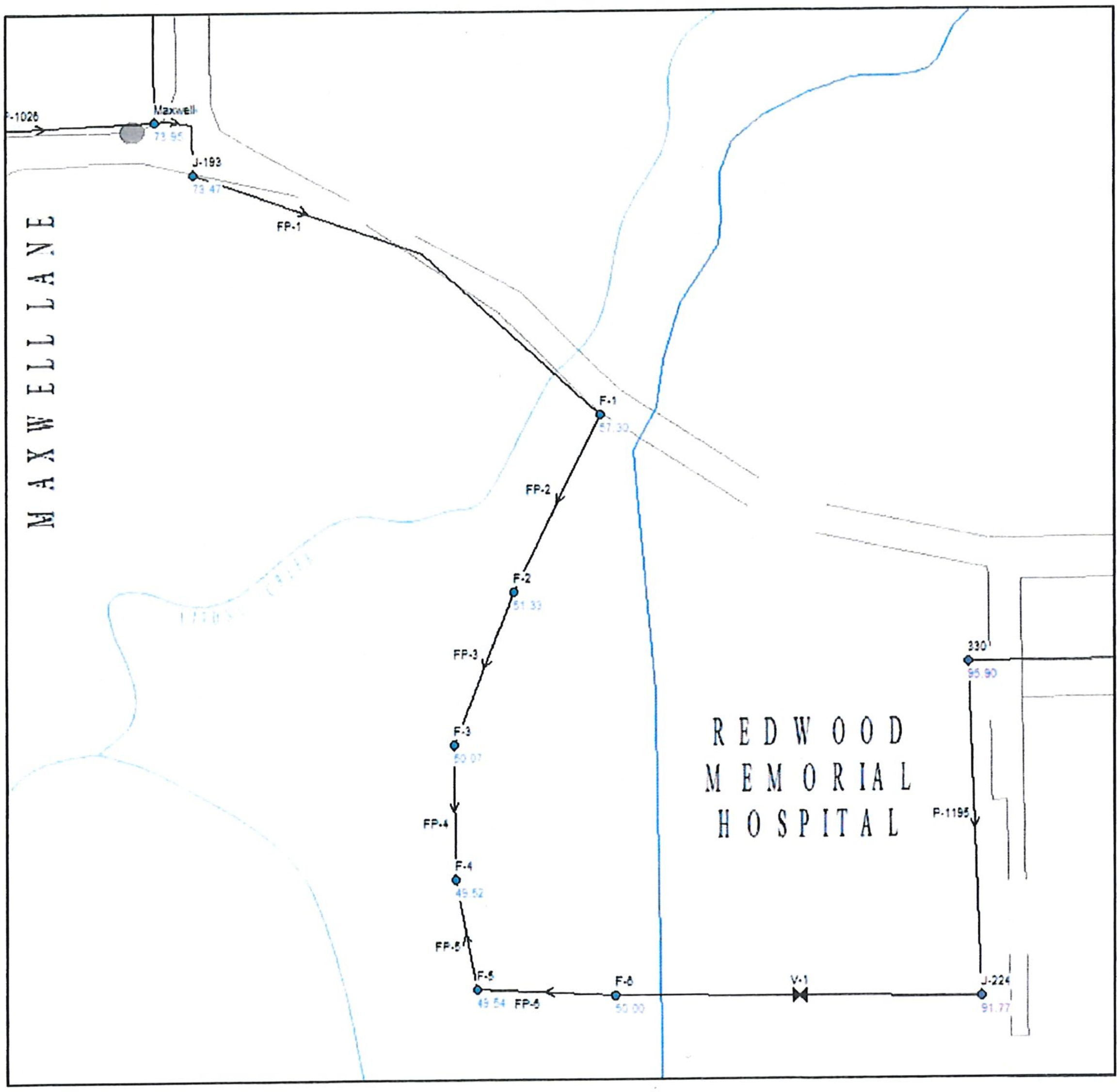
The results indicate that there is sufficient supply from J-193 and J-224 to meet the fire flow and domestic demand at the proposed site through a 6-inch pipe. Results from simulation in the City of Fortuna EPANET model can be found in the attached Appendix (A1, A2) By connecting to J-224 there is both redundancy and an excess of flow available.

Please contact me at your convenience if you have any questions or comments regarding this analysis.

Sincerely,
Jeffrey Laikam
RCE# 68586
JTL/NTN

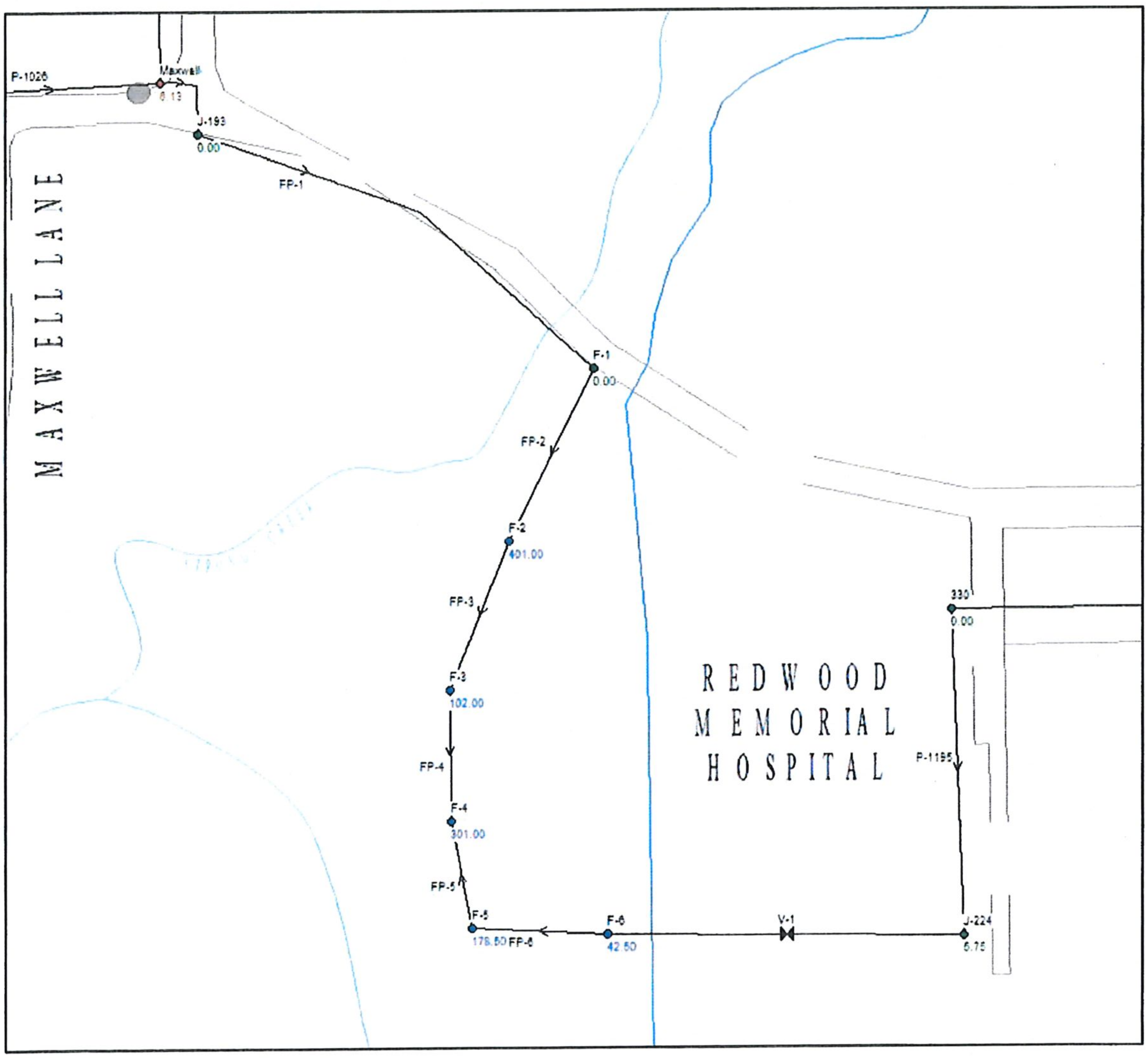
# Appendix A: EPANET Map and Performance Results

Appendix A1




EPANET Pressure Results (psi)

Appendix A2




<u>EPANET Base Demand Results (GPM)</u>

Appendix A3

**Table 3.1** Pipe Headloss Formulas for Full Flow
(for headloss in feet and flow rate in cfs)

| *Formula* | *Resistance Coefficient (A)* | *Flow Exponent (B)* |
|---|---|---|
| Hazen-Williams | $4.727\ C^{-1.852}\ d^{-4.871}\ L$ | 1.852 |
| Darcy-Weisbach | $0.0252\ f(\varepsilon,d,q)d^{-5}L$ | 2 |
| Chezy-Manning | $4.66\ n^2\ d^{-5.33}\ L$ | 2 |

Notes: C = Hazen-Williams roughness coefficient
ε = Darcy-Weisbach roughness coefficient (ft)
f = friction factor (dependent on ε, d, and q)
n = Manning roughness coefficient
d = pipe diameter (ft)
L = pipe length (ft)
q = flow rate (cfs)

**Table 3.2** Roughness Coefficients for New Pipe

| *Material* | *Hazen-Williams C (unitless)* | *Darcy-Weisbach e (feet x $10^{-3}$)* | *Manning's n (unitless)* |
|---|---|---|---|
| Cast Iron | 130 – 140 | 0.85 | 0.012 - 0.015 |
| Concrete or Concrete Lined | 120 – 140 | 1.0 - 10 | 0.012 - 0.017 |
| Galvanized Iron | 120 | 0.5 | 0.015 - 0.017 |
| Plastic | 140 – 150 | 0.005 | 0.011 - 0.015 |
| Steel | 140 – 150 | 0.15 | 0.015 - 0.017 |
| Vitrified Clay | 110 | | 0.013 - 0.015 |

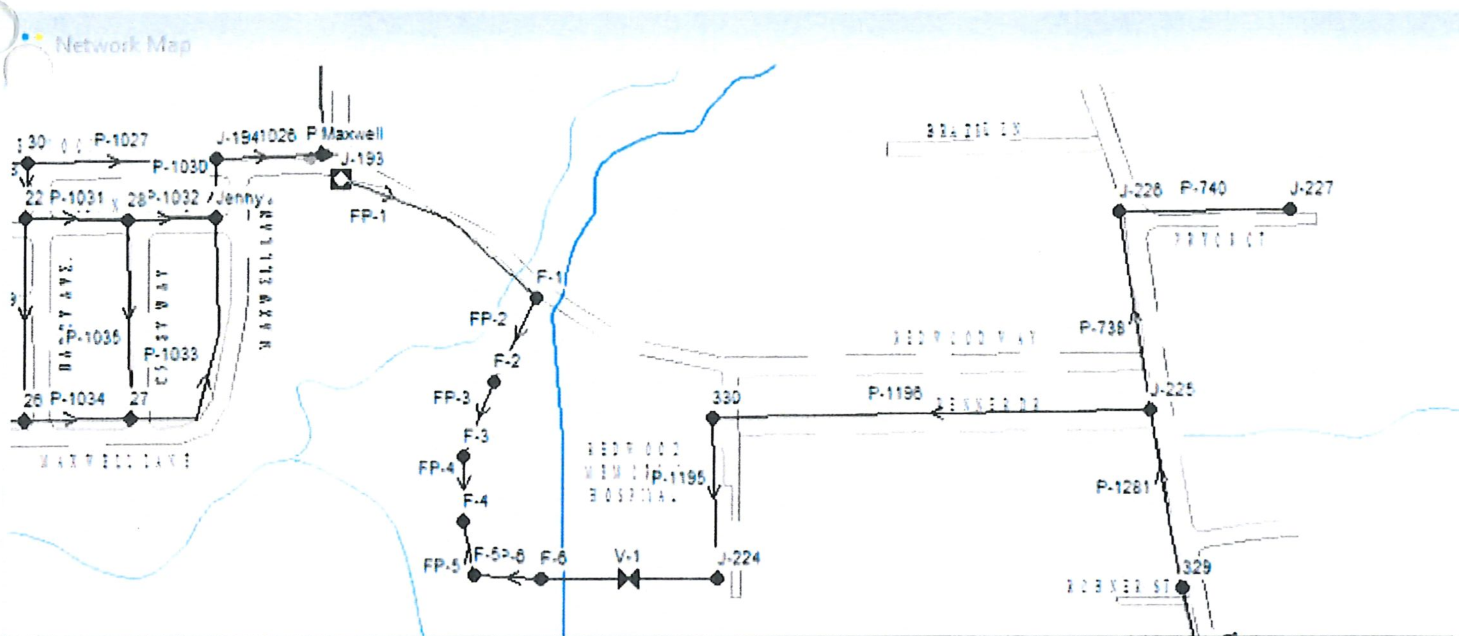
Hazen-Williams Formula used for Calculations

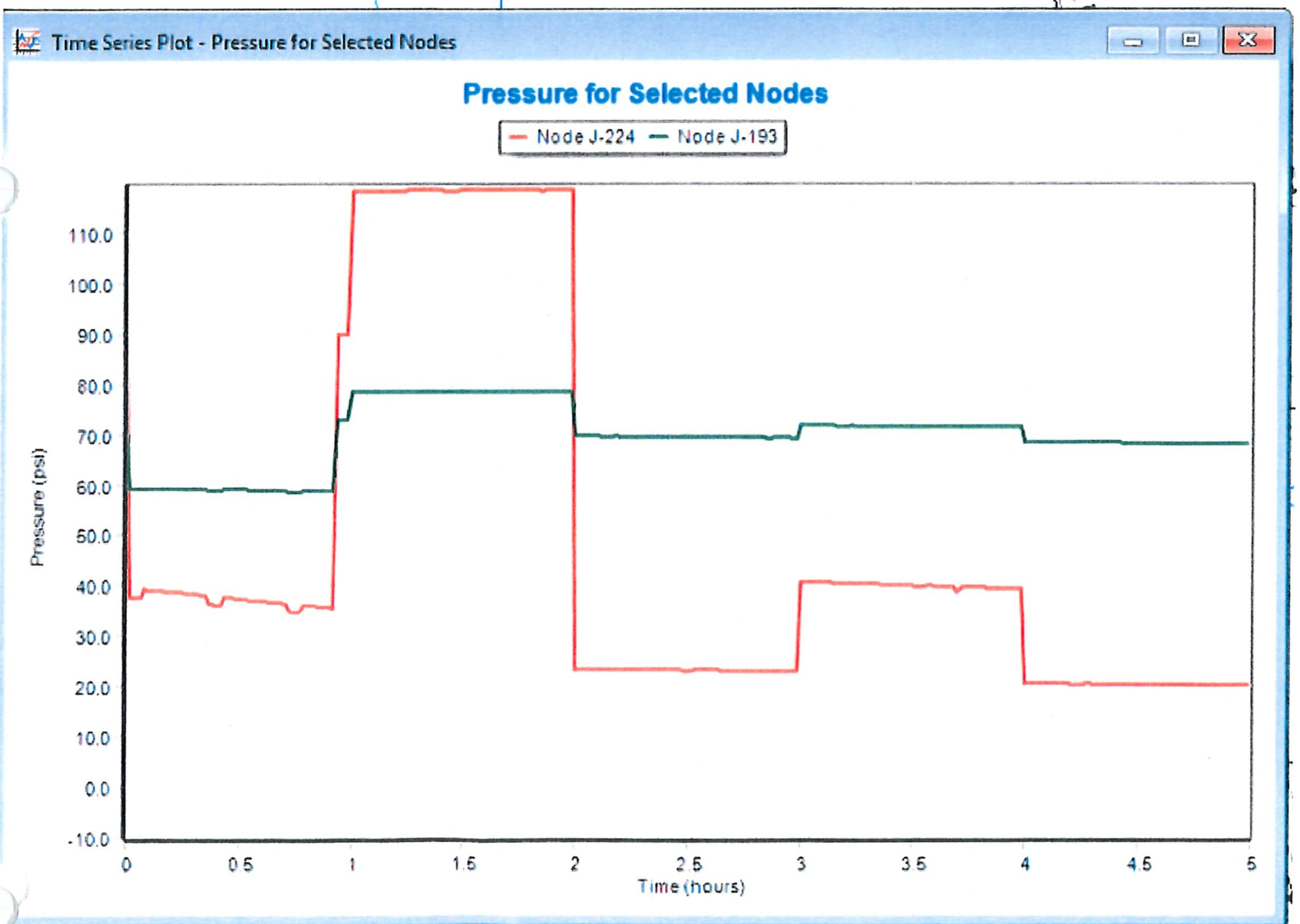
Appendix A4

**Table 3.3** Minor Loss Coefficients for Selected Fittings

| *FITTING* | *LOSS COEFFICIENT* |
|---|---|
| Globe valve, fully open | 10.0 |
| Angle valve, fully open | 5.0 |
| Swing check valve, fully open | 2.5 |
| Gate valve, fully open | 0.2 |
| Short-radius elbow | 0.9 |
| Medium-radius elbow | 0.8 |
| Long-radius elbow | 0.6 |
| 45 degree elbow | 0.4 |
| Closed return bend | 2.2 |
| Standard tee - flow through run | 0.6 |
| Standard tee - flow through branch | 1.8 |
| Square entrance | 0.5 |
| Exit | 1.0 |

Fitting Loss Coefficients from EPANET Manual


Network Map
P-1027
J-1941026
P Maxwell
J-193
P-1030
P-1031
P-1032
Jenny
FP-1
F-1
FP-2
F-2
FP-3
F-3
FP-4
F-4
FP-5
F-5
F-6
V-1
J-224
330
P-1195
P-1196
J-225
P-738
J-226
P-740
J-227
P-1281
329
P-1035
P-1033
P-1034
26
27
22


Time Series Plot - Pressure for Selected Nodes
Pressure for Selected Nodes
Node J-224
Node J-193
Pressure (psi)
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Time (hours)

# 1 Table of Contents

## TABLE OF TABLES

## TABLE OF FIGURES



# Acronyms and Abbreviations

| | |
|---|---|
| APN | Assessor Parcel Number |
| ACOE | Army Corp of Engineers |
| CARB | California Air Resource Board |
| CCR | California Code of Regulations |
| CDFW | California Department of Fish and Wildlife |
| EPA | Environmental Protection Agency |
| ERD | Eel River Disposal and Resource Recovery Inc. |
| DFW | Department of Fishing and Wildlife |
| DTSC | Department of Toxic Substances Control |
| FCMP | Final Construction Management Plan |
| FFPD | Fortuna Fire Protection District |
| FMMP | Farmland Mapping and Monitoring Program |
| FPD | Fortuna Police Department |
| FVFD | Fortuna Volunteer Fire Department |
| GHG | Green House Gas |
| HCDEH | Humboldt County Division of Environmental Health |
| HMAP | Hazardous Materials Area Plan |
| HMRT | Regional Hazardous Materials Response Team |
| HOA | Homeowner's Association |
| HTA | Humboldt Transit Authority |

| | |
|---|---|
| LID | Low Impact Design |
| LOS | Level Of Service |
| MGD | Million Gallons per Day |
| MND | Mitigated Negative Declaration |
| NAAQS | National Ambient Air Quality Standards |
| NCAB | North Coast Air Basin |
| NCUAQMD | North Coast Unified Air Quality Management District |
| NSR | New Source Review |
| NPDES | National Pollutant Discharge Elimination System |
| ODCHC | Open Door Community Health Clinic |
| OSHA | Occupational Safety and Health Administration |
| PRC | Public Resource Codes |
| PD | Planned Unit Development |
| ROW | Right Of Way |
| RTS | Redwood Transit Service |
| SWMM | Storm Water Management Model |
| SWPPP | Stormwater Pollution Prevention Plan |
| TISR | Traffic Impact Study Report |
| TMDL | Total Maximum Daily Load |
| WWTP | Wastewater Treatment Plant |

# 1 Project Summary

| | |
|---|---|
| **Date:** | May 21, 2019 |
| **Project Title:** | Planned Development (PD) on Redwood Way Fortuna, CA 95540 |
| **Project Summary** | 59 cottage-style residences on individual lots for senior housing on two parcels with a total combined size of 14.73 acres. Amenities include a community center, common open space, pedestrian footpath, wetland preservation, and associated roads and utility services. |
| **Lead Agency:** | City of Fortuna |
| **Lead Agency Contact:** | Lead Agency Contact:<br>Liz Shorey, Deputy Director of Community Development<br>(707)725-1408<br>lshorey@ci.fortuna.ca.us |
| **Report Authors:** | Nicholas Notthoff, E.I.T., Project Engineer, Whitchurch Engineering<br><br>Jeff Laikam, P.E., Project Manager, Whitchurch Engineering |
| **Author Contact:** | Whitchurch Engineering<br>610 9th Street, Fortuna CA, 95540<br>(707)725-6926 |
| **Project Location:** | Redwood Way, Fortuna CA, 95540 |
| **Coastal Zone:** | Site is not located within the Coastal Zone |
| **Assessor Parcel Numbers:** | 202-082-005 and 202-121-002 |
| **General Plan Designation:** | Residential Low (R-L) |
| **Zoning:** | Residential Single Family (R-1-10) |
| **Anticipated Permits and Approvals** | 1) Planned Development/Tentative Map<br>2) Utility Improvement Plans<br>3) Building Permits for residential unit construction |

## 1.1 CEQA Requirement

The proposed Planned Development is subject to the requirements of the California Environmental Quality Act (CEQA). CEQA encourages lead agencies and applicants to modify their projects to avoid potentially significant adverse impacts (CEQA Section 20180 [C][2] and State CEQA Guidelines Section 15070[b][2]). The purpose of this Initial Study (IS) is to provide a basis for determining whether to prepare an Environmental Impact Report (EIR), Negative Declaration, or Mitigated Negative Declaration. This is intended to satisfy the requirements of CEQA (Public Resources Code, Div 13, Sec 21000-21177) and the State CEQA Guidelines (California Code of Regulations, Title 14, Sec 15000-15387).

Section 15063(d) of the State CEQA Guidelines states that an IS shall contain the following information in brief form:

1) A description of the project including the location of the project

2) An identification of the environmental setting

3) An identification of environmental effects by use of a checklist, matrix, or other method, provided that entries on a checklist or other form are briefly explained to provide evidence to support the entries

4) Discussion of means to mitigate identified significant effects, if any

5) An examination of whether the project would be consistent with existing zoning, plans, and other applicable land use controls

6) The name of the person or persons who prepared and/or participated in the Initial Study

The environmental checklist form contained in this document is based on Appendix G of the CEQA Guidelines (2018).

### 1.1.1 Lead Agency name and Address

Fortuna City Council
621 11th St
Fortuna, CA 95540

The Lead Agency for the proposed development is the City of Fortuna, per CEQA guidelines Section 21067.

### 1.1.2 Contact person(s) and phone number

Jeff Laikam, PE
Lead Engineer
Whitchurch Engineering
(707)725-6926
jtl@whitchurchengineering.com

Lead Agency Contact:
Liz Shorey
Deputy Director of Community Development
(707)725-1408
lshorey@ci.fortuna.ca.us

# 2 Project Description

The proposed project is a Planned Development (PD) on Redwood Way in Fortuna, California. It will consist of 59 cottage-style residences on the combined parcels for a total of 14.73 acres. This project will house senior residents in Fortuna, and ensure close proximity with both medical and shopping services. Strongs Creek is located on adjoining property to the north and northwest of the site, with a portion of the bank located on the site in the northwest area; Jameson Creek crosses the site in the southwest area. Riparian vegetation associated with these creeks will be preserved through a 50-foot bank setback, in accordance with Fortuna General Plan policies. The site also includes approximately 0.04 acres of wetlands to be preserved, and a 25-ft setback and fencing for wetland protection. Primary access is from Redwood Way. A 10-foot emergency road will be developed from Joseph Drive. Interior access will be provided with a new 20-foot private road with a 5-foot sidewalk. The private road entryway is located on a City-owned parcel (APN 202-082-004), for which an easement will be dedicated.

The project as designed is incorporating substantial green space and a creek side easement for a trail to achieve aesthetic integration with the local landscape. The historic horticultural elements (redwood tree, mature fruit trees, and wild roses) fall within the current design zone for green space and trails and shall be incorporated into the landscape design.

## 2.1 Project Location and Setting

The site is located on Redwood Way in Fortuna CA, 95540, east of the California state highway 101. The site is in the central area of Fortuna, generally between Rohnerville Road to the east, Redwood Way to the north, Kenmar road to the south, and Fortuna Boulevard to the west. The project parcels (APN: 202-082-005, 202-121-002) combined are approximately 14.73 acres in size. The majority of the site consists of pastureland, used for grazing cattle. There are no buildings, structures, or utility lines on the site. Jameson Creek crosses the site in southwestern area, and Strongs Creeks northwestern area. The parcel is located within the California Township and section S1 T2N R1W. The parcel is not located in a Coastal zone, but portions of the site are within the 100-year flood zone.

## 2.2 Applicant

Dennis Fitze
1749 Alamar Way
Fortuna, CA 95540

## 2.3 General Plan Designation

The General Plan land use designation is Residential Low (RL). This designation provides for single family detached homes, secondary residential units, public and quasi-public uses, limited neighborhood-serving commercial uses, and similar and compatible uses. The maximum allowable is 6.9 units per gross acre. The project proposes 59 units; the maximum number of units is 101 units.

## 2.4 Zoning

The zoning designation is Residential Single Family (R-1-10), allowing one single family residence per lot (FMC 17.03.011). The project proposes that each residence will be located on a separate lot.

Planned Development are allowed under Fortuna Municipal Code (FMC) Section 17.07.080, allowing waiver of minimum lot sizes (with no change in overall density) and other zoning standards, in exchange for amenities such as common open space. Each of the single family residences will be placed on a separate lot and built to the property lines, which will require waiver of the standard R-1-10 standards. The project proposes waiver of lot area, lot width, lot depth, ground coverage, and setbacks. In exchange, the development will include common open space for use by all of the residents, trails, and wetland and creek preservation. The opens spaces will be maintained by a homeowners' association (HOA).

## 2.5 Project Phasing

The PD is anticipated to be constructed in four phases, as shown on the tentative map.

## 2.6 Utilities

Installation of utilities includes water, sewer, and power lines to service each new residence. The sewer system will require the use of two pump stations to elevate the waste to the City's sewer system located on Redwood Way. The water system will be connected to the City's public water main in Redwood Way to the north, and looped to St. Joseph Drive to the west of the development. Sewer service will be privately maintained by the HOA and be connected to the City sewer lines under Redwood Way northeast of the site. Initial sizing and proposed layout of these systems are included and based on the City of Fortuna SWMM and EPANET models.

### 2.7 Roadway

The main access to the PD will be from Redwood Way. A new road will be installed to connect the PD to Redwood Way on the northern edge of the parcel. The road will be developed to a 20-foot width and 4-foot sidewalk. The interior development will include three cul-de-sacs and access across Jameson Creek to a looped road. An additional all-weather 10-foot road will be provided from St. Joseph Way for emergency access by the fire department and other emergency providers. Parking will be in designated areas adjacent to the road and in driveways and garages.

### 2.8 Drainage

Drainage for the project will adhere to requirements defined by the MS4 permit effective in the project area. Design of stormwater routing and detainment structures will be in conformance with Humboldt County LID Manual requirements. The use of self-detaining areas to retain and infiltrate drainage water will be utilized in the open space areas associated with the development.

### 2.9 Residential

The purpose of this proposed project is to construct 59 units that will house senior residents in Fortuna. The residences will be developed as 2-bedroom, 1.5 bathroom with a garage. Each unit will have access to roads per the connected driveway. The proposed development site plan sheets are included as attachments at the end of this document (Attachment A).

### 2.10 Surrounding Land Use

The parcel is bordered by the Redwood Memorial Hospital to the east, an assisted living facility to the north, single family residences to the west, and pastureland to the south and southwest. Strongs Creek borders the property to the north and Jameson Creek passes through the property in the southwestern portion of the parcel.

## 3 Public Agencies Requiring Approval

The City of Fortuna Planning Commission and City Council are the approving bodies for the planned development subdivision. The City of Fortuna Public Works Department will approve the public utility infrastructure plans. The City of Fortuna Building Division will permit the construction of the residential units.

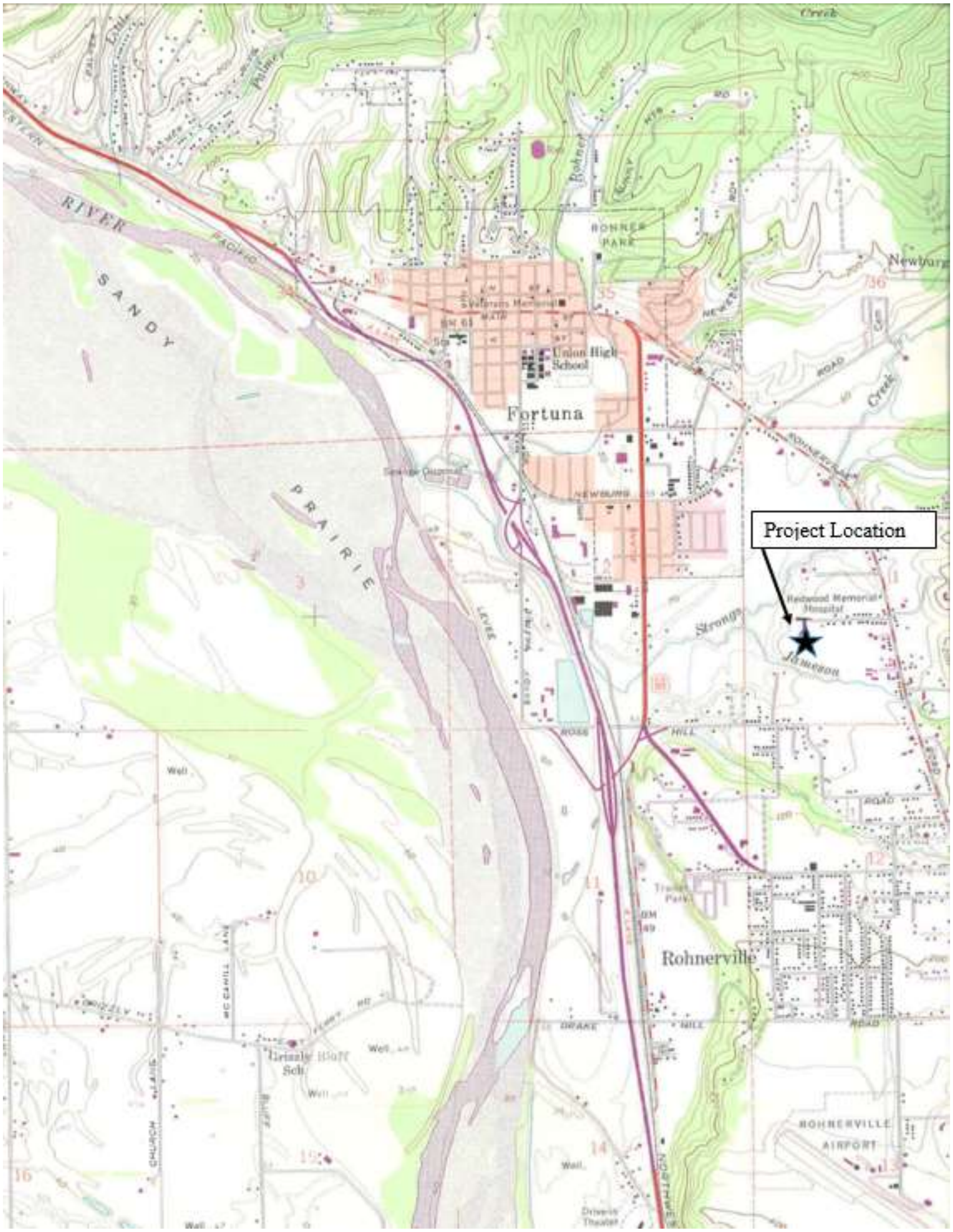



*Figure 1: Fitze Planned Development*


*Figure 2: Fitze Planned Development Aerial Photo*

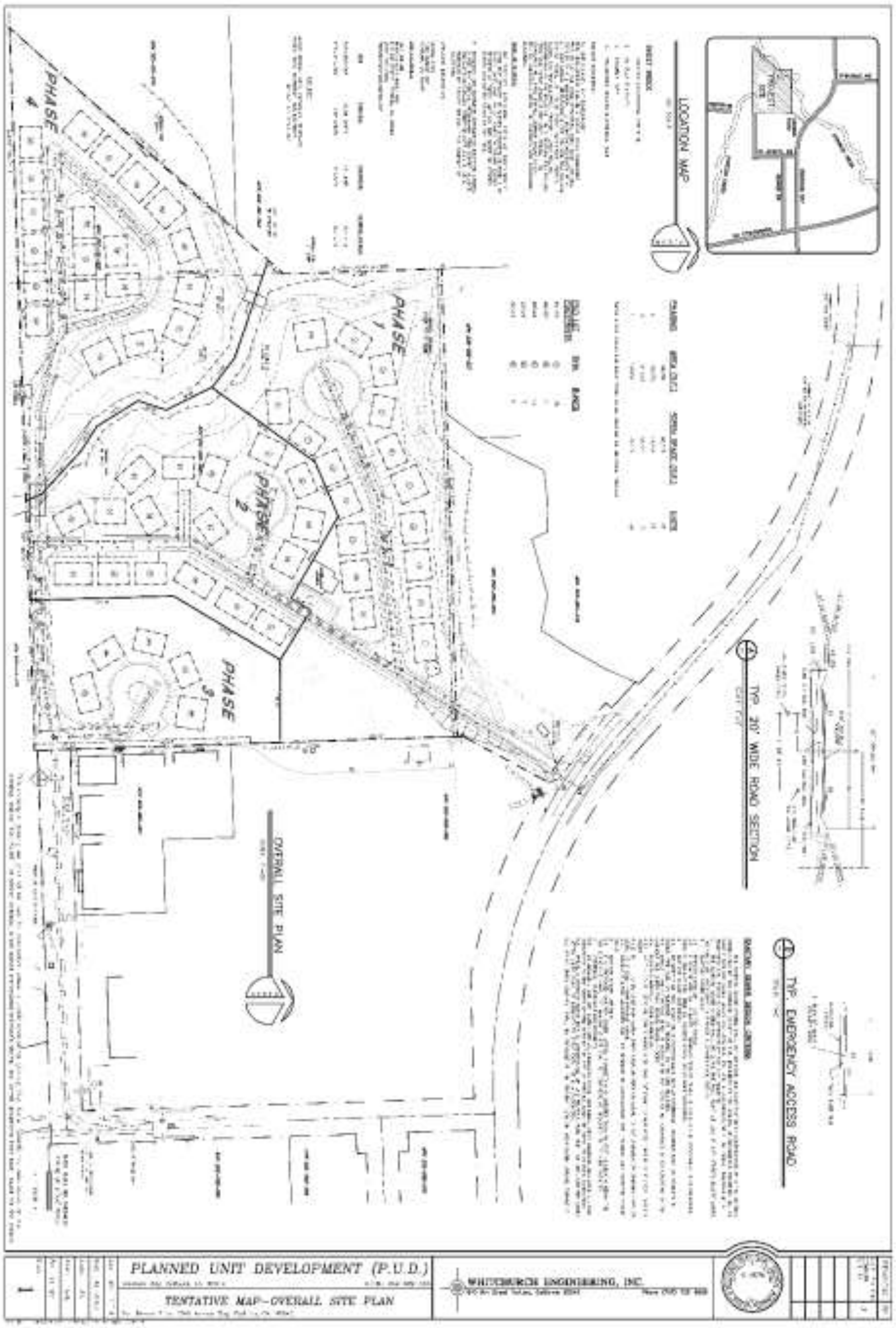


*Figure 3: Fitze Planned Development Tentative Map, Sheet 1*

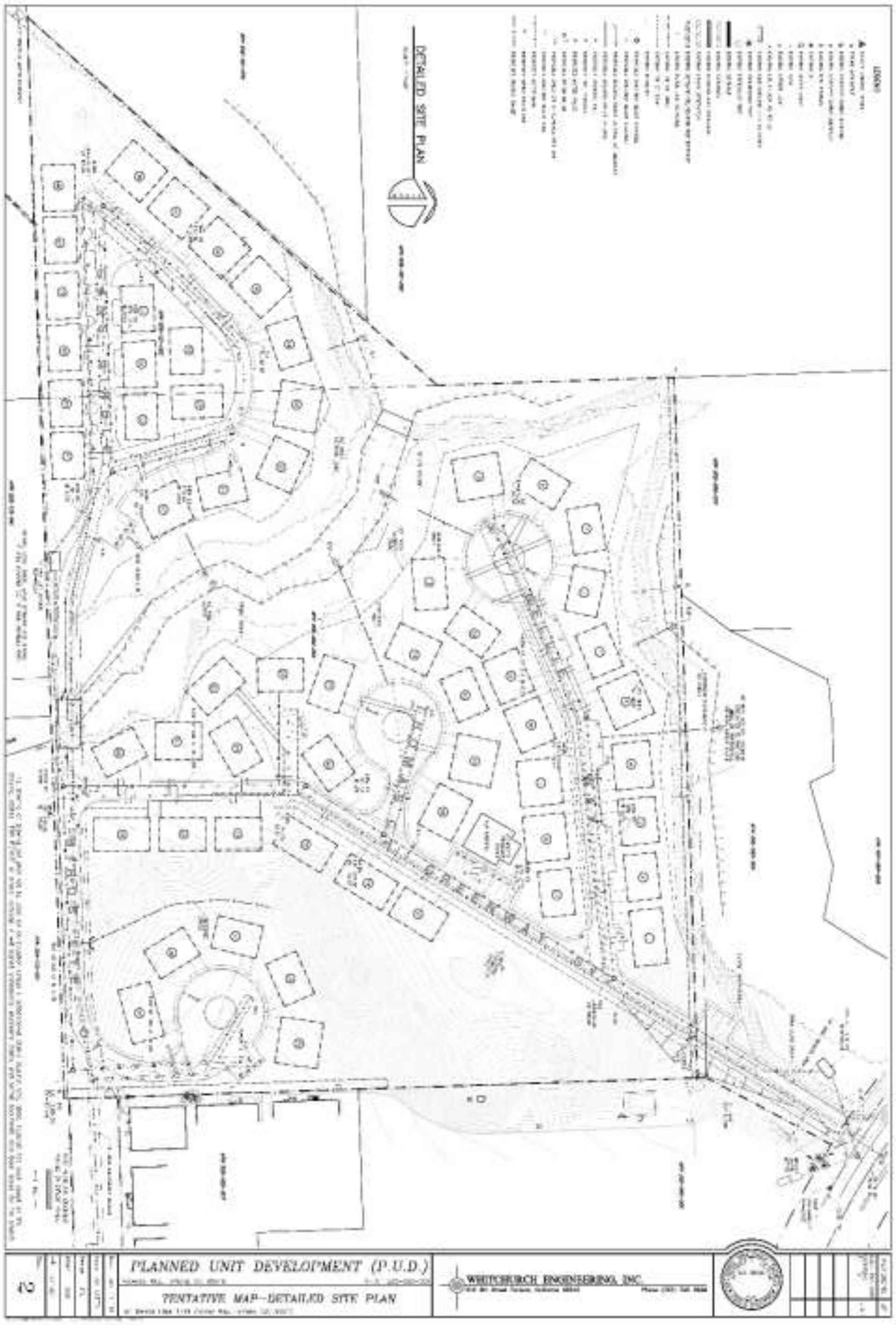



*Figure 4: Fitze Planned Development Tentative Map, Sheet 2*

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

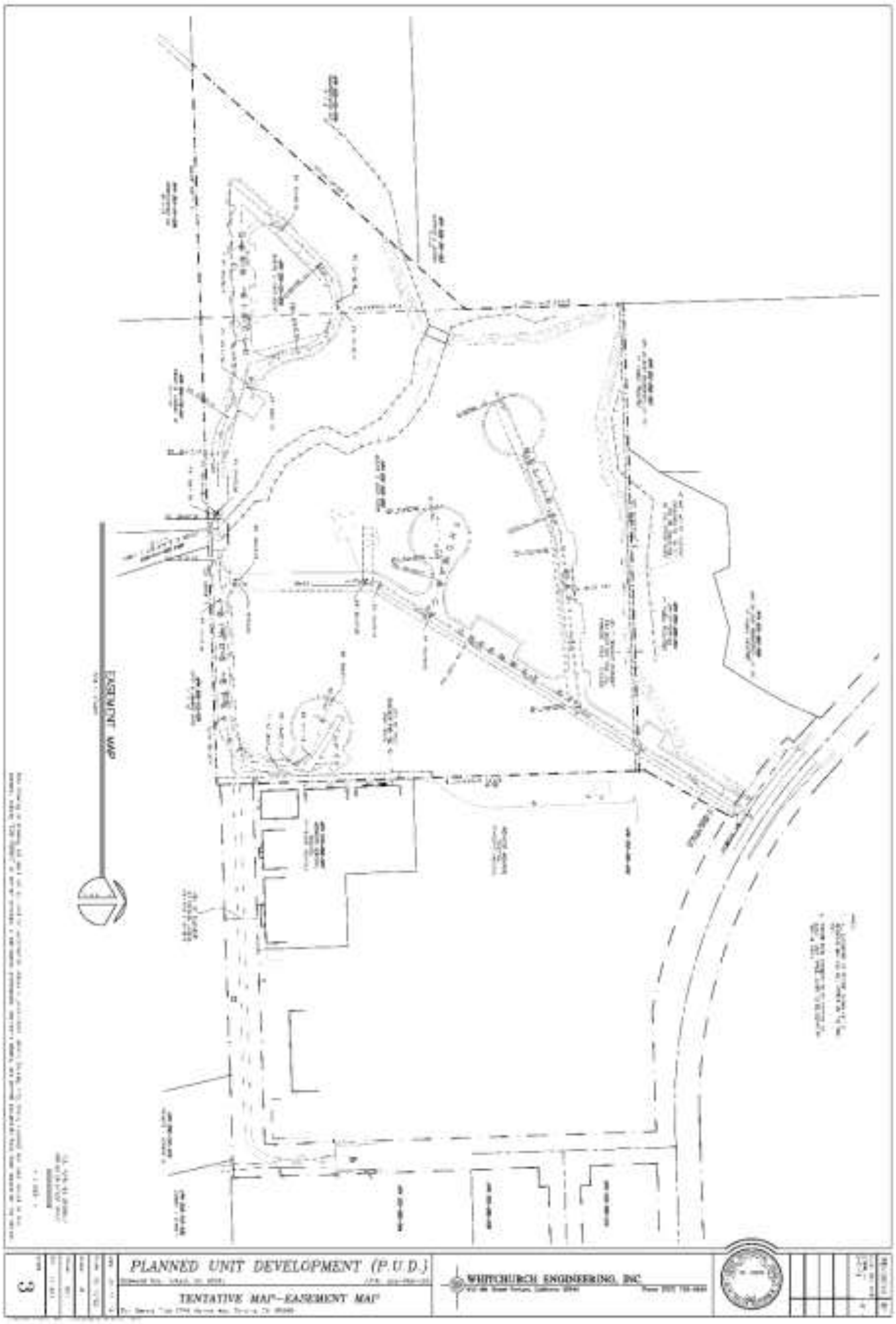


*Figure 5: Fitze Planned Development Tentative Map, Sheet 3*

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

*Figure 6: Fitze Planned Development Tentative Map, Sheet 4*

# 4 Environmental Factors Potentially Affected

The environmental factors marked below have been determined to have a possible effect experienced due to the implementation of this project. Factors that involve at least one impact determined to be a "Potentially Significant Impact" include:

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Aesthetics | ☐ | Agriculture and Forestry Resources | ☐ | Air Quality |
| ☒ | Biological Resources | ☒ | Cultural Resources | ☒ | Geology/Soils |
| ☐ | Greenhouse Gas Emissions | ☐ | Hazards & Hazardous Materials | ☒ | Hydrology/Water Quality |
| ☐ | Land Use / Planning | ☐ | Mineral Resources | ☒ | Noise |
| ☐ | Population / Housing | ☐ | Public Services | ☐ | Recreation |
| ☒ | Transportation/Traffic | ☐ | Tribal Cultural Resources | ☐ | Utilities / Service Systems |
| ☐ | Mandatory Findings of Significance | | | | |

A detailed explanation of all responses follows in Section 4 of this report. All answers take into account 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. The explanation of each issue identifies: (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 a less than significant level.

## 4.1 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. |

May 22, 2019

Liz Shorey, Deputy Director
of Community Development

Date

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

## 4.2 Evaluation of Environmental Impacts

A detailed explanation of all responses follows in Section 10 of this report. All answers take into account 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. The explanation of each issue identifies: (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 a less than significant level.

In the checklist the following definitions are used:

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 offsite as well as onsite, 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 citied 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 analysis of each issue should identify:
    a) the significance criteria or threshold used to evaluate each question; and
    b) the mitigation measure identified, if any, to reduce the impact to less than significant

## 4.3 AESTHETICS

***Table 1: Aesthetic impact evaluation***

| I. **AESTHETICS**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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, which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☒ | ☐ |

### 4.3.1 THRESHOLDS OF SIGNIFICANCE

The project would have a significant effect on aesthetic resources if it would have a substantial adverse effect on a scenic vista; substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway; substantially degrade the existing visual character or quality of the site and its surroundings; create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

### 4.3.2 Discussion

Views within the project site include the senior living facility looking south, Redwood Memorial Hospital looking west, farm land facing north, and residential houses looking east (however dense vegetation will limit the residential houses from viewing the land). Thus, the viewshed is a combination of urban and rural areas.

a) Adverse Effect on a Scenic Vista – Less than Significant Impact

The project area is substantially surrounded by urban and suburban development including a senior living facility, hospital, single family residential neighborhood and rural residential uses. The project area may be temporarily altered by equipment, construction materials, and workers during active construction. The changes to these views will be minor, temporary, and will generally be visible only to the public in the immediate vicinity of the active portion of construction.

Post construction, the new residences will be substantially set back from Redwood Way. Upon completion of the project, there will not be any substantial discernible alterations to the visual nature of the area as native landscape plantings and trees are part of the project development and most adjacent properties are also developed to typical urban or suburban densities. The zoning of the site is Residential Single Family (R-1-10). The proposed development is suitable for this zoning, and single-family residences are not considered to be a visual nuisance.

b) Damage Scenic Resources within a State Scenic Highway – No Impact

Based on California Scenic Highway Mapping System information, no designated state scenic highways are found adjacent to or within view of the project site (California Department of Transportation, 2015). There are no officially designated State Scenic Highways within Humboldt County, although Highway 101 has been identified by the State Scenic Highway Mapping System as eligible for state listing for its entire length in Humboldt County. The project site is not visible from Highway 101.

c) Degrade Existing Visual Character – Less than Significant Impact

Construction activities associated with the project will result in minor temporary aesthetic impacts that will not substantially alter/degrade the existing visual character of the project area. Site work will include installation of a roadway, driveways, parking, sidewalks and development of usable space for recreation. The project will not substantially degrade the existing visual character, or the visual quality of the project site and its surroundings. The riparian areas surrounding both Jameson and Strongs Creek will be substantially unaltered. Therefore, the project will not substantially alter the existing visual character of the project site or its surroundings. The impact is less than significant.

d) New Source of Light or Glare – Less than Significant Impact with Mitigation Incorporation

Construction of the project will occur during daylight hours and will not produce a noticeable amount of light or glare. For public safety reasons, street lights will be installed in the parking areas. Street lighting will consist of low-pressure sodium lighting on light standards pursuant to City policy.

The City of Fortuna General Plan policy requires that all new development provide on-sight lighting to be shielded and downward facing to limit night sky illumination and to prevent direct views of lighting elements from neighboring streets and properties.

### 4.3.3 FINDINGS

The Proposed Project will not have a substantial adverse effect on scenic resources or visual character. For the reasons stated above, the project will have Less than Significant Effect.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

## 4.4 AGRICULTURE AND FORESTRY RESOURCES

***Table 2: Agriculture and Forestry Resources impact evaluation***

| **II. AGRICULTURE AND FORESTRY RESOURCES.** Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? | ☐ | ☐ | ☐ | ☒ |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forestland to non-forest use? | ☐ | ☐ | ☐ | ☒ |

### 4.4.1 Thresholds of Significance

Agriculture and Forestry Resources would be significantly affected by the proposed project if the project were to convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (hereafter “farmland”), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program (FMMP) of the California Resources Agency, to non-agricultural uses. Significant impacts to Agricultural and Forestry Resources would also occur if the project conflicted with existing zoning for agricultural use or a Williamson Act contract; conflicts with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)); Result in the loss of forest land or 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 Farmland, to non-agricultural use or conversion of forestland to non-forest use.

### 4.4.2 DISCUSSION

Maps prepared pursuant to California’s FMMP include Humboldt County as an “Area Not Mapped” and, therefore do not categorize the project area as having any type of Important Farmland (California Department of Conservation, 2012). According to the Fortuna General Plan

Background Report (Mintier & Associates et al. 2009), most of the City of Fortuna is located on prime farmland. The City of Fortuna General Plan 2030 Draft Programmatic Environmental Impact Report (DPEIR) identifies the project site as prime farmland. The DPEIR indicates that approximately 923 acres of the City's planning area of 8,051 acres is prime farmland. The subject site is approximately 0% of the prime farmland identified in the City of Fortuna planning area. According to the Fortuna General Plan Background Report, there are no parcels under Williamson Act contract within or adjacent to the project site (Mintier & Associates et al. 2009).

According to the Humboldt County WebGIS Portal, the parcel is considered prime agricultural land and has a Storie Index rating of 65, or good for agriculture and a Grade 2 rating. The Storie Index expresses relative suitability soil for general intensive agriculture (Humboldt County, 2002). Grade 1 soils (those with a Storie Index rating from 80 to 100) are well-suited to general intensive agriculture. They are easily worked and very productive; irrigation is simple and efficient. The Lower Eel River Watershed contains the City of Fortuna and greater Planning Area and is the watershed with the greatest area of Grade 1 soils and prime farmland in Humboldt County (Humboldt County, 2002). Figure 1 shows a map of the city of Fortuna and all its prime farmland and forestry land.

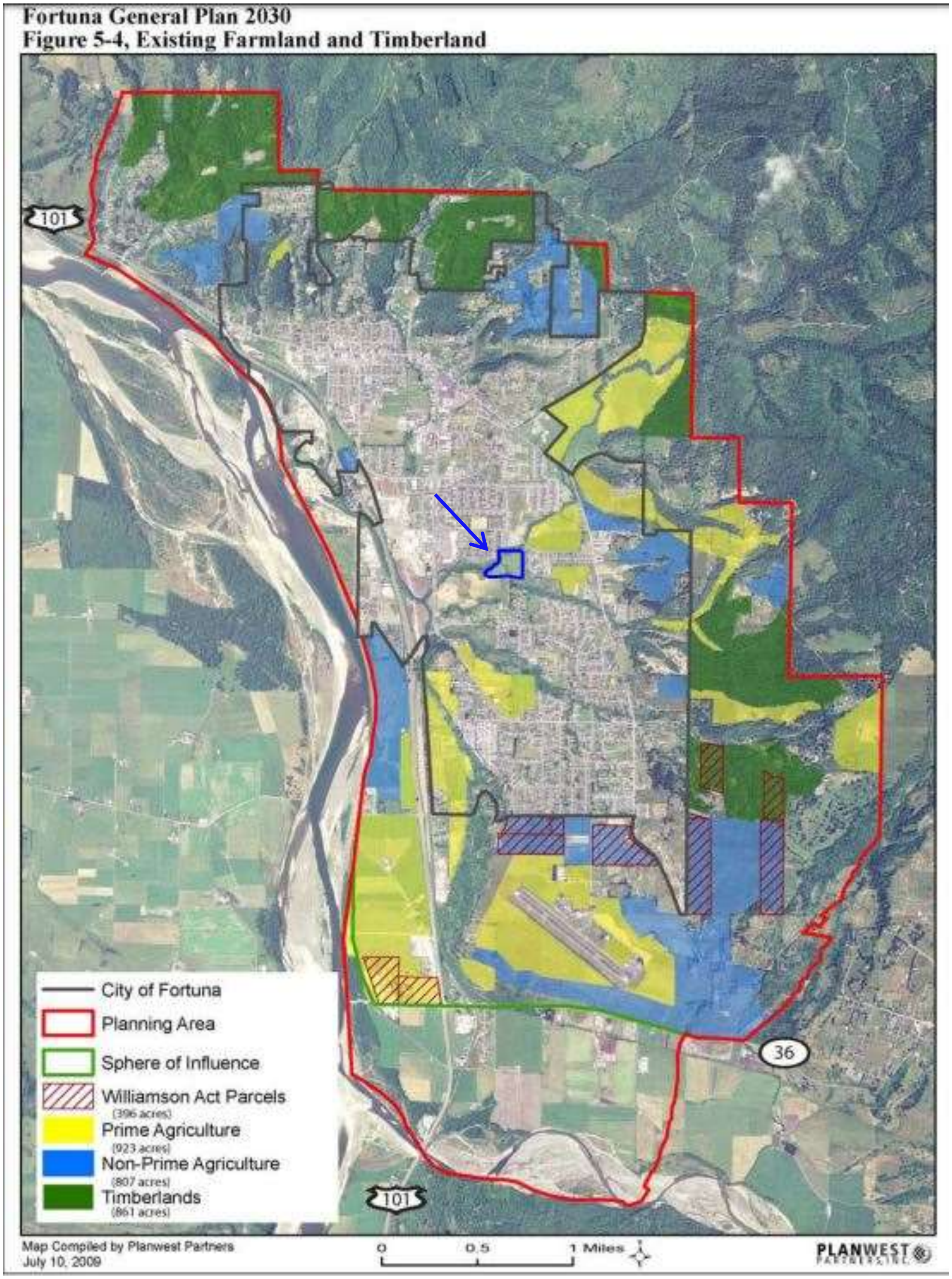



*Figure 7: Map of Agriculture and Timber land in Fortuna, California. Site is marked with blue outline.*

a) Convert Farmland – Less Than Significant

The project site does include local designated Prime Farmland but not Unique Farmland, or Farmland of Statewide Importance, as shown on any maps prepared pursuant to the FMMP. The project will not convert FMMP designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use. The project site has historically been used for growing hay and other silage and for the grazing of cattle, however, a 13.35-acre parcel does not typically provide sufficient area to sustain economically viable agricultural activity and the site has been designated for development in the Fortuna General Plan. According to the General Plan 2020, 289 acres of the 923 acres designated as Prime Farmland in the planning area is designated for urban use including the project site. Thus, the 13.35 acres of the project site represents approximately 0 percent of the prime farmland within the planning area; therefore, the project will have a less than significant effect.

b,c) Conflict with Existing Zoning for Agricultural Use or Forest Land or Result in the Loss of Forest Land – No Impact

The project site is zoned R-1-10. There are no parcels in the project site or in the vicinity under Williamson Act contract (California Department of Conservation 2012) or zoned for Timberland Production. The project will not conflict with agricultural or forest land zoning or Williamson Act contracts and will not result in the loss of forest land; therefore, no impact will occur.

d) Convert Forest Land or Farmland – No Impact

The subject site is substantially surrounded by properties developed with urban and suburban uses with no adjacent forest land, timber land or intensive agricultural uses. Therefore, development of the subject site does not have the potential to cause the conversion of other farmland to non-agricultural use or conversion of forest land to non-forest use. No impact has been identified.

#### 4.4.3 MITIGATION MEASURES

No mitigation required.

#### 4.4.4 FINDINGS

The Project will have a Less than Significant Impact on Agricultural and Forestry Resources.

## 4.5 AIR QUALITY

***Table 3: Air quality impact evaluation***

| **III. AIR QUALITY**. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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, which exceed quantitative thresholds for ozone precursors)? | ☐ | ☐ | ☒ | ☐ |
| d) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ☒ | ☐ |
| e) Create objectionable odors affecting a substantial number of people? | ☐ | ☐ | ☒ | ☐ |

### 4.5.1 Thresholds of Significance

The project would have a significant effect on Air Quality if it conflicts with or obstructs implementation of applicable air quality plans; violates any air quality standard or contribute substantially to an existing or projected air quality violation; results in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors); exposes sensitive receptors to substantial pollutant concentrations; or creates objectionable odors affecting a substantial number of people.

### 4.5.2 DISCUSSION

The climate in Fortuna is moderate, with the predominant weather being moist air masses moving in a westerly direction from the ocean. Average annual rainfall is approximately 40 inches with the majority falling between October and April. The Draft Environmental Impact Report for the City of Fortuna General Plan Update concludes that: “The City of Fortuna benefits from generally good airflow and quality. Its primary sources of air emissions include smoke from residential wood stoves, vehicular exhaust particulates, and dust from unpaved roads.”

The Proposed Project is located within the North Coast Air Basin (NCAB) and is subject to North Coast Unified Air Quality Management District (NCUAQMD) requirements. The NCUAQMD is responsible for monitoring and enforcing local, state, and federal air quality standards in the County of Humboldt. Air quality standards are set for emissions that may include, but are not limited to, visible emission, particulate matter, and fugitive dust. The entire NCAB is currently designated as "non-attainment," or in excess of allowable limits, for the State 24-hour $PM_{10}$ standard for breathable particulate matter of 10 microns or less ($PM_{10}$), and as "attainment," or within allowable limits, with respect to the balance of the criteria pollutants (http://www.ncuaqmd.org/index.php?page=aqplanning.ceqa).

**a) Conflict with or Obstruct Applicable Air Quality Plan – Less than Significant Impact**

The Health and Safety Element of the Fortuna General Plan (October 2010) includes policies to maintain compliance with NAAQS for $PM_{10}$ (Policy HS-3.2 Particulate Matter); to reduce Greenhouse Gas emissions (Policy HS-3.6 Greenhouse Gas Emissions Reduction from Transportation); and require that new development incorporate air pollutant emission reduction measures during construction and operation (Policy HS-3.7 Air Pollutant Emission Reduction Construction and Operation Measures). The Health and Safety Element also includes programs to work with the NCUAQMD to develop and implement an Air Quality Management Plan for controlling $PM_{10}$ (Program HS-4); and to require proposed new subdivisions, PDs, and other large development projects to implement air emission reduction measures (Program HS-5).

The project will generate a minor amount of particulate emissions over the duration of construction in the form of dust, and vehicle and equipment emissions as a result of earthwork, trenching, clearing, grading, and other construction activities. The project will not cause any long-term increase in the emissions of particulate matter or other air pollutants as the primary purpose of the project is to consolidate existing health care services and to provide additional services to residents of Fortuna and the Eel River Valley, limiting the need to travel to more distant providers. To reduce potential impacts to air quality, the City of Fortuna General Plan includes construction emission reduction measures that are required for development projects. Those are incorporated into the project. While the NCAB is in non-attainment for $PM_{10}$, the temporary nature of construction activities combined with project implementation of standard dust and $CO_2$ emission reduction actions during construction will avoid significant impacts.

In the long term, the project will not substantially add to the level of $PM_{10}$ or other emissions such that it will cause a cumulatively considerable net increase of pollutant emissions in the area. With implementation of Best Management Practices (BMPs) and the City's Construction Emission Reduction Measures, which are incorporated into the project, the project will not obstruct implementation of the NCUAQMD particulate matter attainment plan. The project will also be consistent with applicable General Plan policies related to air resources and a less than significant impact will occur.

**b) Violate Air Quality Standard or Contribute Substantially to Existing or Projected Air Quality Violation – No Impact**

Under the federal Clean Air Act of 1977, the US Environmental Protection Agency (EPA) is required to identify NAAQS to protect public health and welfare. The EPA has established NAAQS for six criteria air pollutants (Carbon Monoxide, Lead, Nitrogen Dioxide, Ozone, Particle Pollution and Sulfur Dioxide); however, the NCAB does not meet or exceed these federal pollutant thresholds. Under the California Clean Air Act, the California Air Resources Board (CARB) has adopted more stringent standards for the criteria air pollutants. Though it has adopted a particulate matter attainment plan, the NCUAQMD has not established specific thresholds of significance for criteria pollutants. As discussed above, the NCAB is currently designated as a state non-attainment area for $PM_{10}$, but does not violate any other federal, state, or local air quality standards (CARB 2013). In the NCAB, most particulate matter is caused by vehicle emissions, wind generated dust, construction dust, wildfire and human caused wood smoke, and sea salts. Health effects from particulate matter include reduced lung function, aggravation of respiratory and cardiovascular diseases, increases in mortality rate, and reduced lung function and growth in children.

It is anticipated that the following equipment will be used during construction, which is anticipated to last between twelve and fifteen months: excavator, bulldozer, roller, backhoe, concrete trucks and dump trucks for hauling materials.

During project construction, a small number of trips associated with the delivery of materials will occur throughout the construction period. The trips will create a minor temporary air quality impact within the neighborhood immediately surrounding the project area.

Disturbance of soil at the project site during excavation and earthmoving will contribute to project dust emissions. Project construction will require trucks to remove excess materials to a disposal site and to deliver construction and fill materials to the project site. In addition to haul truck trips, workers will travel to and from the project site each day, generating a minor amount of daily commute trips.

The project will be required to comply with all rules and standards of the NCUAQMD and with air pollution prevention BMPs incorporated into the project.

**c) Result in Cumulatively Considerable Net Increase of Any Criteria Pollutant for which the Region is in Non-Attainment – Less than Significant Impact**

As described above, the NCAB is in non-attainment for the criteria air pollutant $PM_{10}$; however, as discussed above, with incorporation of construction emission reduction measures that are required for development projects (Environmental Protection Action 1) in the City of Fortuna, project construction will cause only minor and short-term production of $PM_{10}$ and will not significantly increase the background levels. Project operation will result in negligible additional $PM_{10}$ emissions; therefore, the project will result in a less than significant cumulative impact to air quality from criteria air pollutant and precursor emissions.

**d) Expose Sensitive Receptors to Substantial Pollutant Concentrations – Less than Significant Impact**

Construction of the project will create temporary emissions of toxic air contaminants, primarily as a component of diesel emissions. Due to the variable nature of construction activity, the generation of toxic air contaminant emissions in most cases will be temporary, particularly considering the short amount of time such equipment is typically within an influential distance of sensitive receptors. Sensitive receptors in the project area include residences, churches, schools, a hospital, and areas adjacent to roadways where the general public will have access. Concentrations of mobile-source diesel PM emissions are typically reduced by 70 percent at a distance of approximately 500 feet. In addition, 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 variable nature of construction activities associated with this project.

Construction will commence in the summer of 2019 between the hours of 7:00 AM and 7:00 PM, Monday through Friday. Construction will be allowed on weekends and holidays subject to City approval. As discussed above, the project will result in only minor, short-term construction-related air emissions. Additionally, the implementation of the City's construction emission reduction measures that are required for development projects (Environmental Protection Action 1), will keep diesel $PM_{10}$ exhaust emissions at lower levels. As these emissions are temporary in nature, health risks from project construction are not anticipated. Construction impacts are less than significant.

Project operation will not expose sensitive receptors to substantial pollutant concentrations as the project does not include any significant stationary source emissions, as the project components are those typical for a residential PD. Source emissions will be constrained to resident vehicles, and intermittent gardening equipment. Therefore, operational impacts will be less than significant.

**e) Create Objectionable Odors – Less than Significant Impact**

During construction the various diesel-powered vehicles and equipment could create localized odors. Additionally, some materials used in construction or substrates encountered in sub-surface construction may create objectionable localized odors. These odors will be temporary and not likely to be noticeable for extended periods of time beyond the construction zone due to atmospheric dissipation. The impact will be less than significant.

The project will comply with City of Fortuna new Planned Development/Subdivision and other large development projects air emission reduction measures (City of Fortuna; General Plan - HS-5, 2010) through the application of the following control measures;

1) Use watering to control dust during tree clearing activities
2) Spray exposed soils and dirt roads as needed during clearing, grading, and trenching;
3) Sweep paved streets used by earth-moving equipment at least once a day;
4) Apply soil stabilizers to areas where development or landscaping will not occur within tree (3) days of grading;
5) Plant ground cover in disturbed areas immediately after grading;
6) Cover haul truck loads;
7) Use only low VOC and low formaldehyde coatings, paints and insulation in buildings;
8) Fit construction equipment with EPA and/or NCAQMD-approved exhaust systems, and keep these vehicles tuned and in good working order;
9) Limit diesel-powered construction equipment idling time to 10 minutes maximum; and
10) Stage diesel-powered construction equipment as far away from residences as possible.

### 4.5.3 FINDINGS

The Project will have a Less than Significant Impact on Air Quality with the project standards.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

## 4.6 BIOLOGICAL RESOURCES

***Table 4: Biological Resources impact evaluation***

| IV. **BIOLOGICAL RESOURCES**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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, and 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? | ☐ | ☐ | ☐ | ☒ |

### 4.6.1 Thresholds of Significance

The project would have a significant impact to Biological Resources if it were to 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 Wildlife or U.S. Fish and Wildlife Service; have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service; 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,

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

hydrological interruption, or other means; 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; conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

### 4.6.2 DISCUSSION

Zoning of the site is Residential Single Family (R-1-10). The site is surrounded by residential uses to the northwest and southeast, an assisted living facility to the north, patureland to the southwest, and Strongs Creek to the north and northwest. The undeveloped site is largely composed of a pasture, which flanks Strongs Creek along portions of the northern and western property border. The field is vacant and has been typically used for cattle and horse grazing. The Strongs Creek stream channel is located on adjacent land to the north, but portions of the bank and riparian vegetation are on the project site. Jameson Creek crosses the site in the southwest project area. Several small wetlands are located on the site, totaling 0.04 acres in size. In general, the entire site to be developed is heavily grazed and in poor condition for biological resources habitat.

The pasture is vegetated by sweet vernal grass (*Anthoxanthum oderatum*), English daisy (*Bellis perennis*), velvet grass (*Holcus lanatus*), perennial ryegrass (*Lolium perenne*), penny royal (*Mentha pulgeium*) and white clover (*Trifolium repens*). Non-tree vegetation along the riparian edges is composed of Himalayan blackberry (*Rubus armeniacus*) as well as California blackberry (*Rubus ursinus*).

The Strongs Creek and Jameson Creek riparian forest is dominated by red alder (*Alnus rubra*) with scattered Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scoulerii*), California bay (*Umbellularia californica*), and bigleaf maple (*Acer macrophyllum),* with an understory of salmon berry (*Rubus spectabilis*), cascara (*Rhamnus purshiana*), thimbleberry (*Rubus parviflorus*), and ground cover including colt's foot (*Petasites frigidus var. palmatus*), lady fern (*Athyrium felix-femina*), and creeping buttercup (*Ranunculus repens*).

Currently, the pastures on the site provide limited wildlife habitat for mammals, reptiles, amphibians, and avian species due to the heavily grazed condition and limited forage, cover or nesting habitat. The most suitable habitat on site for wildlife cover and breeding bird use, is the Strongs Creek riparian. No development will occur within 50 feet of the Strongs Creek bank and riparian area, and it will continue to function as a wildlife corridor.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

Development activities will not have a significant effect on sensitive wildlife because all development activities will take place within the existing pasture area. Grading will occur outside of the 50-foot creek setback from the high flow channel and the 25-foot wetland setback. This project will have a less than significant impact to special-status species, riparian habitat or sensitive natural community.

Although the project area does contain some native plants and associations the overall vegetation stand is largely composed of introduced species and the area has been graded and mowed repeatedly in the past and has otherwise been impacted through its use for livestock grazing. The on-site vegetation type is not considered to have a high conservation value or a high-quality occurrence of the given communities due to past management, and the presence of invasive and non-native plant species. Riparian areas surround both Jameson and Strongs Creek on site. A streamside management area has been defined and includes a setback of 50-ft from the top of bank of each stream as required by the City of Fortuna. This setback will ensure preservation of riparian vegetation.

A wetland survey was conducted for the subject property by J. Regan Consulting in October and November 2016 for APNs 202-082-005 and 202-121-002. Three small areas with a total area of 0.04 acres meet the Army Core of Engineers (ACOE) requirements to be defined as jurisdictional wetlands with the main site area (APN: 202-082-005). These wetlands have been reviewed and approved by the American ACOE, the approved Jurisdictional determination and wetland delineation report can be found in the attachments of this study (Attachment B).

**a) Impacts to Special-Status Species, Riparian or Sensitive Natural Community – Less than Significant Impact with Mitigation**

The project will be constructed in the vicinity of Strongs and Jameson Creeks, but development will not encroach on the 50-ft streamside management area. Wetlands are recommended in the Fortuna General Plan to have a 50-foot setback; however, the Fortuna General Plan Policy NCR-15 allows for a reduced setback up to 25 feet when a biological report indicates that such wetland buffer areas are not required. Site review by J. Regan consulting indicates that wetland setback could potentially be reduced to 25-ft as the jurisdictional wetlands on site do not function as high value animal habitat (Attachment C).

Vegetation at the sites has been altered and modified by past land use and development. These activities have altered the environmental conditions at the sites so that common, non-native plant species dominate the sites. The ongoing disturbed nature of the sites and regular impacts from human intrusion are factors that likely contribute to the absence of rare plants or their ability to colonize the site over time, with the exception of species that can tolerate a high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disturbance regime. Through the ACOE wetland delineation process, database information concluded that there are no previously known rare plant populations within the project parcels.

Given the above information and that no special status plant species were observed during the Regan Consulting wetland delineation, the proposed project is not anticipated to directly or indirectly impact any listed or special status plant species; thus, anticipated impacts are less than significant.

**b) Effect on Wetlands – Less than Significant Impact with Mitigation**

The Regan Consulting report revealed several potential jurisdictional wetlands at the project site. The wetlands report concluded that the wetland was described as relatively low function due to past and current agricultural use, lack of hydrological connection to other waters, the small size (0.04 acres) and the disturbed nature of the Oregon ash grove.

In a letter dated November 28, 2018 from the US Army Corps of Engineers, a Jurisdictional Determination was approved determining there are no jurisdictional water of the United States and navigable waters of the United States within the boundary area of the site – per Section 404 of the Clean Water Act. The site, in terms of this report, includes the entry way to the proposed project, and does not include the total parcel areas included in the previous wetland delineation report (Attachment B). The Jurisdictional Determination and the wetland delineation report associated with it the project entry way can be found in the attached documentations (Attachment D).

Every unit will be at least 50 feet from the riparian zone as to not disrupt the surrounding environment. Jurisdictional wetlands are recommended to have a 50-foot setback for any development. Through communication with the City of Fortuna and review by J. Regan Consulting, it has been determined that the setback may be reduced to 25 feet around the wetland areas without impact to the wetlands. This reduction was determined to be appropriate based on the analysis that the wetlands located on site do not function as high value animal habitat.

**c) Interfere with Movement of Fish or Wildlife Species – No Impact**

Development activities will not have a significant effect on fish or wildlife because all development activities will take place within the existing disturbed pasture area. Grading will occur outside of the 50-foot creek setback from the high flow channel and the 25-foot wetland setback. This project will have a less than significant impact to special-status species, riparian habitat or sensitive natural community. Implementation of the project will not interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. No impact will occur.

**d) Interfere with Movement of Fish or Wildlife Species, Migratory Wildlife Corridors or Native Wildlife Nursery Sites –Less than Significant Impact with Mitigation Incorporated**

This project is not anticipated to impede the use of native wildlife nursery sites. However, suitable Strongs Creek and Jameson Creek riparian habitat exists on site for wildlife cover and breeding bird use. Development will not occur within the 50-foot riparian buffer and will not occur during the breeding season before a nesting survey is completed (BR-3 Mitigation). No work will be performed within Strongs or Jameson creeks, therefore potential migratory fish within the channel will not be effected.

The Fortuna General Plan includes Policy NCR-2.1 (Riparian Corridor Protection), to address fish and terrestrial wildlife habitat protection, enhancement, and movement along riparian corridors. The Strongs and Jameson creeks riparian will remain as a buffer. No other development will occur within 50 feet of the riparian corridor.

This project will have a less than significant effect on the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. With the incorporation of BR-3 Mitigation, this project will have a less than significant effect on native wildlife nursery sites.

**e) Habitat Conservation Plan – No Impact**

The City of Fortuna does not have an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan within which the project will conflict. Furthermore, according to the Fortuna General Plan Background Report (City of Fortuna 2007), the Fortuna General Plan Planning Area (which encompasses both incorporated territory and unincorporated areas that may directly or indirectly affect the City's future development) is not subject to an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impact will occur.

### 4.6.3 MITIGATION MEASURES

**BR-1: Compliance with Army Corps Nationwide Permit.**

Timing for Implementation/Compliance: City plan review of improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review and pre-construction site review.

Evidence of Compliance: Final development plans depict creek banks and wetland areas and setbacks. City Community Development Department to review Nationwide Permit during plan review to ensure protection measures are depicted. Building Inspectors to review during site development to ensure fencing and other measures are implemented.

**BR-2: Maintain the 50-ft setback from Strongs and Jameson creeks' top of bank. Maintain 25-ft setback from jurisdictional wetlands.**

Timing for Implementation/Compliance: City plan review of improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review and pre-construction site review.
Evidence of Compliance: Plans depict 50-foot setback from Strongs and Jameson Creeks, and 25-foot setbacks from wetlands.

BR-3: Migratory Bird Protection
There are potential direct impacts to migratory bird species if construction or vegetation removal occurs during the breeding season (March 1- August 15). Therefore, preconstruction nesting surveys will be performed if construction will occur during that time to mitigate these potential impacts.

If breeding birds are found in the vicinity, construction will be delayed until after the breeding season or proper setbacks should be established in cooperation with the California Department of Fish and Wildlife prior to proceeding with construction.

Timing for Implementation/Compliance: March - August
Person/Agency Responsible for Monitoring: Owner
Monitoring Frequency: Once, pre-construction
Evidence of Compliance: Visual or written verification that no breeding birds are present.

### 4.6.4 FINDINGS
The Project will have Less than Significant Effect on Biological Resources with Mitigation Incorporation.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

## 4.7 CULTURAL RESOURCES

***Table 5: Cultural Resources impact evaluation***

| V. **CULTURAL RESOURCES**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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) Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074? | ☐ | ☐ | ☒ | ☐ |

### 4.7.1 Thresholds of Significance

The project would have a significant effect on Cultural Resources if it would cause a substantial adverse change in the significance of a historical resource as defined in '15064.5; cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5; directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or disturb any human remains, including those interred outside of formal cemeteries; or create change in the significance of a tribal cultural resource as defined in Public Resources Code 21074.

### 4.7.2 DISCUSSION:

A Cultural Resources Investigation (CRI) for this project was performed by William Rich M.A., RPA of William Rich and Associates (Appendix E). The purpose of this investigation was to determine whether historical resources are present within the proposed project area or adjacent areas.

The investigation methods included a review of the files at the Northwest Information Center (NWIC) located in Rohnert Park, California. Review of archaeological and historical literature and historic photographs pertinent to the project region was conducted at the Humboldt County Historical Society, Humboldt State University (HSU) Library-Humboldt Room, the HSU Cultural Resources Facility and the author's personal files. Correspondence with Native American Tribes was initiated by the City of Fortuna. William Rich and Associates obtained a sacred land search from the Tribal Preservation Historical Officer for the Bear River Band of the Rohnerville Rancheria and the Chairman of the Wiyot Tribe.

According to the NWIC records search, a portion of the project area has been subject to a previous cultural resources survey as part of a proposed sewage system for the community of Rohnerville (Gorrell, 1976). No known cultural resources are recorded in the area proposed for the subdivision; however, four Native American archaeological sites, an archaeologically sensitive area and an historic period barn and residence are located within ½ mile of the project area.

Ethnogeographic information for the project location is sparse. Research indicates that the Wiyot's ancestral area included what is today Fortuna and extended south to Alton. The closest Wiyot village was known to be situated at the mouth of Strongs Creek along the Eel River, well outside of the project area (Loud, 1918).

A pedestrian field survey was completed for the entire project area on April 30, 2019. Survey conditions were good with adequate light and numerous exposures of mineral soil throughout the survey area. Shovels and trowels were used to clear ground cover in some areas where ground visibility was obscured.

The report concluded that no significant archaeological or historic period resources, for the purposes of CEQA, exist in the limits of the proposed subdivision area. At this time, no further archaeological studies are recommended for the project by William Rich and Associates. Although the report finds that it would be unlikely to encounter significant buried archaeological materials during project implementation, the Cultural Resource Protection Protocol described below would ensure potential project impacts on inadvertently discovered cultural resources are eliminated or reduced to less than significant levels.

**a, b, d) Cause a Substantial Adverse Change in the Significance of a Historical or Archaeological Resource; or Disturb any Human Remains, Including Those Interred Outside of Formal Cemeteries – No Impact**

The Cultural Resources Investigation report concludes that no significant archaeological or historic period cultural resources, that for the purposes of CEQA (15064.5 (a)), would be considered an historical resource, exist in the limits of the proposed project area. Therefore, the Code of Federal Regulations (CFR) recommends a finding of no substantial adverse changes (PRC §5020.1(q) and 14 CCR §15064.5(b)(1)) to historical resources.

In the event that cultural resources are unearthed during project implementation, Cultural Resource Protection Protocol 1 and 2, stated in the following pages, will be implemented. These offer recommendations that would ensure potential project impacts on inadvertently discovered cultural resources are eliminated or reduced to less than significant levels. At this time, no further archaeological studies are recommended by Williams & Associates. This project will not cause any known disturbance to human remains, and will have no known significant impact on historical or archeological resources.

**c)Directly or indirectly destroy a unique paleontological resource or unique geologic feature – Less than significant with Mitigation**

According to the Fortuna General Plan, the bluffs overlooking the Eel River, which are miles from the project site, are a significant source of fossils. Therefore, unique paleontological resource or geologic features have the potential to exist within Fortuna's Planning Area. However, it is unlikely these resources exist on the project site because of the site's geologic conditions. The area is described in the *Geologic Map of California* as "Pleistocene-Holocene alluvium playa, and terrace deposits; unconsolidated and semi-consolidated. Mostly non-marine, but includes marine deposits near the coast."

During the pedestrian field survey, attention was given to the banks of Strongs Creek where subsurface soils could be observed. Despite conducting an intensive pedestrian field investigation with intuitively-spaced shovel scrapes to aid inspection of mineral soil, no artifacts, features, sites or other cultural resources were identified in the areas proposed for project implementation.

If any unique paleontological resource or unique geologic feature is discovered, Cultural Resource Protection Protocol 1 will be implemented. Since there is no current knowledge of a unique paleontological resource or unique geologic feature, this project is anticipated to have no significant impact.

**e)Cause a substantial adverse change in the significance of a tribal cultural resource –Less than significant**

Starting in 2018, Lead Agencies are to consult with Tribes and initiate consultation prior to the release of a negative declaration, mitigated negative declaration or environmental impact report under the California Environmental Quality Act (CEQA).

More specifically, AB 52 creates a new category of resources in CEQA called "tribal cultural resources" and seeks to engage the expertise of Native American tribes in the protection and preservation of those resources. To fulfill that purpose, the new law requires the lead agency to consult with a local Native American tribe as part of the environmental review process. The law also requires that the details of the tribal cultural resource be kept confidential and provides examples of mitigation measures that focus on preserving tribal cultural resources.

The City of Fortuna sent consultation letters regarding the proposed project to the Bear River Band of the Rohnerville Rancheria and the Wiyot Tribe on December 14, 2018 (Appendix E). On April 29, 2019, WRA sent a letter to the Native American Heritage Commission (NAHC) requesting a search of the Sacred Lands Inventory File. The NAHC responded on May 1, 2019. A follow-up letter was sent to Erika Cooper, THPO for the Bear River Band of the Rohnerville Rancheria and Chairman Ted Hernandez of the Wiyot Tribe on May 6, 2019. The letter described the isolated artifact that was found during the field survey. Ms. Cooper acknowledged receipt of the letter and no further responses were received (Appendix E).

Impacts

This project will have no impact on known tribal cultural resources. If tribal cultural resources are discovered, the Cultural Resource Protection Protocol outlined below will ensure Cultural Resources Protection Protocol are to be followed. Mitigation Measure C-1 requires that the protocol is printed on the project construction plans; this will ensure that the construction contractors are aware of and responsible for the protocol.

### 4.7.3 MITIGATION MEASURES

**C-1: If tribal cultural resources are discovered, the Cultural Resource Protection Protocol outlined below will be followed. The protocol shall be printed on all construction plan sets.**

#### Cultural Resource Protection Protocol 1: Cultural Resources

If cultural resources, such as lithic materials or ground stone, historic debris, building foundations, or bone are inadvertently discovered during ground-disturbance activities, work shall be stopped within 20 meters (66 feet) of the discovery, per the requirements of CEQA (January 1999 Revised Guidelines, Title 14 CCR 15064.5 (f)). If the proposed project receives Federal funding, it may be considered a Federal undertaking triggering compliance with Section 106 National Historic Preservation Act. Inadvertent discoveries shall be treated as outlined in 43 CFR 10.4 and 36 CFR 800.13.

Work near the archaeological find shall not resume until a professional archaeologist, who meets the *Secretary of the Interior's Standards and Guidelines*, has evaluated the materials and offered recommendations for further action.

Prehistoric materials which could be encountered include: obsidian and chert debitage or formal tools, grinding implements, (e.g., pestles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic materials which could be encountered include: ceramics/pottery, glass, metal, can and bottle dumps, cut bone, barbed wire fences, building pads, structures, trails/roads, etc.

Cultural Resource Protection Protocol 2: Human Remains

If human remains are inadvertently discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie adjacent to human remains (Public Resources Code, Section 7050.5). The Humboldt County coroner will be contacted to determine if the cause of death must be investigated. If the coroner determines that the remains are of Native American origin, it is necessary to comply with State laws relating to the disposition of Native American burials, which fall within the jurisdiction of the Native American Heritage Commission (NAHC) (Public Resources Code, Section 5097). The coroner will contact the NAHC. The descendants or most likely descendants of the deceased will be contacted, and work will not resume until they have made a recommendation to the landowner or the person responsible for the excavation work for means of treatment and disposition, with appropriate dignity, of the human remains and any associated grave goods, as provided in Public Resources Code, Section 5097.98. Work may resume if NAHC is unable to identify a descendant or the descendant failed to make a recommendation.

> **Timing for Implementation/Compliance: Submittal of utility** Improvement plans and building permit plans.
> **Person/Agency Responsible for Monitoring:** City Community Development Dept.
> **Monitoring Frequency:** Plan review.
> **Evidence of Compliance:** Protocol printed on plans.

### 4.7.4 FINDINGS

The Project will have a Less than Significant Impact on Cultural Resources with Mitigation Incorporation.

## 4.8 GEOLOGY AND SOILS

***Table 6: Geology and Soils impact evaluation***

| **VI. GEOLOGY AND SOILS**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 wastewater disposal systems where sewers are not available for the disposal of wastewater? | ☐ | ☐ | ☐ | ☒ |

### 4.8.1 Thresholds of Significance

The project would have a significant effect on geology and soils if it would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: 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, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides; result in substantial soil erosion or the loss of topsoil; 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; 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; or 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.

### 4.8.2 DISCUSSION

The City of Fortuna is located within a complex geological environment characterized by high rates of tectonic activity. The area is known for a high amount of seismicity, with more than 60 earthquakes producing discernible damage since the mid-1800s. The project area lies north of the Mendocino Triple Junction, where the North American, Pacific and Gorda plates meet. The local geologic setting of Fortuna is characterized by the Little Salmon fault and the Eel River. The City lies east of the Eel River and is built on alluvium derived from the Eel and Van Duzen rivers and from streams draining the hills east of town.

The Humboldt County GIS website and the EIR for the Fortuna General Plan do not identify any earthquake faults, or earthquake fault hazard zones within the project area. According to the Humboldt County GIS, the project site is relatively stable, is not within a liquefaction zone, and is not within an Alquist Priolo Fault Zone. Soil types have not been mapped by the Natural Resources Conservation Service. However, geologic maps of the region indicate the material underlying the project area and surrounding slopes is associated with the Middle to Late Pleistocene aged Hookton Formation (Kilbourne, 1985). The Hookton Formation is composed principally of non-marine gravel, sand, silt, and clay; however, some of the sediments along the western limits of this formation appear to have been deposited in shallow marine or marginal environments (Ogle, 1953). The Wildcat series of the Hookton formation are the predominate soils in the area.

#### a.i) Fault Rupture – Less than Significant Impact

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. This act prohibits the location of structures designed for human occupancy across active faults and regulates construction within fault zones. The project site is not within or adjacent to an Alquist–Priolo Earthquake Fault Zone (CGS 1991). The nearest fault classified as an Alquist–Priolo Earthquake Fault Zone is the Little Salmon Fault located approximately 2.1 miles northeast of the project. Based on published mapping, the possibility of ground ruptures and/or fault creep at the project site is low. The impact is less than significant.

#### a.ii) Ground Shaking – Less than Significant Impact

All of coastal Northern California is subject to potentially strong seismic ground shaking and multiple earthquake sources capable of generating moderate to strong earthquakes are in close proximity to the project site. Strong seismic shaking is a regional hazard that could cause major damage to the project area. The extent of ground-shaking during an earthquake is controlled by the earthquake magnitude and intensity, distance to the epicenter, and the geologic conditions in the area. The impact is less than significant.

a.iii) Liquefaction – Less than Significant Impact

Liquefaction is the transformation of saturated, loose, fine-grained sediment to a fluid-like state because of earthquake shaking or other rapid loading. Liquefaction is known to occur in loose or moderately saturated granular soils with poor drainage.

An engineering soils report was completed for the project site by Whitchurch Engineering. The report found that "according to the State of California Department of Conservation Division of Mines and Geology Special Publication 115 (1995) … this parcel is located in an area of moderate to low liquefaction potential." Further, the report concluded "…soils at this site are capable of providing adequate support for the construction of a planned unit development." The impact is less than significant.

a.iv) Landslides – Less than Significant Impact

Landslides are gravity-driven downslope movements of earth materials, typically triggered by earthquakes, or elevated pore pressures, resulting from peak rainfall events. Factors that influence the susceptibility of an area to landslides, or mudflows, include slope gradient, the nature of earth materials, vegetative cover, and groundwater levels (City of Fortuna 2010a). The project site is not within a landslide zone and is on relatively flat ground. The project will not expose people or structures to substantial risk of landslides for the reasons stated above. The impact is less than significant.

f) Loss of Topsoil – Less than Significant Impact with Mitigation

Construction activities, including trenching, excavation, trimming/removal of vegetation, shrubs and trees, and operation of heavy equipment will disturb soil and, therefore, have the potential to cause erosion. Subject to regulatory approval, erosion control actions and a Storm water Pollution Protection Plan (SWPPP) will be prepared for the project prior to the start of construction and soil disturbance. The erosion control actions will include BMPs designed to reduce erosion of exposed soil and minimize the sediment entrained in runoff from the site during construction. BMPs may include: plastic tarps, geo-fabric, woven coconut fronds, silt fences, coir rolls/straw wattles, erosion control matting, site watering for controlling dust, or other suitable materials. With the implementation of these mitigation measures, potential impacts to soil erosion or the loss of topsoil will be less than significant.

g) Unstable Soil – Less than Significant Impact

According to the City of Fortuna General Plan Program EIR (City of Fortuna 2010a), the Planning Area is underlain by sedimentary materials and the potential for unstable soils (e.g., soils subject to liquefaction, lateral spreading, subsidence, or expansion). However, because the project will be subject to state building code requirements and is on relatively flat ground, the impact will be less than significant.

h) Expansive Soils – Less than Significant Impact

Expansive soils are generally high in certain clay types and are prone to large volume changes upon wetting and drying. According to the Fortuna General Plan Program EIR (City of Fortuna 2010a), the Eel River Valley is underlain by the Hookton Formation that includes coastal plain and fluvial deposits. The western two-thirds of the Fortuna Planning Area overlays this formation. Given the unconsolidated nature of this formation and its proximity to the Eel and Van Duzen rivers this portion of the Fortuna Planning Area is subject to varying levels of expansive soils. The soils report conducted by Whitchurch Engineering indicate low amounts of clayey soils, meaning there are little to no expansive soils in the project site. This soils report can be found in the attached documentation (Attachment F). The project impact from expansive soils will have no impact.

i) Septic Tanks – No Impact

Because the project does not include septic tanks or alternative wastewater disposal systems, and because construction of the berms and treated effluent pump station will not be impacted or be located on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems, no impact will occur.

### 4.8.3 MITIGATION MEASURES

GS-1: Implement standard construction BMPs in accordance with a standard Caltrans SWPPP. The erosion control actions will include BMPs designed to reduce erosion of exposed soil and minimize the sediment entrained in runoff from the site during construction. BMPs may include: plastic tarps, geo-fabric, woven coconut fronds, silt fences, coir rolls/straw wattles, erosion control matting, site watering for controlling dust, or other suitable materials. With the implementation of these mitigation measures, potential impacts to soil erosion or the loss of topsoil will be less than significant.

Timing for Implementation/Compliance: During construction of project.

Person/Agency Responsible for Monitoring: Licensed QSD or designated Construction Observer.

Monitoring Frequency: Before, during, and after rain events resulting in 0.1 inches of rainfall depth within a 24-hour period.

Evidence of Compliance: Visual site inspection by QSD or designated Construction Observer.

### 4.8.4 FINDINGS

The Project will have Less Than Significant impact on Geology and Soils within limited mitigation.

## 4.9 GREENHOUSE GAS EMISSIONS

***Table 7: Greenhouse gas emissions impact evaluation***

| **VII. GREENHOUSE GAS EMISSIONS.** Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Generate greenhouse gas emissions (GHG), 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? | ☐ | ☐ | ☒ | ☐ |

### 4.9.1 Thresholds of Significance

The project would have a significant impact on Greenhouse Gas Emissions if it would generate greenhouse gas emissions (GHG), either directly or indirectly, that may have a significant impact on the environment; or conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

### 4.9.2 DISCUSSION

The proposed project is a 59-unit residential subdivision limited to senior residents. The site is currently vacant. Vegetation consists of significant riparian vegetation associated with the Streamside Management Areas of Strongs Creek and Jameson Creek. In addition, 0.04 acres of wetlands have been delineated, and will be preserved on the site.

The California Global Warming Solutions Act of 2006 (Assembly Bill 32) definitively established the state's climate change policy and sets GHG reduction targets (Health & Safety Code §38500 et seq.). The state set its target at reducing greenhouse gases to 1990 levels by 2020.

CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects. The model quantifies direct emissions from construction and operations (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use.

The model is an accurate and comprehensive tool for quantifying air quality impacts from land use projects throughout California. The model can be used for a variety of situations where an air quality analysis is necessary or desirable such as California Environmental Quality Act (CEQA) documents, National Environmental Policy Act (NEPA) documents, pre-project planning, compliance with local air quality rules and regulations, etc.

In an attempt to quantify this impact, project staff evaluated GHG impacts projected from the project using the CalEEMod model.

Project-related air quality impacts fall into two categories: short-term construction-related impacts and long-term operations-related impacts. Emissions for the project were calculated using the CalEEMod model Construction equipment types and numbers specified in the CalEEMod modeling effort are based on the applicant's guidance and the consultant's experience. Construction emissions estimated for the proposed project were modeled over a period of one year. This modeling of project-level emissions is considered conservative because it condensed the same level of emissions into a shorter time period, thus inflating the project's average annual emissions estimates. Long-term operational emissions for the proposed project are based on the land uses and trip generation rates

a) Generation of Greenhouse Gas Emissions – Less than Significant Impact

According to the CalEEMod Model, the mitigated construction emissions are as follows:

***Table 8: Modelled construction emissions totals generated through the CalEEMod application.***

| | ROG | $NO_X$ | CO | $SO_2$ | Fugitive $PM_{10}$ | Exhaust $PM_{10}$ | $PM_{10}$ Total | Fugitive $PM_{2.5}$ | Exhaust $PM_{2.5}$ | $PM_{2.5}$ Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **lbs/day** | | | | | | | | | |
| 2019 | 12.2 | 11.1 | 10.7 | 0.17 | 13.7 | 0.62 | 14.0 | 1.48 | 0.57 | 1.82 |

The construction of the proposed project will contribute a temporary, short term increase in air pollution from vehicles and equipment during construction. The proposed project will result in emissions of GHGs, which contribute to global climate change. Given the scope of global climate change, however, it is not anticipated that the project will have an individually discernible effect on global climate change (i.e., increase global temperature as a result of emissions from the project).

Operational GHG's were calculated once the planned development has undergone all construction phases, and including full residency on site utilizing the CalEEMod model.

*Table 9: Full buildout greenhouse gas emissions modelled using the CalEEMod model.*

| | ROG | $NO_X$ | CO | $SO_2$ | Fugitive $PM_{10}$ | Exhaust $PM_{10}$ | $PM_{10}$ Total | Fugitive $PM_{2.5}$ | Exhaust $PM_{2.5}$ | $PM_{2.5}$ Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **lbs/day** | | | | | | | | | |
| Area | 0.20 | 0.06 | 4.88 | $2.60e^{-4}$ | | 0.03 | 0.03 | | 0.03 | 0.29 |
| Energy | 0.01 | 0.11 | 0.05 | $6.80e^{-4}$ | | $8.64e^{-3}$ | $8.64e^{-3}$ | | $8.64e^{-3}$ | $8.64e^{-3}$ |
| Mobile | 0.45 | 2.73 | 5.82 | 0.01 | 0.95 | 0.02 | 0.90 | 0.23 | 0.01 | 0.27 |
| Total | 0.68 | 2.90 | 10.75 | 0.01 | 0.95 | 0.32 | 1.18 | 0.23 | 0.05 | 0.31 |

Given the scope of global climate change, it is not anticipated that the project will have an individually discernable effect on global climate change and the impacts are less than significant.

**Project-related Reduction in Greenhouse Gas Emissions**

The project includes a number of design features that will result in a reduction in greenhouse gas emissions.

1) Senior Occupancy. The project is a residential development that will limit its occupancy to senior residents. For a number of reasons, senior household sizes are smaller, a greater number are retired and not employed, car ownership is lower, and the vehicle trips made by seniors is significantly less than the number of trips made by the general population, by a degree of approximately 40 % (U.S. Dept. of Transportation Federal Highway Administration Summary of Travel Trends 2009). Therefore, the project buildout emissions modeling in Table 9 above, may effectively be considered to be reduced by 40%.
2) Transit Proximity. The project is located in close proximity to a bus stop operated by the Humboldt Transit Authority. The bus stop is located on Redwood Way approximately 400 feet to the east of the project entrance. In addition, the City of Fortuna operates a low-cost senior bus for those age 50 and above.
3) Proximity to Services. The project is an in-fill development, and is located in the vicinity of medical, shopping, and other services. Redwood Memorial Hospital, Open Door Health Clinic, and other medical offices are located to the east directly adjacent to the project site. Redwood Shopping Center is located on Fortuna Boulevard approximately 1/3 mile to the west, reached by car, bus, bike, or foot on Redwood Way. Other services are also available on Fortuna Boulevard.

4) Vegetation. The project includes approximately 40% open space, including common open space surrounding each residential unit, riparian vegetation along Strongs and Jameson Creeks, and preserved wetlands. The common open space will be landscaped with lawn, shrubs, and trees, which will be an addition to the amount of vegetation that currently exists on the site. Walking paths will be incorporated into the project design, and will connect to the City's future John Campbell Greenway Trail along the south side of Strongs Creek.

All of these listed design reduction measures will result in an approximately 40% reduction in greenhouse gas emissions when levels are compared to the standard residential development measurements calculated in the CalEEModel prepared for the project, and compared to the modeling that was done for the Fortuna General Plan EIR that considered standard residential development in the R-1-10 land use designation. Therefore, the project will result in a reduction in greenhouse gases when compared to a standard residential development allowed under the Fortuna General Plan.

b) Conflict with an Applicable Plan, Policy, or Regulation - Less than Significant Impact

The NCUAQMD does not have rules, regulations, or thresholds of significance for non-stationary or construction-related GHG emissions. In 2011, the NCUAQMD adopted Rule 111 - Federal Permitting Requirements for Sources of Greenhouse Gases to establish a threshold above which New Source Review (NSR) and federal Title V permitting applies and to establish federally enforceable limits on potential to emit greenhouse gases for stationary sources. These are considered requirements for stationary sources and should not be used as a threshold of significance for non-stationary source projects.

The Fortuna General Plan includes two policies specific to GHGs. Policy HS-3.5 (Restoration for Greenhouse Gases Absorption) states, "foster and restore forests and other terrestrial ecosystems that offer significant carbon mitigation potential." Policy HS-3.6 (Greenhouse Gas Emissions Reduction from Transportation) states, "Increase clean-fuel use, promote transit-oriented development and alternative modes of transportation, and reduce travel demand." The City of Fortuna does not have an adopted Climate Action Plan or similar policies and standards to address GHG emissions other than the two polices noted above. Also, the City has not adopted local implementing procedures and guidelines for CEQA to address how emissions should be analyzed in environmental documents.

### 4.9.3 MITIGATION MEASURES

No Mitigation Required

### 4.9.4 FINDINGS

The Project will have a Less than Significant on Global Greenhouse Gases.

## 4.10 HAZARDS AND HAZARDOUS MATERIALS

***Table 10: Hazard and hazardous materials impact evaluation***

| **VIII.HAZARDS AND HAZARDOUS MATERIALS.** Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 complied 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 area or where residences are intermixed with wildlands? | ☐ | ☐ | ☒ | ☐ |

### 4.10.1 Thresholds of Significance

The project would have a significant impact on hazards and hazardous materials if it were to 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; emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school; or be located on a site which is included on a list of hazardous materials sites complied pursuant to

Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment. In addition, for projects 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; if the project is within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area. Finally, the project would have a significant impact to hazards and hazardous materials if it would impair the implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan; or expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized area or where residences are intermixed with wildlands.

### 4.10.2 DISCUSSION

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency, or if it has characteristics defined as hazardous. Factors that influence the health effects of exposure to hazardous material include the dose to which the person is exposed, the frequency of exposure, the exposure pathway, and individual susceptibility.

The California Code of Regulations (CCR) defines a hazardous material as a substance that, because of physical or chemical properties, quantity, concentration, or other characteristics, may either (1) cause an increase in mortality or an increase in serious, irreversible, or incapacitating, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of, or otherwise managed (CCR, Title 22, Division 4.5, Chapter 10, Article 2, Section 66260.10).

Hazardous wastes are defined in the same manner. Hazardous wastes are hazardous materials that no longer have practical use, such as substances that have been discarded, discharged, spilled, contaminated, or are being stored prior to proper disposal. Hazardous materials and hazardous wastes are classified according to four properties: toxicity, ignitability, corrosivity, and reactivity (CCR, Title 22, Chapter 11, Article 3).

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

Project construction will require the use of hazardous materials such as fuels, lubricants, paints, and solvents. Construction activities for the project will be short-term and one-time in nature, and will involve the limited transport, storage, use, or disposal of hazardous materials. Some examples of hazardous materials handling include fueling and servicing construction equipment on-site, and the transport of fuels, lubricating fluids, and solvents. These types of materials; however, are not acutely hazardous, and all storage, handling, and disposal of these materials are regulated by the Department of Toxic Substances Control (DTSC), the U.S. EPA, the Occupational Safety & Health Administration (OSHA), and the Fortuna Fire Protection District.

Because the City, contractors, and other construction service providers will be required to comply with existing hazardous materials laws and regulations for the transport, use, and disposal of hazardous materials, the impacts associated with the project having the potential to create a significant hazard to the public or the environment will be less than significant.

b) Upset or Accidents Involving Hazardous Materials – Less than Significant Impact

During construction, routine transport of hazardous materials to and from the project site could indirectly result in an incremental increase in the potential for accidents. Caltrans, the Federal Department of Transportation, and the California Highway Patrol (CHP) regulate the transportation of hazardous materials and wastes, including container types and packaging requirements, as well as licensing and training for truck operators, chemical handlers, and hazardous waste haulers. Because the City, contractors, and other construction service providers will be required to comply with existing hazardous materials laws and regulations for the transport and use of hazardous materials, the impacts associated with the potential to create a significant hazard to the public or the environment will be less than significant.

c) Emit Hazardous Materials within 0.25 Mile of a School – Less than Significant Impact

There is a potential impact related for the project to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school, as the project is west of the Norman G. Ambrosini Elementary School. However, as stated above in Sections a) and b) above, the impacts associated with the project having the potential to create a significant hazard will be less than significant.

d) Included on a List of Hazardous Materials Sites – Less than Significant Impact

There is one hazardous material site compiled pursuant to Government Code Section 65962.5 (Hazardous Waste and Substances Site List or “Cortese” list) within the project area. The Redwood Memorial Hospital is an institutional user of hazardous materials. Hospitals abide to the California Code of Regulations, Title 8, Section 5193, when discerning the proper disposal of hazardous waste and thus provide a less than significant impact on the site.

e,f) Safety Hazard for People Residing or Working Within Two Miles of an Airport – No Impact

The nearest public airport, the Rohnerville Airport, is located approximately 2 miles south of the project site. The project will not result in airport-related safety hazards for people residing or working in the project area. No impact will occur.

### g) Impair or Interfere with an Adopted Emergency Response/Evacuation Plan – No Impact

The Humboldt County Department of Health & Human Services Division of Environmental Health (HCDEH) has a Hazardous Materials Area Plan (HMAP) that covers the County, including the City of Fortuna and its surroundings. The HMAP establishes the following:

- Policies, responsibilities, and procedures required for protecting the health and safety of Humboldt County's population, the environment, and the public and private property from the effects of hazardous materials incidents;

- Emergency response organization for hazardous materials incidents occurring within Humboldt County;

- Operational concepts and procedures associated with the Eureka Fire Departments Regional Hazardous Materials Response Team (EFD HMRT).

The City of Fortuna also has hazardous material response plans associated with the regulatory requirements for their wastewater treatment, water treatment plant facilities and operations, and an emergency response plan that establishes chain-of-command and response procedures between the police, fire, public works, City staff and board, and other essential departments and outside organizations. Response plans are also included in hazardous materials business plans, for those businesses that are required by the HCDEH to prepare and maintain them.

The project will not impair or interfere with any emergency response and evacuation plans, and does not include development that will significantly increase the number of people exposed to potential emergencies. Furthermore, no roads will be closed as a result of project activities. No impact will occur.

### h) Exposure to Wildland Fires – Less than Significant Impact

The project will not expose people or structures to a risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Construction involving heavy equipment, vehicles, power tools, and personnel smoking in and around the project site could cause the ignition of a wildfire; however, the project site is within the urbanized area of Fortuna so the possibility of a wildfire is remote. The impact is less than significant.

### 4.10.3 MITIGATION MEASURES
No mitigation required.

### 4.10.4 FINDINGS

The Project will have No Impact on Hazards and Hazardous Materials.

## 4.11 HYDROLOGY AND WATER QUALITY

***Table 11: Hydrology and water quality impact evaluation***

| **IX.HYDROLOGY AND WATER QUALITY**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 stormwater 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 of 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 or loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | ☐ | ☐ | ☐ | ☒ |
| j) Result in inundation by seiche, tsunami, or mudflow? | ☐ | ☐ | ☐ | ☒ |

### 4.11.1 Thresholds of Significance

The project would have a significant effect on hydrology and water quality if it would violate any water quality standards or waste discharge requirements; 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); 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; 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; 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, or otherwise substantially degrade water quality. Significant impacts would also occur if the project would place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary of Flood Insurance Rate Map or other flood hazard delineation map; place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary of Flood Insurance Rate Map or other flood hazard delineation map; place within a 100-year flood hazard area structures, which would impede or redirect flood flows; expose people or structures to a significant risk or loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or result in inundation by seiche, tsunami, or mudflow.

### 4.11.2 DISCUSSION

According to EPA, the proposed project is located within the Eel River watershed, which drains approximately 3,680 square miles and extends from the headwaters in the mountains to the east to the river's mouth at the Pacific Ocean. More specifically, the project site is located within the Strongs Creek watershed, which encompasses approximately 10,700 acres and drains a mix of developed and undeveloped areas. Rainfall in the project area ranges from 41 to 55 inches per year. Flooding is a direct result of storm flows. The subject property is in Zone X according to the Firm Flood Insurance Panel Map.

The Strongs Creek Drainage Area is located in the central area of the City of Fortuna, bordered by the Rohner Creek and Hillside Creek Drainage Areas to the north and the Jameson Creek Drainage Area to the south. The Strongs Creek watershed is the largest watershed in the general Fortuna area, encompassing approximately 5,200 acres not including tributaries, and approximately 10,700 acres when tributaries are included. Tributaries to Strongs Creek include Rohner Creek, Jameson Creek, and Mill Creek.

Jameson Creek runs through the middle of the project site. Jameson Creek is at approximately 115 feet in elevation. EPA temperature analysis of the Strongs Creek drainage has been designated as marginal for the purposes of Total Maximum Daily Loads (TMDL) and sediment is not a concern.

The outlying rural stormwater systems including the project site are composed largely of roadside ditches and culverts with some developed stormwater systems along Rohnerville Road. Stormwater runoff from these systems flows by gravity to Rohner Creek, Hillside Creek, Strongs Creek, Jameson Creek, and Mill Creek before flowing to the main stem of Strongs Creek and discharging to the Eel River. Each of the aforementioned creeks are primarily in their natural, unchanneled state, except for the lower reaches of Strongs Creek which is partially channelized. The mean annual flow volume for Strongs Creek is 20.1 cfs and the catchment area is 13,670,166 square feet (1.27 $km^2$) according to the USEPA.

a,f) Violate Water Quality Standards or Degrade Water Quality–Less than Significant with mitigation

Construction activities can introduce pollutants to Stormwater runoff, including sediment, paint, solvent, pavement, construction debris and trash, as well as hydrocarbons and other fluids from construction vehicles. The most likely pollutant from the proposed project will be sediments created by soil disturbance during or immediately after construction from rainfall events. These potential pollutants are regulated under the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities. This construction general permit offers NPDES coverage for Stormwater discharges with construction activities of more than 1.0 acre and will apply if the project disturbs over one acre of ground. Ground disturbance will be more than one acre; therefore, the project will trigger the requirement for a Stormwater Pollution Prevention Plan (SWPPP).

A SWPPP must contain site plans that show the construction area, roadways, Stormwater collection/discharge points, general existing and proposed topography, and drainage patterns across the project. As described in section A of the construction general permit, a SWPPP must include: Best Management Practices (BMPs) the discharger will use to protect Stormwater runoff; a visual monitoring program; a chemical monitoring program for non-visible pollutants to be implemented in the event of a BMP failure; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303 (d) list for sediment.

Jameson Creek and Strongs Creek, both located by or in the subject site, are tributaries of the Eel River, which is on the 303 (d) list. Project activities will not take place along the Eel River or immediately adjacent to its tributaries; however, since the Eel River is downstream from the project site, the Eel River could be potentially affected by project activities in the absence of adequate controls. The project is within an MS4 permit area. An MS4 requires the incorporation of an Erosion Control Plan and implementation of a SWPPP to protect nearby waterbodies from uncontrolled erosion and stormwater runoff. The project will not violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality with the implementation of these plans.

Construction of the project will also require the use of gasoline and diesel-powered equipment, such as trucks, excavators, graders, bulldozers, backhoes, compactors, and generators. Chemicals such as diesel, gasoline, lubricants, hydraulic fluid, transmission fluid, paints, solvents, glues, and other substances will be utilized during construction. An accidental release of any of these substances could degrade surface or groundwater and cause a significant impact. Therefore, the following mitigation is included in section 11.9.3.

With implementation of these mitigation measures, project impacts to water quality will be less than significant after mitigation.

b) Substantially Deplete Groundwater Supplies or Interfere with Groundwater Recharge–No Impact

Dewatering of the construction work area could be required if groundwater accumulates in an excavation area. Dewatering typically involves pumping water out of the excavation area to lower groundwater levels to the extent needed for construction. Based on the Whitchurch Engineering soil exploration logs, no ground water was found on site down to the deepest hole of 94”. Water table draw-down during project construction will most likely not occur based on these soil explorations. Soil exploration logs can be found in the attached documentation (Attachment G). No other aspect of the project will substantially deplete groundwater supplies or interfere with groundwater recharge; therefore, no impact has been identified.

c) Alter Drainage Patterns–Less than Significant Impact

The project will not substantially alter the existing drainage patterns of the project site or in the area and will not alter any waterway. The impact is less than significant.

d, e) Increase Runoff Resulting in Flooding or Exceed Capacity of Storm Drain System–Less than Significant Impact

The proposed project will not materially alter the hydrology and hydraulics of the watershed. The impact is less than significant.

g, h) Place Housing and/or Structures Within a 100-Year Flood Zone–Less than Significant Impact with Mitigation

The project site has Jameson Creek pass through the middle of the parcel. On the map shown on the next page, the 100-year flood zone can be seen to surround the Jameson Creek. During the construction of the project, certain areas will be graded to ensure the flow of the water to the creeks as well as building the residences in areas of higher elevation. This will help to keep flooding of the residences to a minimal and therefore it less than significant impact with mitigation.

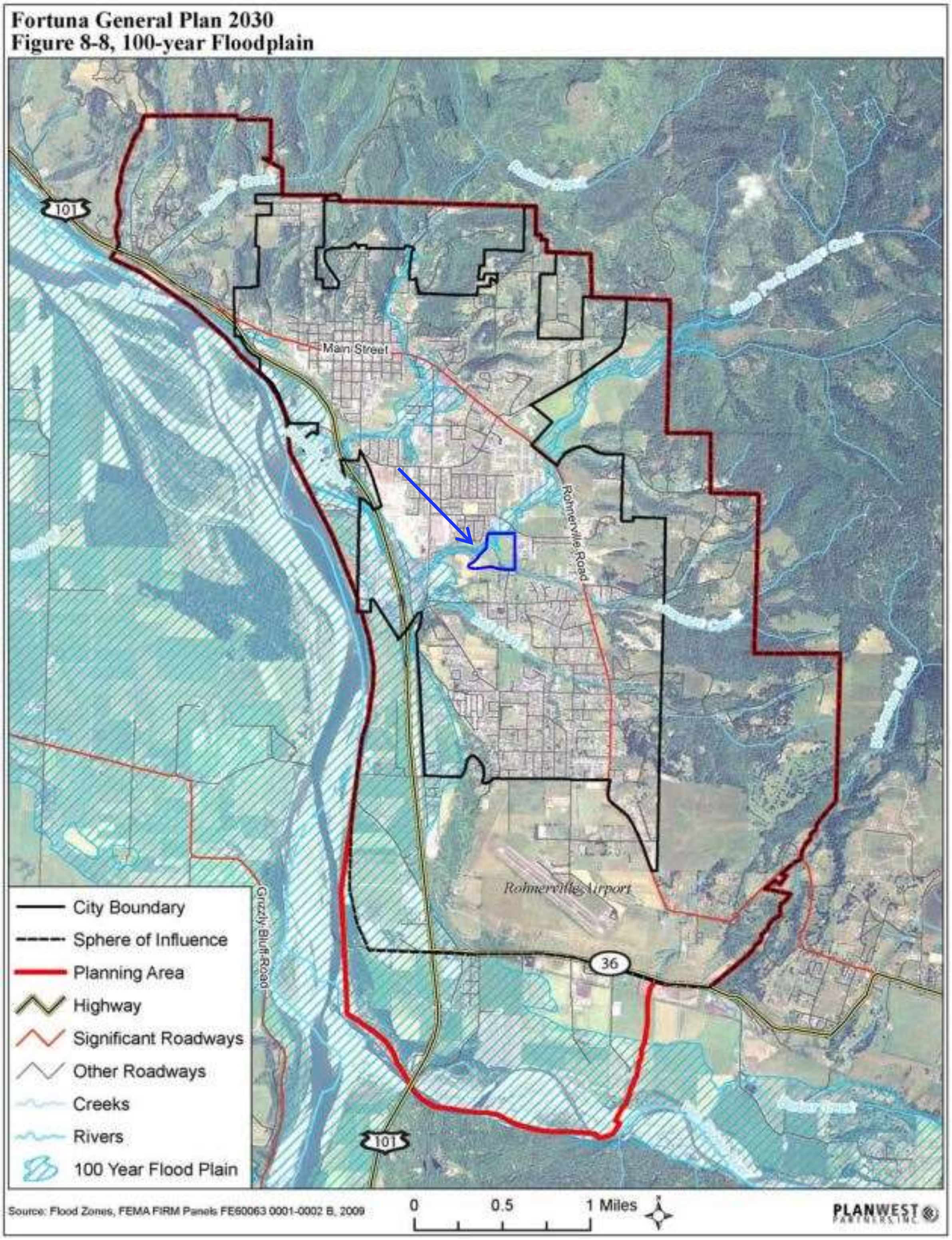
Fortuna General Plan 2030
Figure 8-8, 100-year Floodplain
101
Main Street
Rohnerville Road
Rohnerville Airport
Grizzly Bluff Road
36
City Boundary
Sphere of Influence
Planning Area
Highway
Significant Roadways
Other Roadways
Creeks
Rivers
100 Year Flood Plain
Source: Flood Zones, FEMA FIRM Panels FE60063 0001-0002 B, 2009
0
0.5
1 Miles
PLANWEST PARTNERS INC

*Figure 8: Flood zone map of the proposed project area*

i) Flooding from a Levee or Dam Failure –No Impact

According to the Humboldt Operational Area–Hazard Mitigation Plan (HMP) (Figure11-2 Dam Inundation Areas), the project site is not located within a dam failure inundation area. Fortuna also does not have any critical facilities located in a dam inundation area (Humboldt County 2008). The HMP includes information on risk assessment and mitigation strategies for hazards from dam failure and other hazards such as flooding, tsunami, earthquakes, etc. The proposed project does not include any activities or components which will expose people or structures to a significant risk of loss from flooding from a levee or dam failure. No impact will occur.

j) Inundation by Seiche, Tsunami, or Mudflow–No Impact

Based on area characteristics, the project site is not down-gradient of a debris-flow source and will not be subject to mudflows. The project site is also not near any enclosed water body capable of producing a seiche event. According to the State of California Humboldt County Tsunami Inundation Map for Emergency Planning, the tsunami inundation zone for the Fortuna quadrangle generally ends approximately ½ mile east of the historic Fernbridge on the Eel River. No impact will occur.

### 4.11.3 MITIGATION MEASURES

**HWQ-1: Prepare and Implement SWPPP and BMPs**

The City shall ensure that a SWPPP is prepared and implemented for the project and includes BMPs. The SWPPP shall be prepared prior to any construction on any portion of the project and implemented prior to and during construction. At a minimum the contractor shall implement the following, or the equivalent as described in the approved SWPPP:

#### *4.11.3.1 Materials Management*

- The Contractor shall provide protected (covered) storage areas for any potentially toxic materials (concrete, herbicides, pesticides, fertilizer, grease, oils, fuel, paints, stains, solvents, wood preservatives, etc.). Ensure that these materials are protected from vandalism, and that all lids and covers are securely fastened. Clearly mark all hazardous material containers.

- Bags of mortar, concrete, or other supplies shall be placed on pallets and covered with tarps so that if precipitation does occur these materials will not be exposed to Stormwater and become a Stormwater pollutant.

• Minimize the production or generation of hazardous materials and wastes at the site. Do not allow them to accumulate on the ground. Schedule regular pickup of used materials by licensed waste haulers and ensure proper disposal.

• All hazardous material containers shall be placed in secondary containment. Ensure that adequate secondary containment volume is provided for hazardous materials and that they are located in areas on the site away from stormwater drains or water courses. Segregate potentially hazardous waste from non-hazardous construction debris. Provide berms, if necessary, to prevent Stormwater run-on from contacting the storage area. Also, use containment berms in fueling and maintenance areas and where the potential for spills is high.

*4.11.3.2 Waste Disposal*

• The Contractor shall provide waste receptacles for common solid wastes at convenient locations on the job site and provide regular collection of wastes, including building materials. Provide cover for receptacles or piles of waste prior to rain events. Do not allow crew to discard miscellaneous trash on the project site.

*4.11.3.3 Spill Prevention and Response*

• The Contractor shall make adequate preparations, including training personnel and providing equipment, to contain and/or cleanup spills of oil and other hazardous materials. Ensure that adequate materials such as absorbents, berms, dry sweep shovels, brooms, and absorbent pads are on hand to clean up any accidental spill that may occur. Spills of hazardous materials can originate from fueling, equipment breaking down (such as hydraulic lines), material transfer operations, and other sources. Cleanup such spills immediately and properly dispose of all wastes and used spill control materials.

*4.11.3.4 Available Erosion Control Supplies*

• The Contractor shall ensure that sufficient erosion control supplies shall be available on site at all times to deal with areas susceptible to erosion during rain events. Materials should include plastic tarps, geo-fabric, woven coconut fronds, coir rolls/straw wattles, jute netting, erosion control matting, silt fencing, straw mulch or other suitable materials.

*4.11.3.5 Non-Stormwater Discharges*

• Activities such as vehicle washing, bucket rinsing, paint brush cleaning, etc. shall be carried out at an approved facility (i.e. carwash or interior sink), wherein the water is discharged into a sanitary sewer. Non-stormwater discharges should be eliminated or reduced to the extent feasible. The Contractor shall designate a qualified person with the responsibility for ensuring that no materials other than stormwater are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems.

*4.11.3.6 Sanitary Waste Management*

• The Contractor shall provide sanitary facilities of sufficient number and size to accommodate construction crews. Locate the sanitary facilities in a convenient location, but away from storm drain inlets and drainage facilities. Anchor the facilities sufficiently to prevent them from being blown over or tipped by vandals. Ensure that the facilities are maintained in good working order and emptied at regular intervals by a licensed sanitary waste hauler.

*4.11.3.7 Vehicle and Equipment Fueling*

• On-site vehicle and equipment fueling should only be used where it's impractical to send vehicles and equipment offsite for fueling. The Contractor shall designate an area for equipment fueling and maintenance away from storm drain inlets or drainage channels. The fueling area shall be located on a paved surface (if practical) and shall be protected with berms to prevent run-on and run-off and contain spills. Secondary containment techniques such as drip pans or drop cloths shall be used when fueling to catch drips or leaks.

*4.11.3.8 Vehicle and Equipment Cleaning*

• Off-site commercial washing businesses are equipped to handle and dispose of wash water properly and are to be used for vehicle and equipment cleaning as much as possible. If vehicle and equipment washing and cleaning must occur on site and cannot be performed in a building equipped with sanitary sewer facilities, the outside cleaning area shall be located away from storm drain inlets and drainage facilities. The wash area shall be stabilized with aggregate base, and bermed to prevent run-off and run-on. The drainage area shall be outfitted with a sump to allow for the collection and disposal of wash water. Wash water is not to be disposed of into storm drains or water courses.

• The wash area shall be used as little as possible, while using the minimum amount of wash water and soaps necessary. Power washers tend to use less water and should be considered. Steam cleaning is not to be performed at any time. Cleaning solvents shall never to be used on-site.

*4.11.3.9 Vehicle and Equipment Maintenance*

• Perform vehicle maintenance off site whenever practical. The Contractor shall coordinate with the City and designate the on-site vehicle and equipment maintenance areas away from storm drain inlets and water courses. Locate the maintenance areas on paved surfaces if practical and protect the maintenance area from stormwater run-on and run-off.

• Properly dispose of used oils, fuels, and lubricants. Do not dump fuels or lubricants on the ground, place in dumpsters, or pour into storm drains or water courses. Properly dispose of or recycle batteries and other waste products.

• Repair leaks of fluids and oil immediately. Place drip pans under vehicles with leaks while they are waiting repair and promptly empty drip pans into proper waste containers.

• Regularly inspect vehicles and equipment for leaks or potential leaks. Perform regularly scheduled preventative maintenance, preferably offsite. Inspect the maintenance area regularly and cleanup any spills or leaks immediately. Maintain an adequate supply of spill cleanup materials in the maintenance area at all times.

*4.11.3.10 Erosion Control BMPs*

• Scheduling Work

-Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of the construction project especially during the rainy season. This project is scheduled to be constructed in the summer season with all grading and major excavations completed prior to the onset of the rainy season, which begins on October 15th. When rainfall is forecast, the construction schedule is to be adjusted to allow the implementation of erosion and sediment controls on all disturbed areas prior to the onset of rains.

• Minimize Earth moving and Vegetation Removal

-Vegetation removal, grading, and other construction activities shall be restricted to the minimum area necessary to complete the project.

• Site Stabilization and Seeding

-All soil disturbances shall be stabilized by native seeding. All soil disturbances shall be stabilized with a pasture seed mix or similar seed mix. The contractor should hand broadcast seed and rice straw in access areas where bare ground exists after construction. Seeding should be done at an adequate time to develop a uniform vegetative cover (70% or greater) before the seasonal rains begin. If this is not possible at the site due to the construction schedule of the project, the Contractor shall implement temporary soil stabilization measures until the vegetative cover develops. The Contractor shall consider measures such as: covering with mulch, temporary seeding/vegetation, soil stabilizers, binders, fiber rolls, blankets, or permanent seeding.

• Seeding and mulching should be done as soon as grading operations are completed. Proper and timely attention shall be taken to avoid erosion. Erosion control and seed establishment can be enhanced with the use of surface roughening followed by seeding and mulching.

- Exposed Area Limitations

-The occurrence of windy days may also require water to be sprayed onto exposed surface areas for dust control. These areas could include dirt roads, soil disposal areas, or other graded surfaces. Care should be taken not to create run-off from the application of excessive quantities of water, or to increase vehicle track-out of sediment from this activity.

- Stockpiled Soils

–The Contractor shall work with the Owner to designate an area to be used for stockpiled soils. Trench spoils generated during utility installation and other activities must be securely stockpiled at the site. In the event of rain, care shall be taken to prevent erosion and sediment transport from stockpiled areas. Stockpiles should be securely covered and placed away from drainage channels, preferably in areas with some natural vegetation in place. Silt fences shall be installed around the soil stockpile areas in the event of extended heavy rainfall. Silt fence construction and maintenance is further discussed in the Sediment Control section of this SWPPP. Uncovered soil stockpiles are to be wetted as needed during windy days to prevent wind erosion.

Timing for Implementation/Compliance: During construction of project.

Person/Agency Responsible for Monitoring: Building Department site inspector or designated Construction Observer.

Monitoring Frequency: Daily, for duration of project.

Evidence of Compliance: Visual site inspection by Building Department Staff.

### 4.11.4 FINDINGS

The Project will have Less than Significant Impact with Mitigation Incorporation on Hydrology and Water Quality with Mitigation Incorporation.

## 4.12 LAND USE AND PLANNING

***Table 12: Land use and planning impact evaluation***

| X. **LAND USE AND PLANNING**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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? | ☐ | ☐ | ☐ | ☒ |

### 4.12.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (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; or (c) conflict with any applicable habitat conservation plan or natural community conservation plan.

### 4.12.2 Discussion

The City of Fortuna's General Plan was adopted in October, 2010. The Fortuna General Plan formalizes the long-term vision for the City's physical evolution. It outlines policies, standards, and programs to guide day-to-day decisions concerning future development.

The subject property is zoned Residential – single family (R-1-10) by the City of Fortuna. Parcels which fall under this zoning definition are meant to encourage the growth of single-family dwelling developments. Each proposed residence will be within its own parcel, this new development being implemented as a PD affects the setback requirements between each parcel, and the size of the lots. Lot sizes are reduced in area to provide community shared open space. This development falls under the principal permitted use of R-1 of one, single-family home per lot.

a) Physically Divide an Established Community–No Impact

No aspect of the project will physically divide an existing residential community; therefore, no impact will occur.

b) Conflict with Applicable Land Use Plans, Policies or Regulations–No Impact

The project site is within the City limits of Fortuna and includes the General Plan Land Use designation of Residential single-family zoning (R-1-10). The proposed project is consistent with General Plan Land Use and Zoning and will not require a General Plan Land Use designation or zoning change, is not within the California Coastal Commission's jurisdiction, and will not conflict with any other applicable plan, policy or regulation with jurisdiction over the project area. Therefore, no impact has been identified.

c) Conflict with any Applicable Habitat Conservation Plan–No Impact

The City of Fortuna does not have an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan within which the project will conflict. Furthermore, according to the Fortuna General Plan Background Report (City of Fortuna 2007), the Fortuna General Plan Planning Area is not subject to an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impact will occur.

### 4.12.3 MITIGATION MEASURES

No mitigations measures are required for this Land use and Planning.

### 4.12.4 FINDINGS

The Project will have No Impact on Land Use and Planning.

## 4.13 MINERAL RESOURCES

***Table 13 : Mineral Resources impact evaluation***

| **XI. MINERAL RESOURCES**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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? | ☐ | ☐ | ☒ | ☐ |

### 4.13.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (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, or (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.

### 4.13.2 DISCUSSION

According to the Fortuna General Plan Background Report (Natural & Cultural Resources, Section 6.5 Mineral/Soils and Energy Resources) (City of Fortuna 2007), there are seven gravel extraction operations in the Eel River adjacent to the City's Planning Area.

**a, b) Result in the Loss of Availability of a Known Mineral Resource of Value to the Region or Delineated by a General Plan, Specific Plan or other Land Use Plan – Less than Significant Impact**

Gravel mining operations are located to the north and south of the project area. The project, will require use of mined rock material but will not require the use of a substantial amount of any mineral resource, and will not result in the loss of availability of known mineral resources of value to the state, region or locally; therefore, the impact will be less than significant.

### 4.13.3 MITIGATION MEASURES

None required.

### 4.13.4 FINDINGS:

The Project will have Less Than Significant Impact on Mineral Resources.

## 4.14 NOISE

***Table 14: Noise impact evaluation***

| **XII. NOISE**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☒ | ☐ | ☐ |
| b) Expose persons to or generate excessive ground borne vibration or ground borne noise levels? | ☐ | ☐ | ☒ | ☐ |
| c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☒ | ☐ |
| d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ☐ | ☒ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |

### 4.14.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (a) expose persons to, or generate, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; (b) expose persons to, or generate, excessive ground borne vibration or ground borne noise levels; (c) result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the Proposed Project; (d) result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the Proposed Project; (e) expose people residing or working in the project area to excessive noise levels (only applicable if the Proposed Project is 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); or (f) expose people residing or working in the project area to excessive noise levels (only applicable if the Proposed Project is located within the vicinity of a private airstrip.)

### 4.14.2 DISCUSSION

Noise levels are measured in decibels (dB), but community noise levels are measured in terms of A-weighted sound level (dBA). The A-weighted scale of frequency sensitivity accounts for the sensitivity of the human ear and is sited in most noise criteria.

The City of Fortuna General Plan 2030 Chapter 8 Health and Safety, Subsection HS-4 Noise provides noise guidelines. The General Plan allows for different levels of noise during the construction phase of the project and during the operational phase of the project. During the construction phase, there are two standards; daytime exterior noise and nighttime exterior noise. During the operational phase of the project (post-construction), the General Plan allows for levels of noise using interior and exterior compatibility standards for residential land uses, with standards of 45 dBA interior and 60 dBA exterior.

The City's General Plan standards for exterior construction noise level impacts to residential land uses are not to exceed 65-dBA during the daytime, and not to exceed 60-dBA during nighttime. Construction noise standards per the General Plan are that construction activities are to be limited to the hours between 7:00 a.m. to 8:00 p.m., Monday through Saturday, except for emergencies and other special permitted circumstances.

Noise from construction activities on this project will be a function of the noise generated by individual construction equipment items ("Construction Equipment" section of the standards of the Construction Management Plan), the equipment location (much of this construction will be insulated by the landform, the depth of the excavation, the lowered topography in relation to the surrounding area, and the timing and duration of noise-generated activities. It is important to note that generally all equipment is not operated continuously or used simultaneously. The number, type, distribution, and usage of construction equipment will differ from phase to phase. The noise generated is both temporary in nature and limited in duration by the phase of construction and permitted hours of operation.

Based on this analysis, the project sites will experience noise levels above the 65 dB, "Acceptable" level. This increase will be short-term and temporary and will cease upon completion of construction. To mitigate temporary increases in noise, the following mitigation measure is recommended:

a, c, d) Exposure to Noise in Excess of Established Standards or Substantially Increase Existing Levels – Less than Significant Impact

The primary noise sources in the project area continue to be transportation-related. Traffic on Redwood Way and Rohnerville Road will continue to have minimal noise impacts on the project area; however, noise impacts from the project itself will be minimal due to the nature of the project.

Noise from construction activities on this project will be a function of the noise generated by individual construction equipment items, the equipment location (much of this construction will be insulated by the landform, the depth of the excavation, the lowered topography in relation to the surrounding area, and the timing and duration of noise-generated activities. It is important to note that generally all equipment is not operated continuously or used simultaneously. The number, type, distribution, and usage of construction equipment will differ from phase to phase. The noise generated is both temporary in nature and limited in duration by the phase of construction and permitted hours of operation.

There are several sensitive receptors including neighboring homes to the north, Redwood Memorial Hospital to the east and Norman G. Ambrosini Elementary School to the southeast. The construction site borders Redwood Memorial Hospital; 1400 feet from Norman G. Ambrosini Elementary School; and 85 feet from the closest residence.

To prevent noise disturbance to the community, construction will be limited to 7 a.m. to 7 p.m. on weekdays and 9 a.m. to 6 p.m. on weekends and holidays with the permission of the City.

Sound from a point source is known to attenuate at a rate of approximately -6 dB for each doubling of distance under typical urban/suburban conditions (HUD Noise Guidelines). For example, a noise level of 84 dB Leq as measured at 50 feet from the noise source will attenuate to 78 dB Leq at 100 feet from the source and to 72 dB Leq at 200 feet from the source to the receptor. Based on the reference noise levels in Table 3.12-1, the noise levels generated by construction equipment at the project site may reach a maximum of approximately 85 dB Leq at 50 feet during site excavation, vegetation trimming/removal and construction.

Based on these assumptions, the residential areas will experience noise levels above the 65 dB, "Acceptable" level. This increase will be short-term and temporary and will cease upon completion of construction.

b) Exposure to Ground Borne Vibration or Noise–Less than Significant Impact

Construction will cause temporary vibration in the immediate vicinity of the active portion of the construction site. Vibration will predominantly be caused by trenching equipment, excavation equipment, and compaction equipment. Vibration from on-site construction activities will typically be intermittent and for short durations.

Based upon the types of anticipated construction equipment, and because no pile driving or blasting is needed, ground borne vibration levels produced during project construction are not expected to have a significant impact at neighboring sensitive receptor locations. The restriction of working hours under the mitigation requirements will eliminate the impact of equipment-generated vibration during night-time, early morning, and evening hours when people are generally more sensitive to noise and vibration. Therefore, a less than significant impact will occur related to ground borne vibration or ground borne noise levels.

e, f) Exposure of People Residing or Working Near a Private or Public Airport to Excessive Noise Levels – No Impact

The nearest public airport, the Rohnerville Airport, is located approximately two miles south of the project site (City of Fortuna, 2007). The project will not result in any changes to the noise levels related to an airport or private airstrip. No impact will occur.

### 4.14.3 MITIGATION MEASURES

**NOI-1: Construction Noise Mitigation Procedures**

The Contractor will prepare a Final Construction Management Plan (FCMP) to minimize temporary noise impacts on the surrounding residences. Pile drivers will not be used on the project site. The FCMP will include, at a minimum, the following measures:

Hours of Construction - The hours of construction will be limited to 7 a.m. to 7 p.m. on weekdays and 9 a.m. to 6p.m. on weekends and holidays with the permission of the City.

Complaint Response - The City shall designate a Construction Observer who shall also serve as a “noise disturbance coordinator,” and be responsible for responding to any local complaints about construction noise or other impacts associated with construction activities. A telephone number for the disturbance coordinator will be conspicuously posted at the construction site and on the City website. The Construction Observer will determine the cause of the noise complaints (e.g., beginning work too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. Reasonable measures to be considered may include (but are not limited to) the following:

- Construction of temporary sound walls or other physical noise barriers between the construction site and adjacent residences;
- Shielding of stationary combustion equipment such as pumps or generators with noise protection barriers;
- Installation of noise reduction features (mufflers & shrouds, etc.) on construction equipment.
- Implementation of noise reduction features will be determined by the Construction Observer based on the type of complaint received from neighbors, the degree of noise levels based on actual measurements if necessary (assuming an acceptable interior noise level of 45 dB per State Building Standards Commission), and the feasibility of implementation of the specific measure.

Timing for Implementation/Compliance: During construction of project.

Person/Agency Responsible for Monitoring: Community Development Department staff or designated Construction Observer.

Monitoring Frequency: Daily, for duration of project.

Evidence of Compliance: Visual site inspection by City Planner and/or Building Department Staff.

### 4.14.4 FINDINGS

The Project will have Less than Significant with Mitigation Incorporation Impact on Noise.

## 4.15 POPULATION AND HOUSING

***Table 15: Population and Housing impact evaluation***

| **XIII.POPULATION AND HOUSING**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes and/or businesses) or indirectly (e.g., through extension of roads or other infrastructure)? | ☐ | ☐ | ☒ | ☐ |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |

### 4.15.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (a) induce substantial population growth in an area, either directly (e.g., by proposing new homes and/or businesses) or indirectly (e.g., through extension of roads or other infrastructure); (b) displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere, or (c) displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

### 4.15.2 DISCUSSION

The project includes 59 new residences, a community center, new roads including a fire lane, and the implementation of new utility services. Each residence is designed to house at least two tenants, and provide a space for a potential vehicle.

a) Induce Substantial Population Growth – Less than Significant Impact

The primary objective of the project is to provide 59 residential units to the city of Fortuna. With two bedrooms in each unit, there could be as many as, if not more than 120 people living in this area. This represents an approximate 0.9% increase in reference to the total population of Fortuna, CA. This does not represent a large increase in the population, thus, less than significant impact is expected. The Fortuna General Plan and Program EIR analyzed the population growth of the City, including the density of the project site at the density in which it is proposed to be developed. The project will not increase the density to a level greater than that analyzed in the General Plan and Program EIR.

b, c) Displace Housing or People – No Impact

The project will not result in the displacement of any housing or people. No impact will occur.

### 4.15.3 MITIGATION MEASURES

No mitigation measures are necessary to regards to population and housing.

### 4.15.4 FINDINGS

The Project will have less than significant impact. Population increase will be minor in reference to the current population in Fortuna, CA. The project purpose is to provide new housing for the elderly, meaning that displacement of people or housing will not occur.

## 4.16 PUBLIC SERVICES

***Table 16: Public service impact evaluation***

| **XIV. PUBLIC SERVICES**. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Fire protection? | ☐ | ☐ | ☒ | ☐ |
| b) Police protection? | ☐ | ☐ | ☒ | ☐ |
| c) Schools? | ☐ | ☐ | ☒ | ☐ |
| d) Parks? | ☐ | ☐ | ☒ | ☐ |
| e) Other public facilities? | ☐ | ☐ | ☒ | ☐ |

### 4.16.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or result in the 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 (a) fire protection, (b) police protection, (c) schools, (d) parks, or (e) other public facilities.

### 4.16.2 DISCUSSION

For fire protection services, the project area is protected by the Fortuna Fire Protection District (FFPD). The FFPD provides structural fire protection and emergency services to the City of Fortuna as well as most of the Planning Area. The FFPD is staffed by the Fortuna Volunteer Fire Department (FVFD), which is comprised of all-volunteer firefighters. The FVFD operates out of three fire stations. The largest station is centrally located on South Fortuna Boulevard, with the two smaller stations located in Hydesville and Campton Heights. The CAL FIRE provides wildland fire protection to the forest area within the Planning Area north and east of the City limits that is designated as a SRA. Several mutual aid agreements exist between the FFPD and other local emergency response agencies in Carlotta, Ferndale, Loleta, Rio Dell, and Scotia (City of Fortuna 2007).

Police protection services and traffic patrol for the project area and Fortuna City limits are provided by the Fortuna Police Department (FPD). The FPD had one officer per 755 residents (2009). The FPD responded to approximately 14,721 calls in 2008, with an average response time of less than three minutes. The Humboldt County Sheriff Department provides police protection within the Planning Area and along Highway 101 in the City limits.

The school districts serving the project area include the Fortuna Union High School District and Fortuna Union Elementary School District. Fortuna Union High is located on 12th Street. Fortuna Middle School is located on L Street. Norman G. Ambrosini Elementary School is located near the site.

Parks and recreation facilities in the project area include landscaped areas and recreational facilities and equipment at Fortuna Union High School. The Parks and Recreation Department has a shared agreement with Fortuna high school to use gym and school field facilities for community soccer, basketball, and football programs. This partnership allows the community to maximize use of available parks and facilities. Other parks in the vicinity include Chamber Park, Rohner Park, and Newburg Park.

The City of Fortuna library provides information, reading, audio, and visual materials. The present library has reached capacity at 18,000 books and has a monthly circulation around 9,000 books per month. The city has signed a memorandum of understanding between the City of Fortuna and the Humboldt County Library. The MOU transfers all library equipment owned by the City of Fortuna to the county. The Humboldt County Library is responsible for maintenance, supplies, and property insurance of the equipment, whereas the city owns the building and pay for repairs and maintenance.

The City of Fortuna provides public transit to all Fortuna residents through sponsorship of the Humboldt Transit Authority. The City's Parks and Recreation Department operates the "Dial-a-Ride" service for seniors over the age of fifty and disabled persons regardless of age. Two buses are in operation Monday through Friday from 8:30 a.m. to 4:30 p.m. One bus operates on Saturday from 9:00 a.m. to 3:30 p.m.

a, b, c, d, e) Substantial Adverse Physical Impacts Associated with New or Altered Fire or Police Protection, Schools, Parks, or other public facilities – No Impact

As discussed in Section XIII, the project will directly induce population growth and create new demand for services. Therefore, the project will have an impact on the service ratios, response times, or other performance objectives of schools, parks, and other public facilities and services that are based on population growth. The project will not require new or physically altered government facilities to serve the project site.

### 4.16.3 MITIGATION MEASURES

No mitigation required.

### 4.16.4 FINDINGS

The Project will have No Impact on Public Services.

## 4.17 RECREATION

***Table 17: Recreation impact evaluation***

| **XV. RECREATION**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☒ | ☐ |
| b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | ☒ |

### 4.17.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (a) increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated, or (b) include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

### 4.17.2 DISCUSSION

The City of Fortuna owns and maintains public parks, open spaces, and recreation facilities under the Parks and Recreation Department. The responsibilities of the Parks and Recreation Department include managing and maintaining City parks and recreational facilities, coordinating recreation programs and service club activities that take place at City parks and facilities, and planning for park and recreational facilities demand. The City of Fortuna has 75 acres of community parkland in Rohner, Newburg and 2 mini/pocket parks.

a) Increase in the Use of Existing Facilities Resulting in Substantial Physical Deterioration – Less Than Significant Impact

This project will indirectly influence recreation use as this project is constructing 59 permanent units for people to live in. As many as if not more than, 120 people could live in the proposed unit development. As these homes are specifically for senior citizens, usage of parks will most likely not include significant wear and tear on facilities (barring visiting family usage).

b) Development of Recreation Facilities that Could Result in Adverse Physical Effects on the Environment – No Impact

The PD includes a 15’ wide trail easement which connects to the City along Strongs Creek. When the trail is constructed, it will provide recreational access to the rear residential development and enrich the nature area. Thus, no adverse physical effects are anticipated, resulting in no impact.

MITIGATION MEASURES

No mitigation required.

### 4.17.3 FINDINGS

The Project will have Less Than Significant Impact on Recreation.

## 4.18 TRANSPORTATION/TRAFFIC

***Table 18: Transportation/Traffic impact evaluation***

| **XVI.TRANSPORTATION / TRAFFIC**. Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 congestions 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 result in substantial safety risks? | ☐ | ☐ | ☐ | ☒ |
| d) Substantially increase hazards due to design features (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 regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities? | ☐ | ☐ | ☐ | ☒ |

### 4.18.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (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 design features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); (e) result in inadequate emergency access; or (f) conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

4.18.2 DISCUSSION:

As proposed, the project site access will be via a bi-direction road way connected to Redwood Way which is classified as a collector road (road that link local streets to the arterials system) by the City of Fortuna. Redwood Way is also identified as providing primary access throughout the community. The City also conducted surveys of critical intersections and the Rohnerville Road/Redwood Way (a two-way stop controlled) intersection is one the 26 critical intersections analyzed by the City.

Level of Service (LOS) is a quantitative measure that characterizes operation of transportation facilities. Using data relative to volumes, right-of-way (ROW) controls, and lane configurations, the relative experience of drivers using the transportations system can be evaluated. It “grades” the operation of the facility similar to a report card; a LOS of "A" is representative of generally free-flowing conditions while a LOS of “F” is representative of long delays. The City’s standard is LOS “C” for all City streets, except Main Street where LOS “D” is the minimum.

According to the City of Fortuna, Rohnerville Road/Redwood Way (a two-way stop controlled) intersection has a level of service (LOS) of B. A LOS of B for a two-way stop-controlled intersection has a delay of 15 to 25 seconds without any queues. This intersection is located approximately 1400 feet from the entrance to the proposed center. The road width at the proposed entry for Redwood Way is 32 feet including the two travel lanes and a pedestrian/bike lane located on the south. There are no sidewalks along most of Redwood Way and the posted speed limit is 35 mph.

A Traffic Impact Study Report (TISR) was prepared for the project by GHD and finalized in December, 2018. The TISR can be found in the attached documentation (Attachment H). The TISR provides an evaluation of operating conditions during the typical weekday morning and evening peak periods under Baseline, Baseline plus Project, Cumulative, and Cumulative plus Project Conditions. Baseline conditions model existing conditions, which include the development of the Open-Door Community Health Center (ODCHC) and the McLean Community Center Projects. Anticipated operations and intersection LOS were assessed for potential impacts using the measure of effectiveness and thresholds of significant established by the City of Fortuna. The purpose of the TISR is to provide City staff and policy makers such as Planning Commissioners and Council members with data that they can use to make an informed decision regarding the potential traffic impacts of the proposed project, and any associated improvements that will be required in order to mitigate these impacts to a level of insignificance as defined by the Fortuna General Plan 2030, or other applicable policies.

The results of the various conditions scenarios reported with this study indicate that the study area roadway network generally will operate adequately over the long-term horizon, with or without the addition of project trips. The TISR concluded that,

“...the proposed project improvements at the project development site it will have minimal effect on the study roadway network because of the additional trips generated…this study confirms that the levels of service encountered with the addition of the project generated trips will be the same as those encountered without the addition of project-generated trips”

The Humboldt Transit Authority (HTA) have two transit services operating within the City of Fortuna. The primary transit services within the study area is the Redwood Transit Service (RTS) mainline, with the RTS Southern Humboldt Intercity transit line operating in the southbound direction from the study area. The RTS main lines provides fixed route services between Scotia, Fortuna, Loleta, Fields Landing, Eureka, Arcata, McKinleyville, Westhaven, and Trinidad seven days per week. Services travel along South Fortuna Boulevard, Redwood Way, Rohnerville Road, and Kenmar Road. Transit stops are currently placed adjacent to Redwood Village Shopping Center along both South Fortuna Boulevard and Redwood Way, and adjacent to the St. Joseph’s Drive and Redwood Memorial Hospital.

Pedestrian facilities (sidewalks on public streets) are provided in varying coverage throughout Fortuna but are not available along Redwood Way near the project site.

a) Conflict with an Applicable Plan, Ordinance, Policy, or Program Establishing Measures of Effectiveness for the Performance of the Circulation System – Less than Significant with Mitigation

Increases in traffic will occur during project construction. The proposed project will generate short-term traffic during construction from transport of heavy construction equipment to and from the project site, truck traffic associated with hauling construction components and materials to the site and removal of debris, and construction workers commuting to and from the site. The temporary increase in traffic will be localized and temporary.

During project construction, truck trips associated with delivery of materials and hauling away of soil and other construction debris will occur. The trips will create a minor impact within the neighborhood immediately surrounding the project site. However, the impact will be short-term, and once construction is completed, all short-term impacts associated with the proposed project will cease.

Based on the TISR conducted by GHD, the project itself will not generate a significant impact on the LOS of the surrounding road network. Conditions leading to the improvement of the surrounding road network will have occurred with, or without the development of the project site.

b) Conflict with an Applicable Congestion Management Program – No Impact

The project area is not subject to a Congestion Management Program and does not have a traffic congestion problem during weekday work hours, with all project area streets and roads below capacity; therefore, there will be no impact.

c) Result in a Change in Air Traffic Patterns – No Impact

The nearest public airport, the Rohnerville Airport, is located approximately 2 miles south of the project site. No aspect of the project will affect air traffic patterns; therefore, there will be no impact.

d) Substantially Increase Hazards due to a Design Feature or Incompatible Use – Less than Significant with Mitigation

The planned intersection of the proposed ODCHC entrance and Redwood Way will require minimal roadway modifications, assuming that the two-way left turn lane associated with the City's current Redwood Way project will be implemented prior to the construction of the planned entrance. In order to address rear-end collision concerns in the southbound direction, a southbound right turn pocket could be considered, but it does not produce a significant benefit in terms of delay.

As discussed above, the presence of construction vehicles and equipment on nearby roadways could increase the normal traffic hazard in the project area. The project will only require traffic safety control procedures onsite to accommodate traffic during construction. Work hours will be confined to 7:00 a.m. to 7:00 p.m. on weekdays, and 9:00 a.m. to 6:00 p.m. on weekends and holidays (if work on weekends and/or holidays is permitted by the City).

e) Result in Inadequate Emergency Access – Less than Significant with Mitigation

The project site borders the Redwood Memorial Hospital which is the main hospital for Fortuna residents and other nearby cities. The site is located on one of three main access ways to the hospital; Renner Drive, west Redwood Way and east Redwood Way. During the beginning stages of construction, it is likely that there will be large equipment being operated near west Redwood Way. This could inhibit the use of both lanes resulting in inadequate emergency access. Once the new road for the units is constructed, then there will be fewer issues with large equipment blocking one of the lanes of Redwood Way. Mitigation through traffic planning management is proposed. This includes signage to guide vehicles through and or around the construction zone at all times.

f) Conflict with Adopted Policies, Plans, or Programs Regarding Public Transit, Bicycle, or Pedestrian Facilities, or Otherwise Decrease the Performance or Safety of Such Facilities – No Impact

The Fortuna General Plan Policy Document is the guiding document addressing bicycle, pedestrian and transit facilities in the project area and Planning Area of Fortuna. The project will not conflict with any of the policies or programs in the policy document, nor adversely affect facilities for public transit, bicycles, or pedestrians. There will be no impact.

### 4.18.3 MITIGATION MEASURES

**TRT-1: Traffic Planning**

The City of Fortuna will be responsible for implementing the following measures to minimize the potential short-term impacts to transportation in the project area during construction:

1. No public traffic routes shall be fully blocked at any time.

2. Workers shall park their privately-owned vehicles at designated locations at the project site to reduce traffic impacts.

3. Temporary parking advisory signs shall be posted at least 24 hours, but no more than 48 hours, in advance of construction.

4. Haul routes shall be utilized by construction trucks to minimize truck traffic on local roadways to the extent possible. When necessary, flaggers and/or signage to guide vehicles through and/or around the construction zone shall be utilized.

5. Truck trips shall be scheduled outside of peak morning and afternoon commute periods to the extent possible.

6. The City of Fortuna shall be responsible for ensuring that any affected residents are notified well in advance of any disruption to the transportation infrastructure.

Timing for Implementation/Compliance: During construction.

Person/Agency Responsible for Monitoring: Building Official.

Monitoring Frequency: During construction activities.

Evidence of Compliance: Visual observance by Building Official.

With implementation of the above mitigation measures, potential impacts on traffic, bicycle and pedestrian circulation attributable to the project will be reduced to a less than significant level.

### 4.18.4 FINDINGS

The Project will have No Impact on Transportation and Traffic with mitigation.

## 4.19 UTILITIES AND SERVICE SYSTEMS

***Table 19: Utilities and Service systems impact evaluation***

| **XVII.UTILITIES AND SERVICE SYSTEMS.** Would the project: | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 water or wastewater facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☐ | ☒ |
| c) Require or result in the construction of new Stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| 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? | ☐ | ☐ | ☐ | ☒ |

### 1.1.1 THRESHOLDS OF SIGNIFICANCE

This Initial Study considers to what degree, if any, the Proposed Project would (a) exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board; (b) require or result in the construction of new water or wastewater facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; (c) require or result in the construction of new Stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; (d) have sufficient water supplies available to serve the project from existing entitlements and resources, or need new or expanded entitlements; (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; (f) be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; or (g) comply with federal, state, and local statutes and regulations related to solid waste.

### 1.1.2 DISCUSSION

The City has prepared master plans for the infrastructure in the project area, including water and sewer and roadways through the General Plan, zoning ordinance, Capital Improvement Plan, and Storm Drainage Master Plan. In addition, Whitchurch Engineering has made use of the SWMM Model provided by the City of Fortuna to determine the effects of the PD on the water and wastewater facilities of the City.

The storage of existing water sources, connection of pressure zones and improvement of existing fire suppression services will not conflict with applicable plans, policies or regulations. City of Fortuna service providers have been contacted regarding the project and have indicated the ability to provide services. Additionally, Whitchurch Engineering has found through the City of Fortuna SWMM and EPANET models that the existing wastewater and potable water systems are adequately sized to service the proposed project. Therefore, the existing water system also has adequate capacity to meet the domestic and irrigation demands of the proposed development.

The General Plan encourages in-filling where existing facilities and services are already available. This project supports "infill" development as it is located in the central area of the City and is substantially surrounded by development on three sides with the exception of a remnant pasture located to the southwest.

The City Wastewater Treatment Plant (WWTP) currently treats 1.0 Million Gallons per Day (MGD) during the dry weather season (June through September), and an average of 1.9 MGD annually (wet and dry weather flows). The recently upgraded WWTP has an average dry weather capacity of 1.5 MGD, and a wet weather capacity of up to 7 MGD. The WWTP can accommodate services for approximately 15,000 people. Additionally, Whitchurch Engineering SWMM modeling indicated that the City's existing wastewater conveyance system has adequate capacity to meet the demands of the proposed development. Based upon this analysis, the projected wastewater inflow resulting from this project will not result in overtopping of junction the downstream invert J-531. Results can be found in the attached documentation (Attachment I).

The overall current storage capacity of the city's water system is approximately 7.5 MG. The city's water supply is limited by water rights. According to the Humboldt County Capital Facilities Technical Report, the city is extracting approximately 75 percent of its groundwater allocation under current rights. The city has approximately 1,489 connections available before it will need to apply for additional water rights. The EPANET analysis conducted by Whitchurch Engineering concluded that an emergency usage of 2,037 GPM could occur in the case of fire response scenario. The system connects to the PD through J-193 and J-224 to provide redundancy, and an excess of water supply. Raw results are included in the attached documentation (Attachment J).

The waste stream generated in the City of Fortuna totals approximately 7,000 tons per year, and includes household, commercial, construction, and garden refuse material, as well as recycling.

The City of Fortuna contracts with Eel River Disposal and Resource Recovery Inc. (ERD) for municipal solid waste collection services. ERD has been in operation for more than 20 years and offers Fortuna residents weekly garbage pickup and bi-weekly curbside recycling of paper, cardboard, plastic, glass, and metal. Solid waste from the ERD transfer station is transported out of Humboldt County to the Dry Creek Landfill in Medford, Oregon or Anderson Landfill in Anderson, California.

a, e) Exceed Applicable Wastewater Treatment Requirements or Wastewater Treatment Capacity – No Impact

The project consists of development pursuant to the General Plan and Zoning Designation at a density and intensity of use which was considered in the City of Fortuna utility Master Plans. The Master Plan identifies long term capacity improvements which may be needed to accommodate anticipated development. Based on analysis of the current City of Fortuna infrastructure through the analysis of the provided SWMM model, no short-term limitations to the provision of service have been identified. No impact will occur.

b) Require Construction or Expansion of New Water or Wastewater Facilities – No Impact

Based on analysis of the current City of Fortuna infrastructure through the analysis of the provided SWMM and EPANET models, the project will not require construction or expansion of new water or wastewater facilities, which will cause significant environmental effects. No impact will occur.

c) Require Construction or Expansion of New Stormwater Facilities – Less than Significant Impact

The project site is in a developed area of Fortuna, which is served by an existing stormwater collection and conveyance system. Implementation of the project is not anticipated to increase the volume or velocity of stormwater runoff off-site such that significant environmental effects are caused. Implementation of LID control will reduce the impact of new stormwater flow.

d) Have Sufficient Water Supplies to Serve the Project – No impact

The project will not require an increase in the capacity or result in overloading of the City's water system. No additional water supply is necessary to serve the proposed project. No impact will occur.

f, g) Have Sufficient Landfill Capacity and Comply with Statutes Related to Solid Waste – Less than Significant Impact

The project will generate a small volume of construction waste that will be hauled by the construction contractor to an approved disposal site. Waste will include construction materials remnants, replaced materials, and worker-generated trash and debris. This will be a less than significant impact on landfill capacity with the implementation of federal, state, and local statutes and regulations related to solid waste.

### 4.19.1 MITIGATION MEASURES

No mitigation required.

### 4.19.2 FINDINGS

The Project will have Less Than Significant Impact on Utilities and Service Systems. Current infrastructure is adequately sized to service the proposed project.

## 4.20 MANDATORY FINDINGS OF SIGNIFICANCE

***Table 20: Mandatory Findings of Significance impact evaluation***

| XVIII. MANDATORY FINDINGS OF SIGNIFICANCE. | Potentially Significant Impact | Less Than Significant with Mitigation Incorporation | 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 would cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☒ | ☐ | ☐ |

### 4.20.1 DISCUSSION

a, c) Degrade Environmental Quality or Adversely Affect Human Beings – Less than Significant with Mitigation

With implementation of the Mitigation Measures presented herein, the project as a whole does not have the potential to significantly degrade the quality of the environment, including air quality, fish or wildlife species or their habitat, plant or animal communities, important examples of the major periods of California history or prehistory, geologic resources, hazards, water resources, land use compatibility, noise, traffic movement, or other adverse effects, directly or indirectly, on human beings.

b) Cumulatively-Considerable Impacts – Less than Significant

The project's individual impacts will not add appreciably to any existing or foreseeable future significant cumulative impact, such as visual quality, historic resources, traffic impacts, or air quality degradation. Incremental impacts, if any, will be negligible and undetectable. As reported throughout this document, cumulative impacts to which this project will contribute will be mitigated to a less than significant level.

610 9th Street
Fortuna, CA 95540
Phone: (707) 725-6926

Determination

This Initial Study has determined that in the absence of mitigation the proposed Project could have the potential to result in significant impacts associated with the factors checked below. Mitigation measures are identified in this Initial Study that will reduce all potentially significant impacts to less-than-significant levels.

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Aesthetics | ☐ | Agriculture and Forestry Resources | ☐ | Air Quality |
| ☒ | Biological Resources | ☒ | Cultural Resources | ☒ | Geology/Soils |
| ☐ | Greenhouse Gas Emissions | ☐ | Hazards & Hazardous Materials | ☒ | Hydrology/Water Quality |
| ☐ | Land Use / Planning | ☐ | Mineral Resources | ☒ | Noise |
| ☐ | Population / Housing | ☐ | Public Services | ☐ | Recreation |
| ☒ | Transportation/Traffic | ☐ | Tribal Cultural Resources | ☐ | Utilities / Service Systems |
| ☐ | Mandatory Findings of Significance | | | | |

On the basis of this Initial evaluation: There are no significant impacts which could not be mitigated to results in less-than-significant levels. The proposed PD does not fall under the requirements to result in an Environmental Impact Report.

# 5 Mitigation Summary

**BIOLOGICAL RESOURCES**

**BR-1: Compliance with Army Corps Nationwide Permit to ensure protection of existing 0.04-acre wetlands.**

Timing for Implementation/Compliance: City plan review of improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review and pre-construction site review.
Evidence of Compliance: Final development plans depict creek banks and wetland areas and setbacks. City Community Development Department to review Nationwide Permit during plan review to ensure protection measures are depicted. Building Inspectors to review during site development to ensure fencing and other measures are implemented. ,

**BR-2: Maintain the 50-ft setback from Strongs and Jameson creeks' top of bank. Maintain 25-ft setback from jurisdictional wetlands.**

Timing for Implementation/Compliance: City plan review of improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review and pre-construction site review.
Evidence of Compliance: Plans depict 50-foot setback from Strongs and Jameson Creeks, and 25-foot setbacks from wetlands.

**BR-3: Migratory Bird Protection**
There are potential direct impacts to migratory bird species if construction or vegetation removal occurs during the breeding season (March 1- August 15). Therefore, preconstruction nesting surveys will be performed if construction will occur during that time to mitigate these potential impacts. If breeding birds are found in the vicinity, construction will be delayed until after the breeding season or proper setbacks should be established in cooperation with the California Department of Fish and Wildlife prior to proceeding with construction.

Timing for Implementation/Compliance: March - August
Person/Agency Responsible for Monitoring: City Construction Inspector
Monitoring Frequency: Once, pre-construction
Evidence of Compliance: Visual and written verification that no breeding birds are present.

## CULTURAL RESOURCES

**C-1: If tribal cultural resources are discovered, the Cultural Resource Protection Protocol outlined below will be followed. The protocol shall be printed on all construction plan sets.**

### Cultural Resource Protection Protocol 1: Cultural Resources

If cultural resources, such as lithic materials or ground stone, historic debris, building foundations, or bone are inadvertently discovered during ground-disturbance activities, work shall be stopped within 20 meters (66 feet) of the discovery, per the requirements of CEQA (January 1999 Revised Guidelines, Title 14 CCR 15064.5 (f)). If the proposed project receives Federal funding, it may be considered a Federal undertaking triggering compliance with Section 106 National Historic Preservation Act. Inadvertent discoveries shall be treated as outlined in 43 CFR 10.4 and 36 CFR 800.13.

Work near the archaeological find shall not resume until a professional archaeologist, who meets the *Secretary of the Interior's Standards and Guidelines*, has evaluated the materials and offered recommendations for further action.

Prehistoric materials which could be encountered include: obsidian and chert debitage or formal tools, grinding implements, (e.g., pestles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic materials which could be encountered include: ceramics/pottery, glass, metal, can and bottle dumps, cut bone, barbed wire fences, building pads, structures, trails/roads, etc.

### Cultural Resource Protection Protocol 2: Human Remains

If human remains are inadvertently discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie adjacent to human remains (Public Resources Code, Section 7050.5). The Humboldt County coroner will be contacted to determine if the cause of death must be investigated. If the coroner determines that the remains are of Native American origin, it is necessary to comply with State laws relating to the disposition of Native American burials, which fall within the jurisdiction of the Native American Heritage Commission (NAHC) (Public Resources Code, Section 5097). The coroner will contact the NAHC. The descendants or most likely descendants of the deceased will be contacted, and work will not resume until they have made a recommendation to the landowner or the person responsible for the excavation work for means of treatment and disposition, with appropriate dignity, of the human remains and any associated grave goods, as provided in Public Resources Code, Section 5097.98. Work may resume if NAHC is unable to identify a descendant or the descendant failed to make a recommendation.

Timing for Implementation/Compliance: Submittal of utility Improvement plans and building permit plans.
Person/Agency Responsible for Monitoring: City Community Development Dept.
Monitoring Frequency: Plan review.
Evidence of Compliance: Protocol printed on plans.

**GEOLOGY AND SOILS/EROSION CONTROL**

GS-1: Implement standard construction BMPs in accordance with a standard Caltrans SWPPP. The erosion control actions will include BMPs designed to reduce erosion of exposed soil and minimize the sediment entrained in runoff from the site during construction. BMPs may include: plastic tarps, geo-fabric, woven coconut fronds, silt fences, coir rolls/straw wattles, erosion control matting, site watering for controlling dust, or other suitable materials. With the implementation of these mitigation measures, potential impacts to soil erosion or the loss of topsoil will be less than significant.

Timing for Implementation/Compliance: During construction of project.
Person/Agency Responsible for Monitoring: Licensed QSD or designated Construction Observer.
Monitoring Frequency: Before, during, and after rain events resulting in 0.1 inches of rainfall depth within a 24-hour period.
Evidence of Compliance: Visual site inspection by QSD or designated Construction Observer.

**HYDROLOGY AND WATER QUALITY**

**HWQ-1: Prepare and Implement SWPPP and BMPs**

The City shall ensure that a SWPPP is prepared and implemented for the project and includes BMPs. The SWPPP shall be prepared prior to any construction on any portion of the project and implemented prior to and during construction. At a minimum, the contractor shall implement the measures listed in the Initial Study, or an equivalent as described in the approved SWPPP:

Timing for Implementation/Compliance: During construction of project.
Person/Agency Responsible for Monitoring: Building Department site inspector or designated Construction Observer.
Monitoring Frequency: Daily, for duration of project.
Evidence of Compliance: Visual site inspection by Building Department Staff.

## NOISE

### NOI-1: Construction Noise Mitigation Procedures

The Contractor will prepare a Final Construction Management Plan (FCMP) to minimize temporary noise impacts on the surrounding residences. Pile drivers will not be used on the project site. The FCMP will include, at a minimum, the following measures:

Hours of Construction - The hours of construction will be limited to 7 a.m. to 7 p.m. on weekdays and 9 a.m. to 6p.m. on weekends and holidays with the permission of the City.

Complaint Response - The City shall designate a Construction Observer who shall also serve as a "noise disturbance coordinator," and be responsible for responding to any local complaints about construction noise or other impacts associated with construction activities. A telephone number for the disturbance coordinator will be conspicuously posted at the construction site and on the City website. The Construction Observer will determine the cause of the noise complaints (e.g., beginning work too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. Reasonable measures to be considered may include (but are not limited to) the following:

- Construction of temporary sound walls or other physical noise barriers between the construction site and adjacent residences;
- Shielding of stationary combustion equipment such as pumps or generators with noise protection barriers;
- Installation of noise reduction features (mufflers & shrouds, etc.) on construction equipment.
- Implementation of noise reduction features will be determined by the Construction Observer based on the type of complaint received from neighbors, the degree of noise levels based on actual measurements if necessary (assuming an acceptable interior noise level of 45 dB per State Building Standards Commission), and the feasibility of implementation of the specific measure.

> Timing for Implementation/Compliance: During construction of project.
> Person/Agency Responsible for Monitoring: Community Development Department staff or designated Construction Observer.
> Monitoring Frequency: Daily, for duration of project.
> Evidence of Compliance: Visual site inspection by City Planner and/or Building Department Staff.

**TRAFFIC AND CIRCULATION**

**TRT-1: Traffic Planning**

The City of Fortuna will be responsible for implementing the following measures to minimize the potential short-term impacts to transportation in the project area during construction:

1. No public traffic routes shall be fully blocked at any time.

2. Workers shall park their privately-owned vehicles at designated locations at the project site to reduce traffic impacts.

3. Temporary parking advisory signs shall be posted at least 24 hours, but no more than 48 hours, in advance of construction.

4. Haul routes shall be utilized by construction trucks to minimize truck traffic on local roadways to the extent possible. When necessary, flaggers and/or signage to guide vehicles through and/or around the construction zone shall be utilized.

5. Truck trips shall be scheduled outside of peak morning and afternoon commute periods to the extent possible.

6. The City of Fortuna shall be responsible for ensuring that any affected residents are notified well in advance of any disruption to the transportation infrastructure.

Timing for Implementation/Compliance: During construction.
Person/Agency Responsible for Monitoring: Building Official.
Monitoring Frequency: During construction activities.
Evidence of Compliance: Visual observance by Building Official.

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