RESOURCE MANAGEMENT AGENCY

Community and Economic Development
Department of Planning and Building

Norman L. Allinder, AICP
Director

- 2037 W. Cleveland Avenue
- Mail Stop G
- Madera, CA 93637
- (559) 675-7821
- FAX (559) 675-6573
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- mc_planning@madera-county.com

PLANNING COMMISSION DATE: **September 9, 2014**

AGENDA ITEM: **#3**

PRJ	**#2014-006**	**General Plan Amendment and Rezone to permit a community infill shopping center.**
APN	**#047-190-025**	**Applicant: Russell Shaw**
		Owner: G.C. Developers, Incorporated
CEQA	**ND #2014-22**	**Mitigated Negative Declaration**

REQUEST:

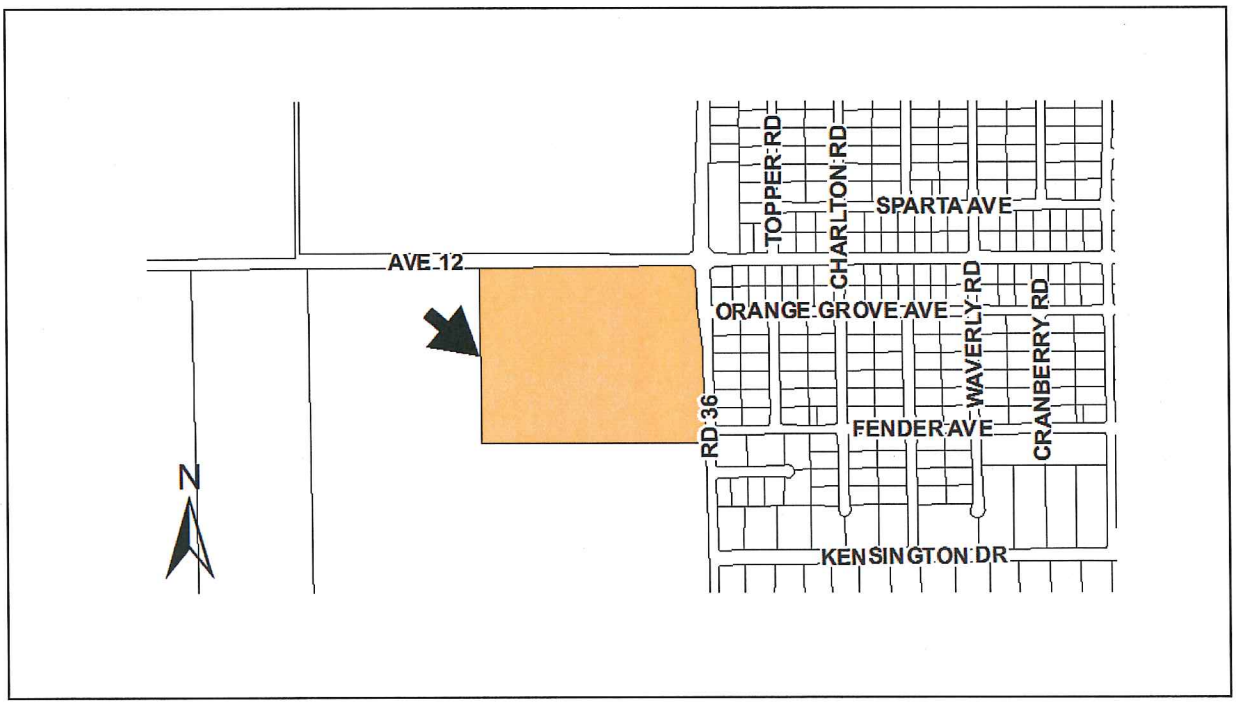
The applicant is requesting a General Plan Amendment and Rezone to permit the development of a commercial infill shopping center and governmental library.

LOCATION:

The property is located on the southwest corner of Avenue 12 and Road 36 (No Situs Available) Madera.

ENVIRONMENTAL ASSESSMENT:

A Mitigated Negative Declaration (ND #2014-22) and mitigation monitoring program has been prepared and is subject to approval by the Planning Commission.



RECOMMENDATION: **Approval of the project (PRJ 2014-006), Mitigated Negative Declaration (ND 2014-22), and the mitigation monitoring program (Exhibit N).**

GENERAL PLAN DESIGNATION (Exhibit A)**:**

SITE: RR (Rural Residential) Designation

PROPOSED: CC (Community Commercial) Designation

SURROUNDING: CC (Community Commercial) Designation, RR (Rural Residential) Designation, AE (Agricultural Exclusive) Designation, PO (Professional Office) Designation, VLDR (Very Low Density Residential) Designation and PI (Public Institution) Designation.

ZONING (Exhibit B)**:**

SITE: ARE-40 (Agricultural Rural Exclusive 40-Acre) District.

PROPOSED: CUM (Commercial Rural Median), and PDD (Planned Development District)

SURROUNDING: CRR (Commercial Rural Restricted), RRM (Residential Rural Multiple Family), RRS (Residential Rural Single Family) and ARE-40 (Agricultural Rural Exclusive 40-Acre) Districts

LAND USE:

SITE: Vacant

SURROUNDING: Public Institution, Professional Office, Commercial, and Agricultural Production.

SIZE OF PROPERTY: 40.2 Acres

ACCESS (Exhibit A)**:** Access is via Avenue 12 and Road 36.

BACKGROUND AND PRIOR ACTIONS:

The subject property has historically been in agricultural production. No land use entitlement applications have been applied for on the subject property.

PROJECT DESCRIPTION:

The request is for a General Plan Amendment and Rezone to permit the development of an infill community shopping center and public library.

ORDINANCES/POLICIES:

General Plan Policy Document – Part I – Land Use Designations provides the guidelines and development standards for the CC (Community Commercial) Designation.

California Government Code Section 65358(a) establishes authority for amending the General Plan by the Board of Supervisors.

Section 18.110.010 of the Madera County Zoning Ordinance provides the authority under California Government Code Section 65804 to amend or change zoning district boundaries by the Board of Supervisors.

Section 18.32.010 of the Madera County Zoning Ordinance outlines the permitted uses within the CUM (Commercial Urban Median) zone.

Section 18.67.010 of the Madera County Zoning Ordinance outlines the permitted uses within the PDD (Planned Development District) zone.

Chapter 18.92 of the Madera County Zoning Ordinance outlines the procedures for the processing and approval of conditional use permits.

Chapter 18.106 of the Madera County Zoning Ordinance outlines the procedures for the processing of Variance applications.

ANALYSIS:

The project site is currently located at the southwest corner of Avenue 12 and Road 36. This project will allow for the operation and construction of a community shopping center and public library within the Madera Ranchos community. The properties in the vicinity of the project site range in size from one (1) acre to 159.69 acres.

The project site is located directly to the south of the Liberty High School campus in the heart of the Madera Ranchos community. The development would permit the construction of 53,800 square feet of new commercial development. As proposed the developer is anticipating a gas station convenience store, two fast food restaurants, drugstore, and potentially a major grocery store. The development also includes 2.5 acres of land allocated for the development of a community park and library to serve the existing and future residents of the Madera Ranchos.

Madera County Avenue 12 has been designated as a Limited Expressway. Attached as Exhibit Q is a Traffic Impact Analysis for this proposal as prepared by KD Anderson & Associates. The Madera County Road Department has been integrally involved with regard to design constraints for the access off of Avenue 12. The applicant has completed a field topographical survey to be conducted and has further caused the commission of a Professional Engineer to work with the County to develop the access from Avenue 12 for the first phase of the Liberty Village at the Ranchos project.

This configuration allows for the essential left-turn movement (also right-in/right-out) into the site for westbound Avenue 12 traffic movements with no left out opportunities pursuant to this plan. The left-in bound vehicles are channeled to a protected left-turn pocket that is contained within left and right, two-foot wide raised medians. There will also be another right in/right-out movement opportunity closer to the traffic signal.

Customers, patrons and employees who desire westbound travel on Avenue 12 from the site towards Highway 99 will egress the site at the Road 36 access point and will make a left-turn movement at the signalized intersection to facilitate their trip needs. Some additional roadway construction will be necessary on the Southside of Avenue 12 (the project side); however, no additional right-of-way acquisition is anticipated to accommodate same.

The project will be annexed to the adjoining Madera County Maintenance District No. 10 for the provision of domestic water services. In anticipation of same, the project proposes the installation of a 10" PVC water mainline along the project's frontage along the southerly side of Madera County Avenue 12. It is anticipated that the proposed development will utilize approximately 6,775 gallons of water per day at full build-out for the project. Currently Maintenance District 10A is under Stage 3.5 water restrictions. The following lays out the restrictions for Stage 3.5:

- Drip Irrigation of trees and bushes 2 days a week during scheduled water use.
    - Even numbered address on Wednesday and Sundays
    - Odd numbered addresses on Tuesday and Saturday
    - Before 11am and after 7pm
    - **No run-off from your drip system is allowed**
- Replacement of evaporated water from pools, in order to maintain specific levels.
- Water use for animals and livestock.
- Watering of food sources, such as vegetable gardens, can be done by means of drip irrigation following the Stage 3.5 restrictions.
- **No** watering of lawns
- **No** use of sprinklers
- **No** washing of cars

First Carbon Solution prepared an Air Quality Analysis Report which is attached as Exhibit P. The technical analysis has been reviewed by County staff; the air quality modeling determined that no additional mitigation measures were required to result in a less than significant impact to the environment. The developer must abide by all San Joaquin Valley Air Pollution Control District requirements.

The proposed development would primarily serve the existing communities of the Madera Ranchos. There would be some capture of commuter traffic, however it is anticipated that will be a small majority of those served by the development. Staff has independently reviewed all technical reports submitted by the applicant and have agreed with the findings within those reports.

The Madera County General Plan states the following related to commercial development:

> *Policy 1.A.4 – The County shall encourage infill development and development contiguous to existing cities and unincorporated communities to minimize premature conversion of agricultural land and other open space lands.*
>
> *Policy 1.D.1 – The County shall require that new community commercial centers locate adjacent to major activity nodes and major transportation corridors.*
>
> *Policy 1.D.2 – The County shall encourage existing and new commercial centers to provide a variety of goods and services, both public and private.*
>
> *Policy 1.D.4 – The County shall promote new commercial development in rural communities that provides for the immediate needs of the local residents and services to tourists and travelers. The scale and character of such commercial development should be compatible with an complement the surrounding area.*

The project was circulated to outside agencies thought to be impacted or regulating the development of the proposed project. This included the Department of Fish and Wildlife,

California Highway Patrol, Golden Valley Unified School District, Department of Water Resources, and the San Joaquin Air Pollution Control District. The San Joaquin Air Pollution Control District was the only outside agency to submit comments on the project.

Comments were received from the Engineering Department, Road Department, and Environmental Health Department, and have been incorporated into the conditions and mitigations measures where appropriate for the project.

WILLIAMSON ACT:

The property is not subject to a Williamson Act contract.

GENERAL PLAN CONSISTENCY:

The project site as proposed would amend the General Plan Designation to CC (Community Commercial) Designation and a Rezone from ARE-40 (Agricultural Rural Exclusive 40-Acre) District to CUM (Commercial Urban Median) District and PDD (Planned Development) District. These actions are consistent with each other and would also create consistency between the existing land uses adjacent to the project site.

RECOMMENDATION:

The analysis provided in this report supports approval of Mitigated Negative Declaration ND #2014-22 and Project #2014-006 as presented subject to the following conditions and Mitigation Monitoring and Reporting Program.

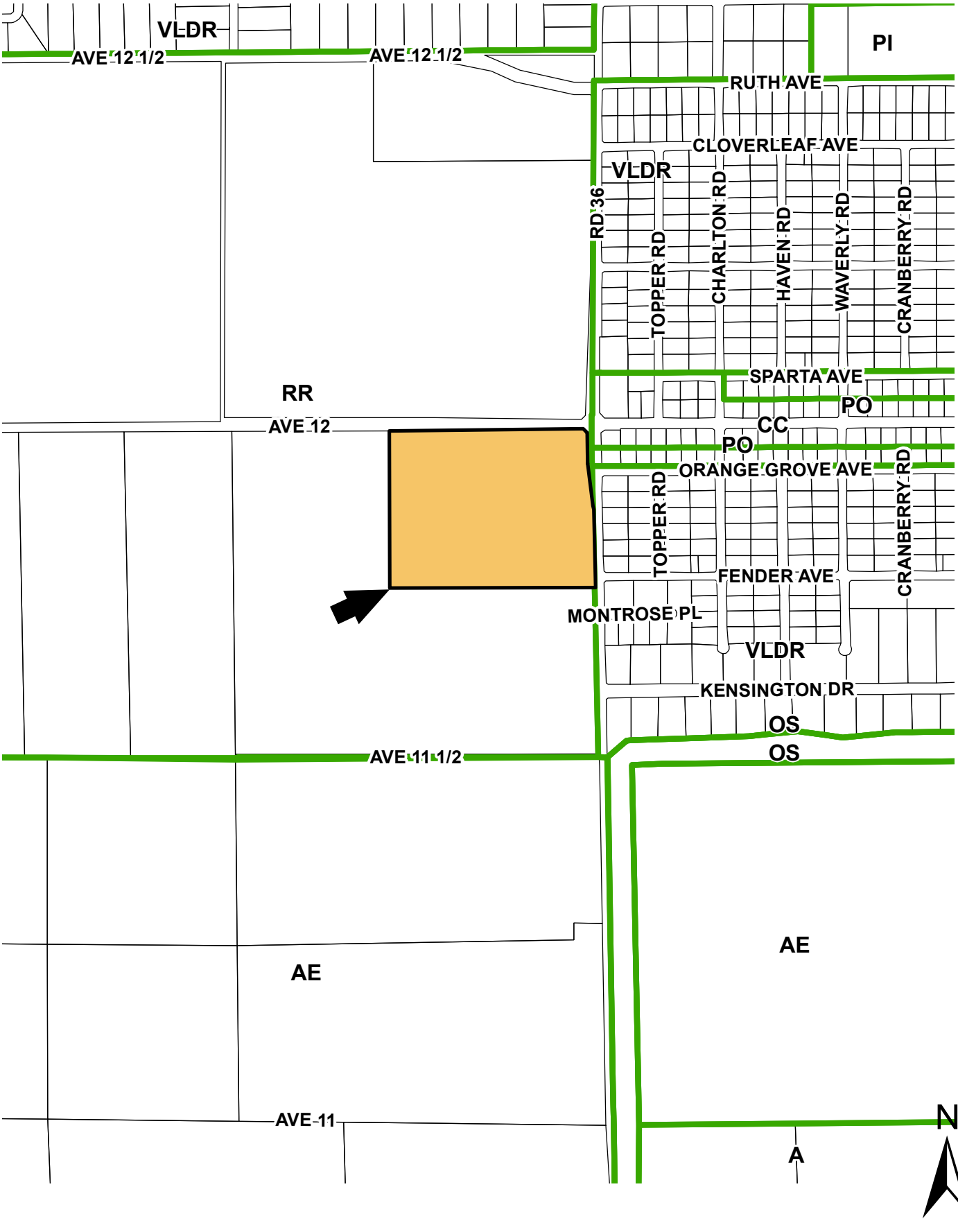
CONDITIONS:

See attached conditions of approval.

ATTACHMENTS:

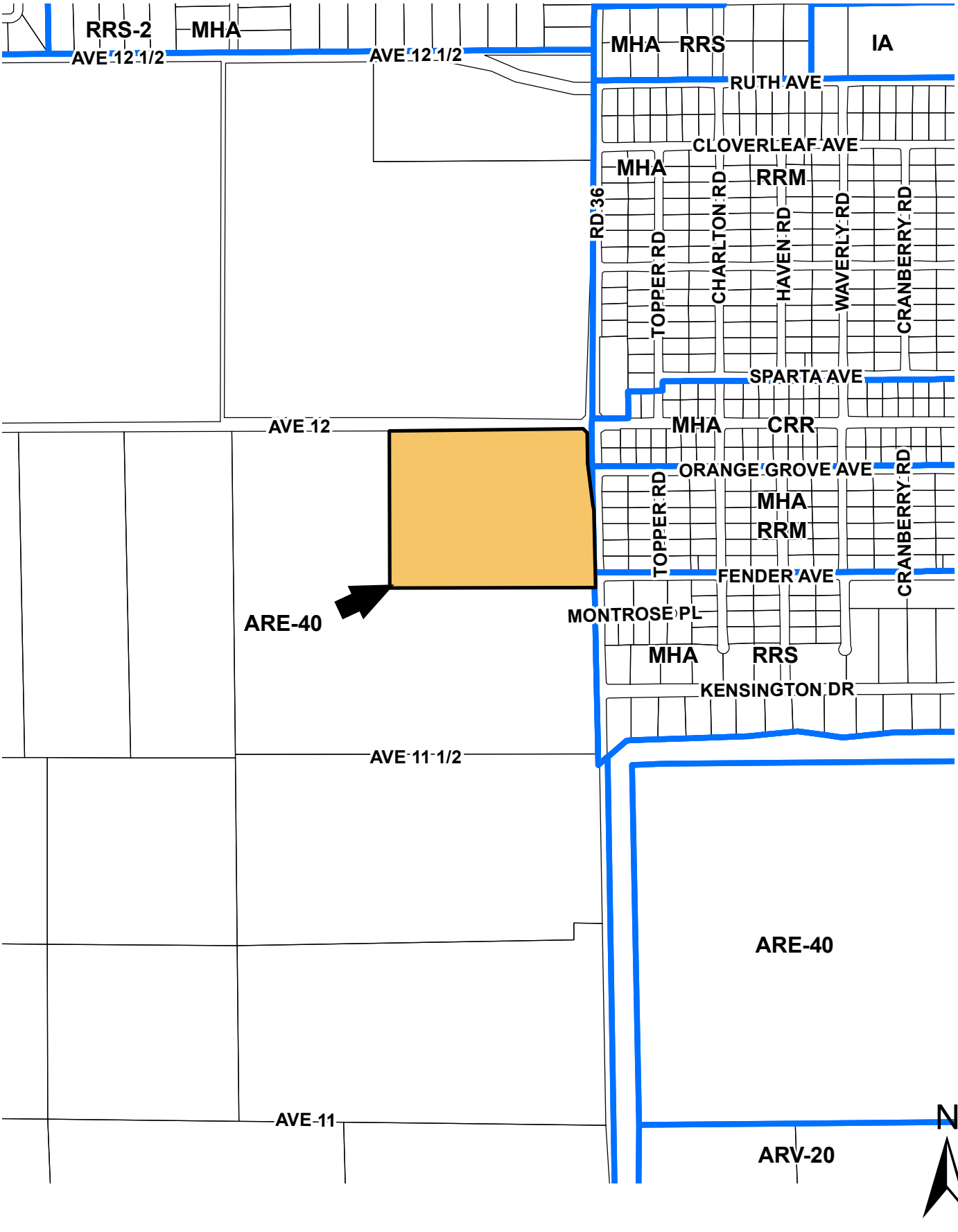
1. Exhibit A, General Plan Map
2. Exhibit B, Zoning Map
3 Exhibit C, Assessor's Map
4. Exhibit D, Site Plan Map
5. Exhibit E, Aerial Map
6. Exhibit F, Topographical Map
7. Exhibit G, Operational Statement
8. Exhibit H, Environmental Health Department Comments
9. Exhibit I, Road Department Comments
10. Exhibit J, Fire Department Comments
11. Exhibit K, San Joaquin Valley Air Pollution Control District
12. Exhibit L, CEQA Initial Study
13. Exhibit M, Mitigated Negative Declaration ND #2014-22
14. Exhibit N, Mitigation Monitoring Reporting Program
15. Exhibit O, Conditions of Approval
16. Exhibit P, Air Quality Analysis Report
17. Exhibit Q, Traffic Impact Analysis
18. Exhibit R, Biological Resources Analysis
19. Exhibit S, AdvanTex Treatment Systems

EXHIBIT A



GENERAL PLAN MAP

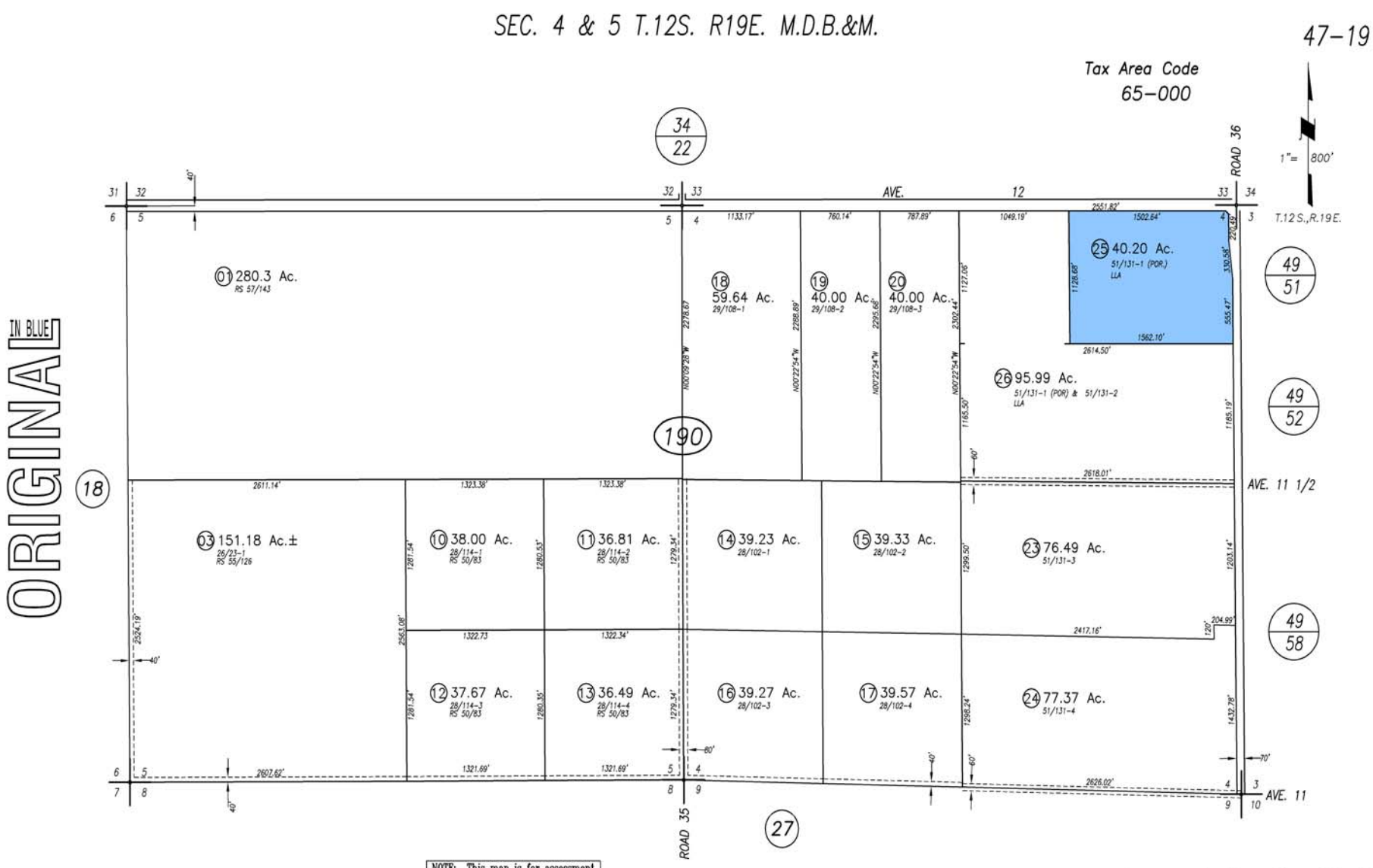
EXHIBIT B



ZONING MAP

ASSESSOR'S MAP

EXHIBIT C



NOTE: This map is for assessment purposes only and is not intended for interpretation of boundary rights, zoning regulations or land division.

NOTE– Assessor's Block Numbers Shown in Ellipses.
Assessor's Parcel Numbers Shown in Circles.

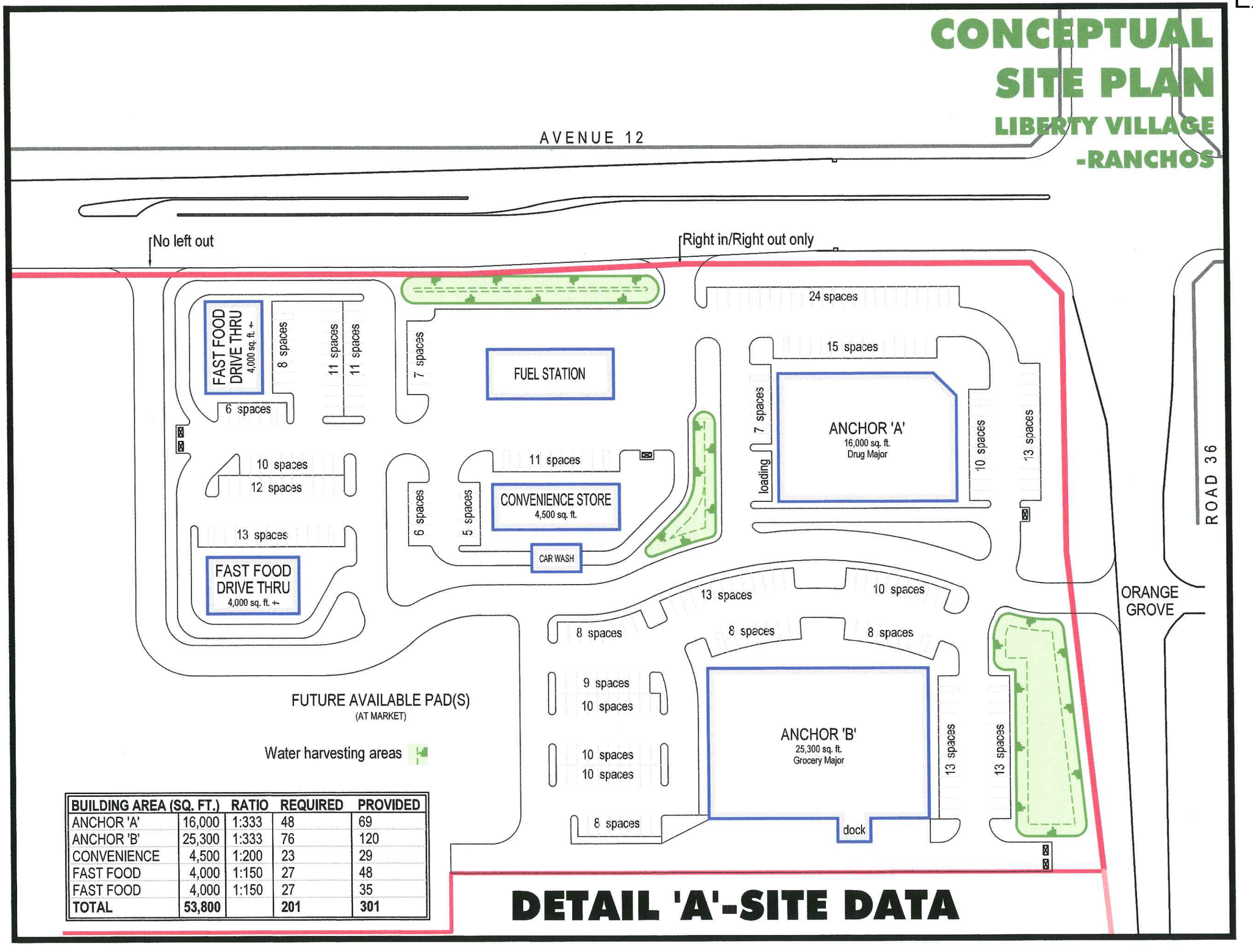
Assessor's Map No. 47–19
Golden Valley Unified
Eastin Arcola
County of Madera, Calif.
1955

08212-0-26 BLH

EXHIBIT D1

CONCEPTUAL SITE PLAN

LIBERTY VILLAGE -RANCHOS



BUILDING AREA (SQ. FT.)		RATIO	REQUIRED	PROVIDED
ANCHOR 'A'	16,000	1:333	48	69
ANCHOR 'B'	25,300	1:333	76	120
CONVENIENCE	4,500	1:200	23	29
FAST FOOD	4,000	1:150	27	48
FAST FOOD	4,000	1:150	27	35
TOTAL	**53,800**		**201**	**301**

DETAIL 'A'-SITE DATA

EXHIBIT D2

View to SW from Avenue 12

View to SE from Avenue 12

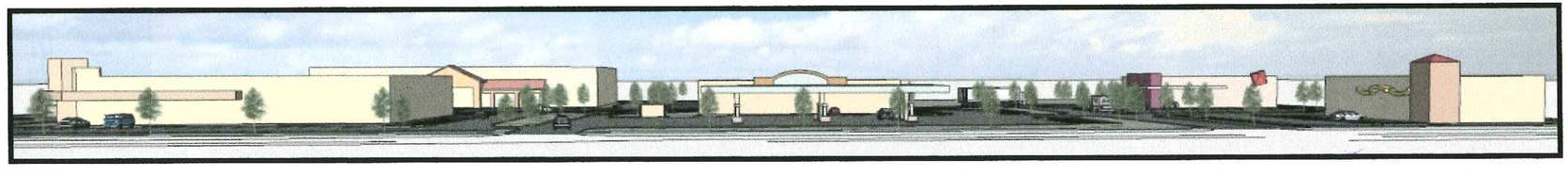
LIBERTY VILLAGE
At the Ranchos
Avenue 12 & Road 36
Madera, California 93636

Alan T. Hendry
Architect

41428 Avenue 10 1/2, Ste B
Madera, California 93636
559.473.1391 V.
775.261.0287 F.
alan@HendryArch.com E.
www.HendryArch.com W.

EXHIBIT D3

Aerial



View South from Liberty High

LIBERTY VILLAGE
At the Ranchos
Avenue 12 & Road 36
Madera, California 93636

Alan T. Hendry
Architect

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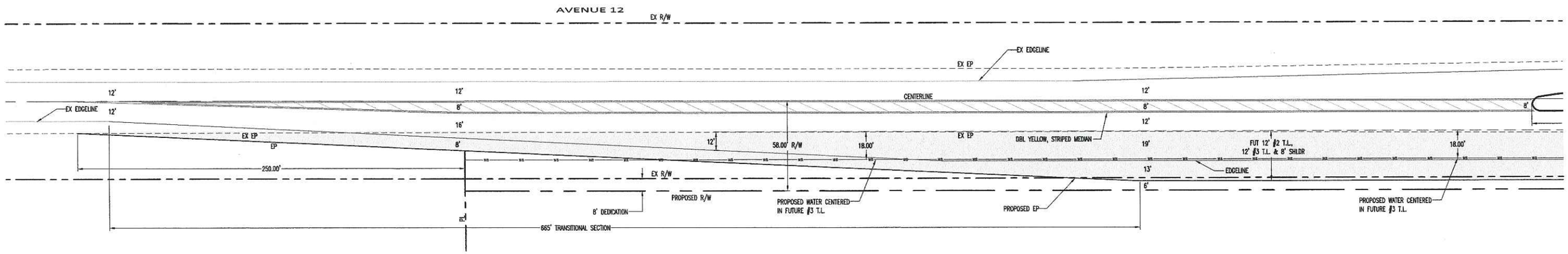
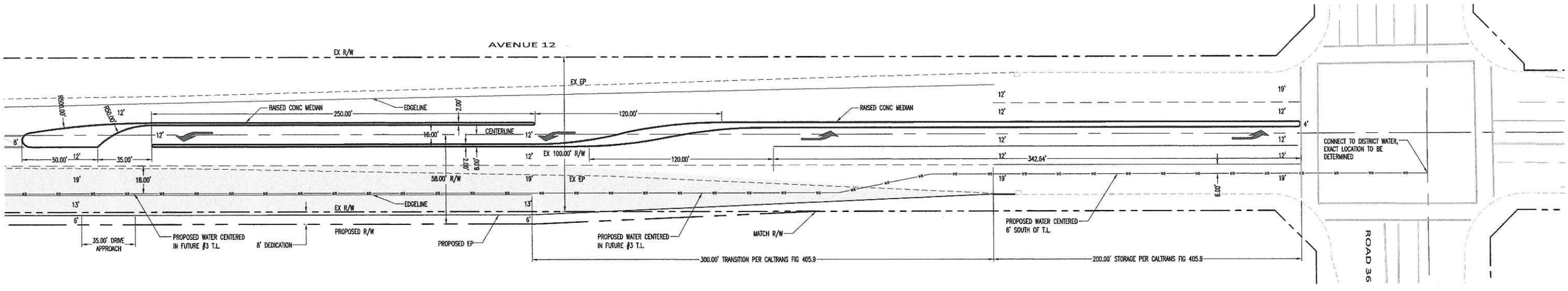
Madera, California 93636
559.473.1391 V.
775.261.0287 F.
alan@HendryArch.com E.
www.HendryArch.com W.

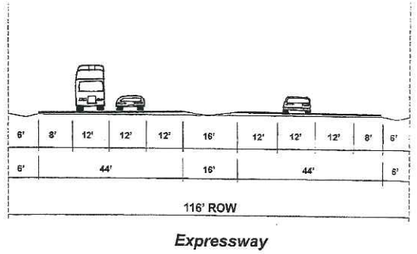
EXHIBIT D4



AVENUE 12



AVENUE 12



Expressway

NOTES:

1. IMPROVEMENTS SHOWN MAY BE CONSTRUCTED IN PHASES AND REPRESENT ULTIMATE DEVELOPMENT ON THE SOUTH SIDE OF AVENUE 12 ONLY.
2. THIS PLAN IS FOR GEOMETRIC APPROVAL OF STREET IMPROVEMENT AND APPROXIMATE FUTURE WATER LOCATIONS ONLY, DRAWING IS NOT FOR USE IN CONSTRUCTION OR ENCROACHMENT PERMITING

30 15 0 30
HORIZ. SCALE: 1"=30
VERT. SCALE: 1"=0

LIBERTY RANCHOS

CONCEPTUAL AVENUE 12
ULTIMATE STREET & WATER IMPROVEMENTS

MADERA COUNTY ROAD DEPARTMENT

LORE ENGINEERING, INC.
CIVIL ENGINEERING • CONSULTING • PLANNING
620 CLEWITT AVENUE, SUITE 101
CLOVIS, CA 93612
(559) 297-5200 TEL
(559) 297-5205 - FAX

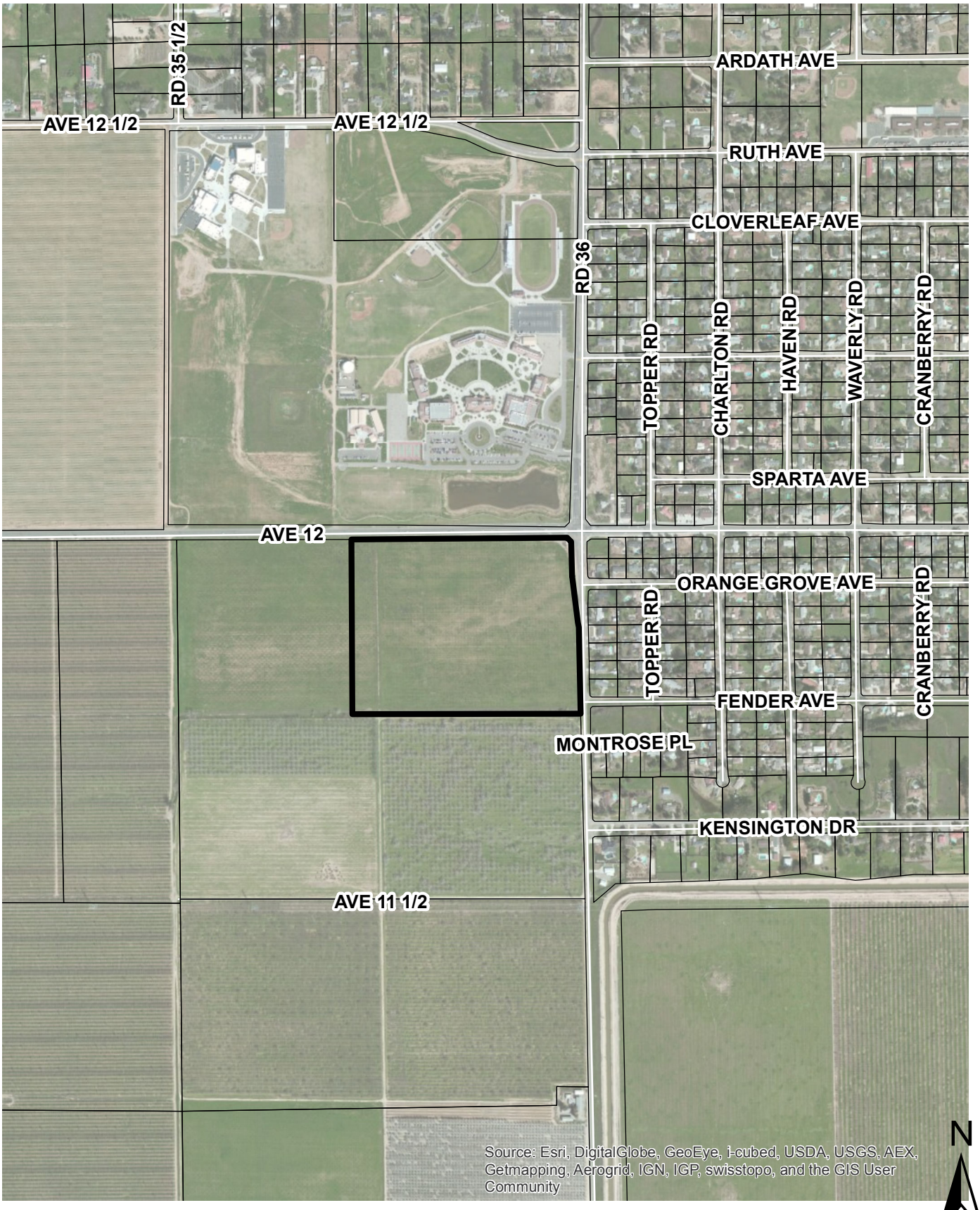
REGISTERED PROFESSIONAL ENGINEER
NEAL M. LORE
No. 54794
EXP. 3-31-15
CIVIL
STATE OF CALIFORNIA

REV NO	DESCRIPTION	DATE	BY	APPRVD BY

JOB: SRE.1401
SHEET NO: C-1
SHEET 1 OF 1
SCALE: 1" = 30'
DATE: 05/30/14
DRAWN BY: H.L.
CHECKED BY: H.L.

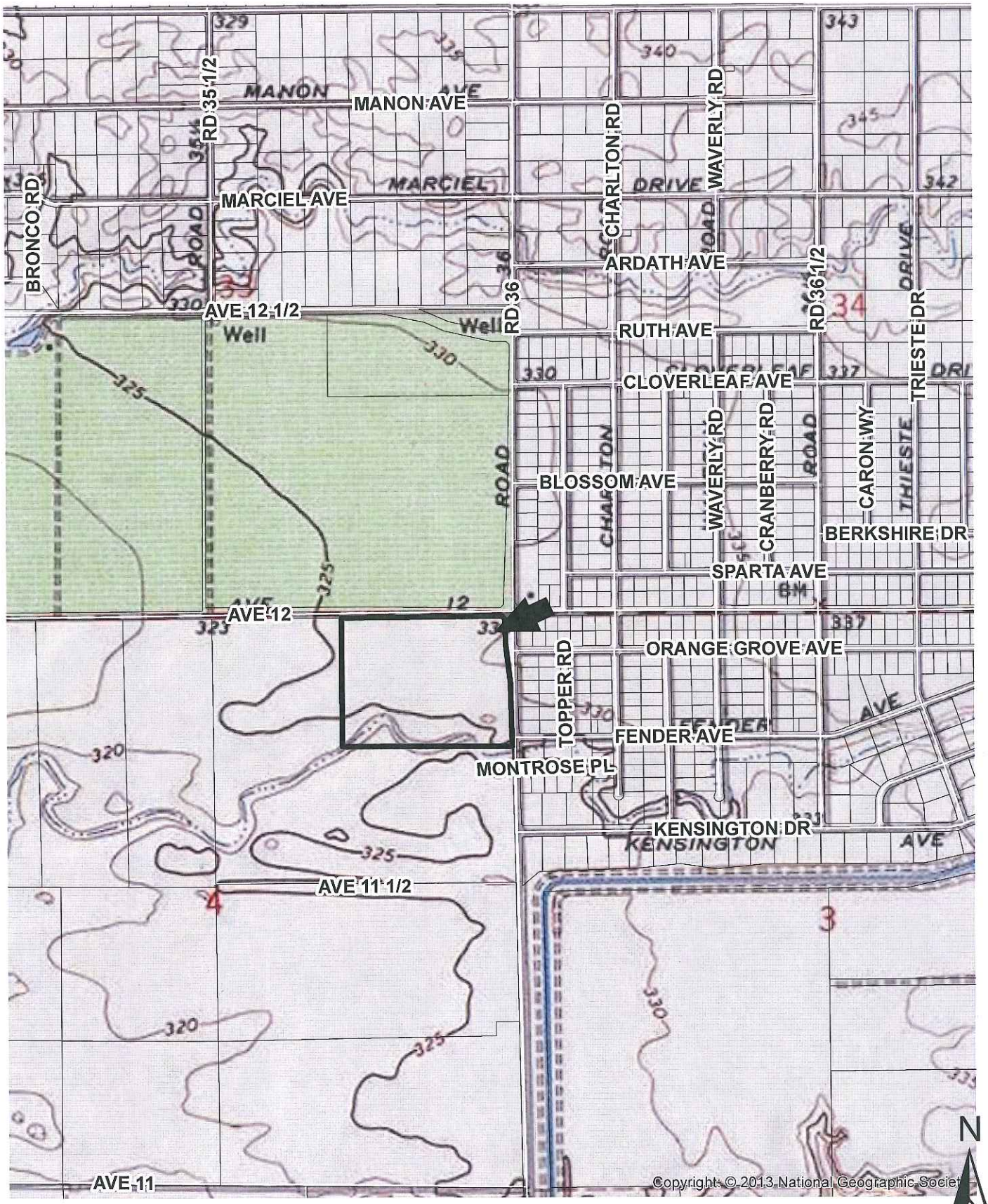
DWG: D:\PROJECTS\2014\SRE.1401\Acad\Xref\X-DSN_SRE1401-2004.dwg USER: Hal DATE: May 30, 2014 1:07pm

EXHIBIT E



AERIAL MAP

EXHIBIT F



TOPOGRAPHICAL MAP

SHAW REAL ESTATE & DEVELOPMENT
P.O. Box 1569
Oakhurst, CA 93644
Phone (559) 683-6222
E-Mail grshaw2@yahoo.com

OPERATIONAL/ENVIRONMENTAL STATEMENT CHECKLIST

1. Please provide the following information:
   Assessors Parcel Number: *APN 47-190-025 being commonly known as: Liberty Village at the Ranchos, (the "Project") Madera Ranchos, CA*
   Applicants Name: *Russell Shaw for G.C. Brown Developers, Inc. as authorized agent.*
   Address: *c/o P.O. Box 1569, Oakhurst, CA 93644*
   Phone Number: *c/o (520) 906-4984*
   Email: *grshaw2@yahoo.com*

2. Describe the nature of your proposal/operation (please be specific)
   The subject land, which has been historically agricultural in function, is on the western edge of the Madera Ranchos Residential community and across from Liberty High School at the Southwest corner of the signalized intersection of Madera County Avenue12 and Madera County Road 36. This proposal is to promote the logical conversion of the property from agricultural to community commercial to enable the development of an integrated retail center to fully serve the citizenry of the Madera Ranchos community. This project, when completed, will afford the opportunity for the residents of the Ranchos to shop locally for goods and services otherwise requiring travels to other destinations the in the City of Fresno or the City of Madera.

3. What is the existing use of the property?
   Vacant – Agricultural, previously farmed in Almonds until approximately 2001

4. What products will be produced by the operation? Will they be produced on-site or at some other location? Are these products to be sole on-site? Explain.
   No manufactured products will be produced at this retail location. The intended use will be the sales and distribution of normal retail products and services.

5. What are the proposed operational time limits?
   Months (if seasonal): *January – December*
   Days per week: *Basically 7days a week*

Hours *Varies by business*
Total hours per day: *12 to 24 hours per day, business dependent*

6. Will there be any special activities or events?
   No, project wide organized special activities anticipated or projected, but the various businesses and tenants may initiate some unique specials or special sales events
   Frequency: *Variable*
   Hours: *Variable*
   Are these activities indoors or outdoors? *Variable*

7. How many customers or visitors are expected?
   Average number per day: *The project, at full build out, is expected to add approximately 5500 new daily trips with 450 of those trips being during the peak p.m. hour. (2 trips = 1 visit to the site)*
   Maximum number per day: *At full build out, it is expected that a maximum of approximately 5,550 trips will occur at the site*
   What hours will customers/visitors be there? *The hours of operation will vary by business.*

8. How many employees will there be?
   Current: *Not applicable*
   Future: *Approximately 200 to 300 new jobs will be created in the project*
   Hours they work: *Normally 8 hours/day.*
   Do any live on site? If so, in what capacity (i.e., caretaker)?
   No employees will be living on-site.

9. What equipment, materials, or supplies will be used and how will they be stored? If appropriate, provide pictures or brochures.
   Materials and supplies will be normally stored inside the respective facilities or in designated storage areas.

10. Will there be any service and delivery vehicles:
    Number: *Approximately 25-100 service and delivery vehicles will arrive at the site at full build out.*
    Type: *Normal trucks and some truck and trailers.*
    Frequency: *On a as needed basis, approximately 2,000 per month at full build out.*

11. Number of parking spaces for employees, customers, and service/delivery vehicles. Type of surfacing on parking area.
    There will be a total of 301 stripped parking stalls in the AC parking lot area serving the respective businesses, which would total 53800 square footage of retail space. Delivery personnel will have available parking in the general parking area, or in designated loading

zones. Accordingly, the average parking ratio is 5.59 spaces per each 1000 square foot of building space.

12. How will access be provided to the property/project? (Street name)
    There are two (2) possible routes of access to the project off of either Madera County Avenue 12 or Madera County Road 36. The Madera County Road Department officials have been consulted and an accord with respect to access for the CUM zoned portion has been reached and is reflected in the full application package.

13. Estimate the number and type (i.e., cars, trucks) of vehicular trips per day that will be generated by the proposed development.
    Estimate trip movements on average day = 2750 (cars and trucks) at full build out. (Based on KP Anderson Traffic Impact Analysis)

14. Describe any proposed advertising including size, appearance, and placement.
    The site will be uniquely identified by a 300 Sq. Ft. Monument Sign at the corner of the site near the intersection of Road 36 & Avenue 12, which should provide guidance to its customers as to necessary trip movements. Moreover, each building will have code compliant business signage.

15. Will existing buildings be used or will new buildings be constructed? Indicate which building(s) or portion(s) of will be utilized and describe the type of construction materials, height color, etc. Provide floor plan and elevations, if appropriate.
    The site is vacant and will be improved with the construction of new retail improvements in general conformance with the Conceptual Building Elevations in the general locations as depicted on the included Conceptual Site Plan Building. A color pictorial of both are provided herein.

16. Is there any landscaping or fencing proposed? Describe location.
    Yes, there are some proposed landscaped areas as shown on the Conceptual Site Plans.

17. What are surrounding land uses to the north, south, east, and west boundaries of the property?
    The property to the North is the Liberty High School.
    The property to the East are developed residential uses;
    The property to the West, is a developed Agricultural and;
    The property to the South are vacant and developed Agricultural

18. Will this operation or equipment used generate noise above existing parcels in the area?

No – The noise generated at this facility will not be unusual or extraordinary. Existing surrounding properties are vacant and unimproved so there are no existing ambient background noise standard.

19. On a daily or annual basis, estimate how much water will be used by the proposed development, and how is water to be supplied to the proposed development (please be specific).

The Project shall being annexed to be within the service area of County Maintenance District 10. All water mainlines shall be installed and shall be operational within the boundary of the subject property. On a daily basis, at full build out, approximately 6775 gallons per business day will be the consumptive water use, including an allowance for seasonal landscaping.

20. On a daily or weekly basis, how much wastewater will be generated by the proposed project and how will it be disposed of?

Approximately 5285 gallons per day of wastewater will be generated at full build out. The project shall utilize a package sewer treatment plant and subsurface disposal areas.

21. On a daily or weekly basis, how much solid waste (garbage) will be generated by the proposed project and how will it be disposed of?

The Project is serviced by Red Rock Environmental Group with respect to solid waste. The project is expected to generate approximately 50 yards of solid waste per week.

22. Will there be any grading? Tree removal? (please state the purpose, i.e. for roads, building pads, drainage, etc.)

There will be no tree removals as the site is devoid of any since the Almond farming operations have ceased. Grading of the site is necessary to facilitate the future construction activities at the site.

23. Are there any archeological or historically significant sites located on this Property? If so, describe and show location on site plan.

No archeological or historically significant sites were discovered during professional studies of the property, see exhibit attached hereto and made a part hereof by this reference.

24. Locate and show all bodies of water on application plot plan or attached map.

No bodies of water are on the subject site.

25. Show any ravines, gullies, and natural drainage courses on the property on the plot plan.

There are no ravines, gullies or natural drainage courses on the subject property.

26. Will hazardous materials or waste be produced as part of the project? If so, how will they be shipped or disposed of?

No hazardous waste will be produced as a result of this project being improved and constructed.

27. Will your proposal require use of any public services or facilities? (i.e., schools, parks, fire and police protection or special districts?)

Schools and parks will not be significantly impacted by this Project. Fire, police, and special services usage will be minimal, and the resulting taxation will provide more funding for such services.

28. How do you see this development impacting the surrounding area?

The development will integrate nicely into the surrounding area and will provide a much needed outlet for necessary goods and services for the Madera Ranchos Community.

29. How do you see this development impacting schools, parks, fire and police protection or special districts?

There will be a moderate proportional impact to fire & police. There will be a positive impact to the schools and the project will be donating land for a much needed community park. The proponent and the County shall agree to the certification of a donation value based upon an appraisal made of the donated property by a licensed MIA appraiser at the sole cost of the proponent.

30. If your proposal is for commercial or industrial development, please complete the following:

Proposed use(s) *Commercial Retail complex*
Square Feet of Building Area(s) – *Approximately 53,800 square Feet proposed*
Total Number of Employees – *200-300*
Building Height(s) – *Approximately 14 feet to 30 feet for the larger facilities*

31. If your proposal is for a land division(s), show any slopes over 10% on the map or on an attached map

No land division is contemplated by this proposed action, further, the site is generally level and no slopes over 10% exist.

RESOURCE MANAGEMENT AGENCY
Environmental Health Department
Jill Yaeger, Director
· 2037 West Cleveland Avenue
· Madera, CA 93637
, (559) 675-7823

MEMORANDUM

TO: Matt Treber

FROM: Environmental Health Department

DATE: August 28, 2014

RE: Shaw, Garland Russell - Project - BdS - Madera (047-190-025-000)

Comments

TO:Planning Department

FROM:Environmental Health Department

DATE:July 10, 2014

RE:BOS Project PRJ#2014-006 Garland Russell Shaw, Madera,
APN 047-190-025

Environmental Health Department comments/conditions:

This proposed project shall be served by a community water system. Water services for any structure(s), within this development must be connected to an approved community water system. [MCC 17.48.020] This development is located within Madera County Service Area (CSA) MD 10A and is included with the County Sewer Master Plan and therefore shall connect to it as an approved community water system. The project shall comply with all CSA requirements.

The proposed project shall be served by a community sewer system to which all of the structure(s) within the proposed project shall connect. Sewer service for all structure(s) within the project must be connected to an approved community sewer system that is approved by Regional Water Quality Control Board (RWQCB).

The construction and then ongoing operation must be done in a manner that shall not allow any type of public nuisance(s) to occur including but not limited to the following nuisance(s); Dust, Odor(s), Noise(s), Lighting, Vector(s) or Litter. This must be accomplished under accepted and approved Best Management Practices (BMP) and as required by the County General Plan, County Ordinances and any other related State and/or Federal jurisdiction.

Solid waste collection with sorting for green, recycle, and garbage is required.

During the application process for required County permits, a more detailed review of the proposed projects compliance with all current local, state & federal requirements will be reviewed by this department. The owner/operator of this property must submit all applicable permit applications to be reviewed and approved by this department prior to commencement of any work activities.

If there are any questions or comments regarding these conditions/requirements or for copies of any Environmental Health Permit Application forms, please contact this department at (559) 675-7823, M-F, 8:00 AM to 5:00 PM.

COUNTY OF MADERA
DEPARTMENT OF PUBLIC WORKS

- 2037 West Cleveland Avenue
- Madera, CA 93637-8720
- (559) 675-7811 Road
- (559) 675-7817 Engineering
- (559) 675-7820 Special Districts

JOHANNES J. HOEVERTSZ
DIRECTOR

MEMORANDUM

DATE: August 28, 2014

TO: Matt Treber

FROM: Road Department

SUBJECT: Shaw, Garland Russell - Project - BdS - Madera (047-190-025-000)

The Road Department has reviewed the above-noted project for a proposed community commercial development in Madera Ranchos. The Road Department recommends approval with the conditions listed below. The project is located along the south side of Avenue 12 and on the west side of Road 36. The General Plan has the site designated as RR (Rural Residential) and will be changed to CC (Community Commercial). It is currently Zoned as ARE-40 (Agricultural, Rural, Exclusive 40 Acres) and will be changed to CUM (Commercial Urban Median). There is also a proposed Library site requiring a General Plan designation of PI (Public Institutional) and Zoned IA (Institutional Area) for a 2.5 acre site within the project site.

Main access will be along Avenue 12 which is designated as a Limited Express Way requiring 116 ft of right-of-way with a width of 58 ft along the project side of Avenue 12. There is currently only 50 ft of right of way thus requiring an additional 8 ft to be Grant Deeded to the County. The portion along Road 36 is designated as a 80 ft Arterial Road. There is currently 73 ft at the intersection of Avenue 12 tapering to 40 ft Grant Deeded to the County.

The proposed site plan shown on Exhibit D1 indicates all locations of driveway approaches which were previousely discussed and were granted preliminary approval by the Road Department.

THE ROAD DEPARTMENT RECOMMENDS THE FOLLOWING CONDITIONS OF APPROVAL:

1.As a condition of approval of the PRJ, the applicant shall grant deed a strip of land 8 ft wide contiguous to Avenue 12.

2.Proposed access location along the project site as depicted by the exihibits provided with the application package has been given preliminary approval.

3.Prior to any construction within the right of way, the applicant is required to apply for and obtain an Encroachment Permit from the Road Department. Once this permit is secured, the applicant may commence with construction.

MADERA COUNTY FIRE DEPARTMENT

IN COOPERATION WITH
CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION

2037 W. CLEVELAND
MADERA, CALIFORNIA 93637
(559) 661-6333
(559) 675-6973 FAX

DEBORAH KEENAN
MADERA COUNTY FIRE MARSHAL

M E M O R A N D U M

TO: Matt Treber

FROM: Deborah Keenan, Fire Marshal

DATE: August 28, 2014

RE: Shaw, Garland Russell - Project - BdS - Madera (047-190-025-000)

Conditions

The existing water system supplying the fire hydrant system in the area is currently unable to support the demand of the current proposal. This project will be required to meet the Fire Flow requirements for commercial buildings per the California Fire Code adopted at the time building permits are applied for.

At the time of application for a Building Permit, a more in-depth plan review of the proposed projectôs compliance with all current fire and life safety codes will be conducted by the Madera County Fire Marshal. (CFC, Section 105)

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

July 16, 2014

Matt Treber
County of Madera
Planning Department
2037 W. Cleveland Avenue
Madera, CA 93637

Project: PRJ #2014-006, Shaw, Garland Russell – Project BdS – Madera (047-190-025-000)

District CEQA Reference No: 20140468

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the project referenced above consisting of amending the General Plan from RR (Rural Residential) to CC (Community Commercial) and rezoning from ARE-40 (Agriculture, Rural, Exclusive, 40 Acre) District to CUM (Commercial, Urban, Median) District to allow commercial development consisting of approximately 53,000 square feet on a 40.2 acre site (APN# 047-190-025). The project is located on the southwest corner of Avenue 12 and Road 36 in Madera, CA. The District offers the following comments:

Emissions Analysis

1) Based on the Operational/Environmental Statement Checklist, the commercial development (proposed project) may exceed the following thresholds of significance: 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), or 15 tons per year particulate matter of 10 microns or less in size (PM10). The District recommends that the Air Quality section include a discussion of the following impacts:

   a) **Criteria Pollutants:** Project related criteria pollutant emissions should be identified and quantified. The discussion should include existing and post-project emissions.

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

i) Construction Emissions: Construction emissions are short-term emissions and should be evaluated separate from operational emissions. The District recommends preparation of an Environmental Impact Report (EIR) if annual construction emissions cannot be reduced or mitigated to below the following levels of significance: 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), or 15 tons per year particulate matter of 10 microns or less in size (PM10).

- *Recommended Mitigation:* To reduce impacts from construction related exhaust emissions, the District recommends feasible mitigation for the project to utilize off-road construction fleets that can achieve fleet average emissions equal to or cleaner than the Tier II emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations. This can be achieved through any combination of uncontrolled engines and engines complying with Tier II and above engine standards.

ii) Operational Emissions: Permitted (stationary sources) and non-permitted (mobile sources) sources should be analyzed separately. The District recommends preparation of an Environmental Impact Report (EIR) if the sum of annual permitted and non-permitted emissions cannot be reduced or mitigated to below the following levels of significance: 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), or 15 tons per year particulate matter of 10 microns or less in size (PM10).

- *Recommended Mitigation:* Project related impacts on air quality can be reduced through incorporation of design elements, for example, that increase energy efficiency, reduce vehicle miles traveled, and reduce construction exhaust related emissions. However, design elements and compliance with District rules and regulations may not be sufficient to reduce project related impacts on air quality to a less than significant level. Another example of a feasible mitigation measure is the mitigation of project emissions through a Voluntary Emission Reduction Agreement (VERA). The VERA is an instrument by which the project proponent provides monies to the District, which is used by the District to fund emission reduction projects that achieve the reductions required by the lead agency. District staff is available to meet with project proponents to discuss a VERA for specific projects. For more information, or questions concerning this topic, please call District Staff at (559) 230-6000.

iii) Recommended Model: Project related criteria pollutant emissions should be identified and quantified. Emissions analysis should be performed using CalEEMod (**Cal**ifornia **E**mission **E**stimator **Mod**el), which uses the most recent approved version of relevant Air Resources Board (ARB) emissions models and emission factors. CalEEMod is available to the public and can be downloaded from the CalEEMod website at: www.caleemod.com.

b) **Nuisance Odors:** The proposed project should be evaluated to determine the likelihood that the project would result in nuisance odors. Nuisance orders are subjective, thus the District has not established thresholds of significance for nuisance odors. Nuisance odors may be assessed qualitatively taking into consideration of project design elements and proximity to off-site receptors that potentially would be exposed objectionable odors.

c) **Health Impacts:** Project related health impacts should be evaluated to determine if emissions of toxic air contaminants (TAC) will pose a significant health risk to nearby sensitive receptors. TACs are defined as air pollutants that which may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. The most common source of TACs can be attributed to diesel exhaust fumes that are emitted from both stationary and mobile sources. Health impacts may require a detailed health risk assessment (HRA).

Prior to conducting an HRA, an applicant may perform a prioritization on all sources of emissions to determine if it is necessary to conduct an HRA. A prioritization is a screening tool used to identify projects that may have significant health impacts. If the project has a prioritization score of 1.0 or more, the project has the potential to exceed the District's significance threshold for health impacts of 10 in a million and an HRA should be performed.

If an HRA is to be performed, it is recommended that the project proponent contact the District to review the proposed modeling approach. The project would be considered to have a significant health risk if the HRA demonstrates that project related health impacts would exceed the District's significance threshold of 10 in a million.

More information on TACs, prioritizations and HRAs can be obtained by:

- E-mailing inquiries to: hramodeler@valleyair.org; or
- Visiting the District's website at:

  http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm.

2) In addition to the discussions on potential impacts identified above, the District recommends the EIR also include the following discussions:

a) A discussion of the methodology, model assumptions, inputs and results used in characterizing the project's impact on air quality. To comply with CEQA requirements for full disclosure, the District recommends that the modeling outputs be provided as appendices to the EIR. The District further recommends that the District be provided with an electronic copy of all input and output files for all modeling.

b) A discussion of the components and phases of the project and the associated emission projections, including ongoing emissions from each previous phase.

c) A discussion of project design elements and mitigation measures, including characterization of the effectiveness of each mitigation measure incorporated into the project.

d) A discussion of whether the project would result in a cumulatively considerable net increase of any criteria pollutant or precursor for which the San Joaquin Valley Air Basin is in non-attainment. More information on the District's attainment status can be found online by visiting the District's website at:

http://valleyair.org/aqinfo/attainment.htm.

District Rules and Regulations

3) The proposed project may be subject to District rules and regulations, including: Regulation VIII (Fugitive PM10 Prohibitions), Rule 4102 (Nuisance), and Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations). In the event an existing building will be renovated, partially demolished or removed, the project may be subject to District Rule 4002 (National Emission Standards for Hazardous Air Pollutants).

4) The proposed project may require District permits. Prior to the start of construction the project proponent should contact the District's Small Business Assistance Office at (559) 230-5888 to determine if an Authority to Construct (ATC) is required.

5) Based on information provided, the proposed project would equal or exceed the relevant District Rule 9510 (Indirect Source Review) applicability threshold of 2,000 square feet of commercial space. Therefore, the District concludes that the proposed project is subject to District Rule 9510.

   Any applicant subject to District Rule 9510 is required to submit an Air Impact Assessment (AIA) application to the District no later than applying for final discretionary approval, and to pay any applicable off-site mitigation fees before issuance of the first building permit. If approval of the subject project constitutes the last discretionary approval by your agency, the District recommends that demonstration of compliance with District Rule 9510, including payment of all applicable fees before issuance of the first building permit, be made a condition of project approval. Information about how to comply with District Rule 9510 can be found online at: http://www.valleyair.org/ISR/ISRHome.htm.

6) The above list of rules is neither exhaustive nor exclusive. To identify other District rules or regulations that apply to this proposed project or to obtain information about District permit requirements, the applicant is strongly encouraged to contact the District's Small Business Assistance (SBA) Office at (559) 230-5888. Current District rules can be found online at: www.valleyair.org/rules/1ruleslist.htm.

The District recommends that a copy of the District's comments be provided to the project proponent. If you have any questions or require further information, please call Sharla Yang at (559) 230-5934.

Sincerely,

Arnaud Marjollet
Director of Permit Services

Sharla Yang

For Chay Thao
Program Manager

AM: sy

Cc: File

Environmental Checklist Form

Title of Proposal: Project #2014-006 Garland Russell Shaw

Date Checklist Submitted: 8/7/2014

Agency Requiring Checklist: Madera County Planning Department

Agency Contact: Matt Treber, Senior Planner **Phone:** (559) 675-7821

Description of Initial Study/Requirement

The Initial Study is a public document used by the decision-making lead agency to determine whether a project may have significant effects on the environment. In the case of the proposed project, the Madera County Planning Department, acting as lead agency, will use the initial study to determine whether the project has a significant effect on the environment. In accordance with CEQA, Guidelines (Section 15063[a]), an environmental impact report (EIR) must be prepared if there is substantial evidence (such as results of the Initial Study) that a project may have significant effect on the environment. This is true regardless of whether the overall effect of the project would be adverse or beneficial. A negative declaration (ND) or mitigated negative declaration (MND) may be prepared if the lead agency determines that the project would have no potentially significant impacts or that revisions to the project, or measures agreed to by the applicant, mitigate the potentially significant impacts to a less-than-significant level.

The initial study considers and evaluates all aspects of the project which are necessary to support the proposal. The complete project description includes the site plan, operational statement, and other supporting materials which are available in the project file at the office of the Madera County Planning Department.

Description of Project:
This project consists of a General Plan Amendment and Rezone on 40.2 acres. The General Plan Amendment would take the existing RR (Rural Residential) Designation to CC (Community Commercial) Designation. The Rezoning would take the existing ARE-40 (Agricultural, Rural, Exclusive 40-Acre) District to CUM (Commercial Urban Median), and PDD (Planned Development) District.

Project Location:
The project is located at the southwest corner of Avenue 12 and Road 36 in Madera, (No Situs is Available).

Applicant Name and Address:
Russell Shaw
PO Box 1569
Oakhurst CA 93644

General Plan Designation:
RR – Rural Residential

Zoning Designation:
ARE-40 – Agricultural Rural Exclusive 40-Acre District

Surrounding Land Uses and Setting:
Institutional, Residential, Commercial, and Agricultural

Other Public Agencies whose approval is required:
None

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

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

☐ 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	☐ Utilities / Service Systems	☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

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

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

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

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

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

Signature _____ Date _____

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?	☐	☒	☐	☐

Discussion:

(a) No Impact
The project site is not located in an area which would have an effect on a scenic vista. There are no identified scenic vistas within the vicinity of the project site that could be impacted

(b) No Impact
The project site is not located within a state scenic highway.

(c) Less than Significant Impact
The project is a request for a General Plan Amendment and Rezone to permit the development of commercial and institutional uses on the subject property. The property has been farmed with crops in the past, however is currently not in agriculture production. The property does not maintain any substantial visual character or quality and therefore the impact is less than significant.

(d) Less than Significant Impact with Mitigation Incorporated
The project could have the potential to create a new source of light or glare, however with the appropriate mitigation measures as discussed in the mitigated negative declaration for the project it would be a less than significant impact.

General Information:

A nighttime sky in which stars are readily visible is often considered a valuable scenic/visual resource. In urban areas, views of the nighttime sky are being diminished by "light pollution." Light pollution, as defined by the International dark-Sky Association, is any adverse effect of artificial light, including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste. Two elements of light pollution may affect city residents: sky glow and light trespass. Sky glow is a result of light fixtures that emit a portion of their light directly upward into the sky where light scatters, creating an orange-yellow glow above a city or town. This light can interfere with views of the nighttime sky and can diminish the number of stars that are visible. Light trespass occurs when poorly shielded or poorly aimed fixtures cast light into unwanted areas, such as neighboring property and homes.

Light pollution is a problem most typically associated with urban areas. Lighting is necessary for nighttime viewing and for security purposes. However, excessive lighting or inappropriately designed lighting fixtures can disturb nearby sensitive land uses through indirect illumination. Land uses which are considered "sensitive" to this unwanted light include residences, hospitals, and care homes.

Daytime sources of glare include reflections off of light-colored surfaces, windows, and metal details on cars traveling on nearby roadways. The amount of glare depends on the intensity and direction of sunlight, which is more acute at sunrise and subset because the angle of the sun is lower during these times.

III. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. 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 Resource Code section 12220(g)) or timberland (as defined by Public Resources Code section 4526) or timberland zoned Timberland Protection (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest land?	☐	☐	☐	☒
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 forest land to non-forest use?	☐	☐	☐	☒

Discussion:

(a) No Impact
The subject property does not consist of any prime farmland, or farmland of statewide importance. The property is not within the vicinity of any forest land and there is no possibility that the subject project would convert any forest land to non forest land. The property is currently mapped as Unique Farmland, however the property has not been cultivated for several years, and it would result in a less than significant impact.

(b) No Impact
The property is not subject to a Williamson act contract or agricultural use, and would not conflict with the agricultural use of any surrounding properties.

(c-d) No Impact
The project site is not within a forested area, and therefore would not impact any existing or planned zoning of forest lands.

(e) No Impact
The proposed development is primarily surrounded by residential, institutional, and commercial properties, and therefore would not result in the conversion of farmland or forest to non-agricultural or non-forest use.

General Information

The California Land Conservation Act of 1965--commonly referred to as the Williamson Act--enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value.

The Department of Conservation oversees the Farmland Mapping and Monitoring Program. The Farmland Mapping and Monitoring Program (FMMP) produce maps and statistical data used for analyzing impacts on

California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status; the best quality land is called Prime Farmland. The maps are updated every two years with the use of a computer mapping system, aerial imagery, public review, and field reconnaissance. The program's definition of land is below:

PRIME FARMLAND (P): Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

FARMLAND OF STATEWIDE IMPORTANCE (S): Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

UNIQUE FARMLAND (U): Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.

FARMLAND OF LOCAL IMPORTANCE (L): Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

GRAZING LAND (G): Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities. The minimum mapping unit for Grazing Land is 40 acres.

URBAN AND BUILT-UP LAND (D): Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, institutional, public administrative purposes, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.

OTHER LAND (X): Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than 40 acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.

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?	☐	☐	☒	☐

Discussion:

(a) Less than Significant Impact

With the implementation of the San Joaquin Valley Air Pollution Control District permits it will result in a less than significant impact.

(b-c) Less than Significant Impact

The project would allow the construction of a commercial shopping center and governmental library. The project will result in impact on air quality primarily during the construction phase. With the adherence to the San Joaquin Valley Air Pollution Control District regulations the potential to violate any air quality standard or increases to criteria pollutant for the San Joaquin Valley basin will be less than significant.

(d) Less than Significant Impact

The project site is adjacent to the Liberty High School, and would permit the construction of a shopping center and governmental library facility. The majority of concerns related to air quality impact would be the result of the construction of the proposed facility. It is assumed that the majority of the construction phases for the project would occur outside of normal school operations (during summer); however with the implementation of the San Joaquin Valley Air Pollution Control District permits the impact will be less than significant.

(e) Less than Significant Impact

The development of a community shopping center and governmental library facility would not create objectionable odors, however during the construction phase there is a potential that odors from heavy diesel equipment could occur, but due to the short duration it is anticipated to be a less than significant impact

General Information

Global Climate Change

Climate change is a shift in the "average weather" that a given region experiences. This is measured by changes in temperature, wind patterns, precipitation, and storms. Global climate is the change in the climate of the earth as a whole. It can occur naturally, as in the case of an ice age, or occur as a result of anthropogenic activities. The extent to which anthropogenic activities influence climate change has been the subject of extensive scientific inquiry in the past several decades. The Intergovernmental Panel on Climate Change (IPCC), recognized as the leading research body on the subject, issued its Fourth Assessment Report in February 2007, which asserted that there is "very high confidence" (by IPCC definition a 9 in 10 chance of being correct) that human activities have resulted in a net warming of the planet since 1750.

CEQA requires an agency to engage in forecasting "to the extent that an activity could reasonably be expected under the circumstances. An agency cannot be expected to predict the future course of governmental regulation or exactly what information scientific advances may ultimately reveal" (CEQA Guidelines Section 15144, Office of Planning and Research commentary, citing the California Supreme Court decision in Laurel Heights Improvement Association v. Regents of the University of California [1988] 47 Cal. 3d 376).

Recent concerns over global warming have created a greater interest in greenhouse gases (GHG) and their contribution to global climate change (GCC). However at this time there are no generally accepted thresholds of significance for determining the impact of GHG emissions from an individual project on GCC. Thus, permitting agencies are in the position of developing policy and guidance to ascertain and mitigate to the extent feasible the effects of GHG, for CEQA purposes, without the normal degree of accepted guidance by case law.

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, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☒	☐

c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion:

(a) Less than Significant Impact with Mitigation Incorporated
The subject property and area is heavily disturbed with agricultural operations. There was a biological survey conducted on the subject property. The report made the conclusion that although historically there may have been sensitive plant and animal species on the project site, however due to the historical agricultural production which has occurred on the property and on adjacent parcels would preclude the occurrence of any sensitive species on site, the one exception would be the burrowing owl. There is mitigation measures included which would result in a less than significant impact.

(b) Less than Significant Impact
The subject property and area is heavily disturbed with existing institution, commercial, and agricultural operations. Therefore the proposal will not substantially affect any riparian or any other sensitive natural community.

(c) Less than Significant Impact
The subject property and area is heavily disturbed with existing institutional, commercial, and agricultural operations. Therefore the proposal will not substantial effect and wetlands as defined by Section 404 of the Clean Water Act.

(d) Less than Significant Impact
The subject property and area is heavily disturbed with existing institutional, commercial, and agricultural operations. Therefore the proposal will not interfere with the movement of native or migratory fish or wildlife species.

(e) No Impact
The subject property is not impacted by any local policies or ordinances related to the protection of plants or animals. The property is currently been deep ripped and continually disked; therefore it will not conflict with any local policies or ordinances protecting biological resources.

(f) No Impact
The subject property and area is heavily disturbed with existing instructional, commercial, and agricultural operations. Therefore the proposal will not conflict with the provisions of an adopted Habitat Conservation Plan or any other conservation plan.

General Information

Special Status Species include:

- Plants and animals that are legally protected or proposed for protection under the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA);
- Plants and animals defined as endangered or rare under the California Environmental Quality Act (CEQA) §15380;
- Animals designated as species of special concern by the U.S. Fish and Wildlife Service (USFWS) or California Department of Fish and Game (CDFG);
- Animals listed as “fully protected” in the Fish and Game Code of California (§3511, §4700, §5050 and §5515); and
- Plants listed in the California Native Plant Society’s (CNPS) Inventory of Rare and Endangered

Vascular Plants of California.

A review of both the County's and Department of Fish and Game's databases for special status species have identified the following species:

Species	Federal Listing	State Listing	Dept. of Fish and Game Listing	CNPS Listing
California tiger salamander	Threatened	Threatened	SSC	
Western spadefoot	None	None	SSC	1B.2
Northern hardpan Vernal Pool	None	None		
Vernal pool fairy shrimp	Threatened	None		
Boggs Lake hedge-hyssop	Specie of Concern	Endangered		1B
Succulent owl's-clover	Threatened	Endangered		1B.2
Hairy Orcutt grass	Endangered	Endangered		1B.1
Madera Linanthus				1B

List 1A: Plants presumed extinct

List 1B: Plants Rare, Threatened, or Endangered in California and elsewhere.

List 2: Plants Rare, Threatened, or Endangered in California, but more numerous elsewhere

List 3 Plants which more information is needed – a review list

List 4: Plants of Limited Distributed - a watch list

Ranking

0.1 – Seriously threatened in California (high degree/immediacy of threat)

0.2 – Fairly threatened in California (moderate degree/immediacy of threat)

0.3 – Not very threatened in California (low degree/immediacy of threats or no current threats known)

Effective January 1, 2007, Senate Bill 1535 took effect that has changed de minimis findings procedures. The Senate Bill takes the de minimis findings capabilities out of the Lead Agency hands and puts the process into the hands of the California Department of Fish and Wildlife (formally the California Department of Fish and Game). A Notice of Determination filing fee is due each time a NOD is filed at the jurisdictions Clerk's Office. The authority comes under Senate Bill 1535 (SB 1535) and Department of Fish and Wildlife Code 711.4. Each year the fee is evaluated and has the potential of increasing. For the most up-to-date fees, please refer to http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

The Valley elderberry longhorn beetle was listed as a threatened species in 1980. Use of the elderberry bush by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. According to the USFWWS, the Valley Elderberry Longhorn Beetle habitat is primarily in communities of clustered Elderberry plants located within riparian habitat. The USFWS stated that VELB habitat does not include every Elderberry plant in the Central Valley, such as isolated, individual plants, plants with stems that are less than one inch in basal diameter or plants located in upland habitat.

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?	☐	☐	☐	☒

Discussion:

(a) No Impact
The subject property had a cultural resource survey conducted by Sierra Valley Cultural Planning. During that survey no historical properties were discovered, and therefore the report has concluded based on the survey and the historical agricultural operations that have existed at the project site no further analysis is warranted as it related to cultural resources.
(b) No Impact
The subject property had a cultural resource survey conducted by Sierra Valley Cultural Planning. During that survey no historical properties were discovered, and therefore the report has concluded based on the survey and the historical agricultural operations that have existed at the project site no further analysis is warranted as it related to cultural resources.
(c) No Impact
The subject property had a cultural resource survey conducted by Sierra Valley Cultural Planning. During that survey no historical properties were discovered, and therefore the report has concluded based on the survey and the historical agricultural operations that have existed at the project site no further analysis is warranted as it related to cultural resources.
(d) No Impact
The subject property had a cultural resource survey conducted by Sierra Valley Cultural Planning. During that survey no historical properties were discovered, and therefore the report has concluded based on the survey and the historical agricultural operations that have existed at the project site no further analysis is warranted as it related to cultural resources.
General Information

Public Resource Code 5021.1(b) defines a historic resource as "any object building, structure, site, area or place which is historically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." These resources are of such import, that it is codified in CEQA (PRC Section 21000) which prohibits actions that "disrupt, or adversely affect a prehistoric or historic archaeological site or a property of historical or cultural significance to a community or ethnic or social groups; or a paleontological site except as part of a scientific study."

Archaeological importance is generally, although not exclusively, a measure of the archaeological research value of a site which meets one or more of the following criteria:

- Is associated with an event or person of recognized significance in California or American history or of recognized scientific importance in prehistory.
- Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable archaeological research questions.
- Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind.
- Is at least 100 years old and possesses substantial stratigraphic integrity (i.e. it is essentially undisturbed and intact).
- Involves important research questions that historic research has shown can be answered only with archaeological methods.

Reference CEQA Guidelines §15064.5 for definitions.

Most of the archaeological survey work in the County has taken place in the foothills and mountains. This does not mean, however, that no sites exist in the western part of the County, but rather that this area has not been as thoroughly studied. There are slightly more than 2,000 recorded archaeological sites in the County, most of which are located in the foothills and mountains. Recorded prehistoric artifacts include village sites, camp sites, bedrock milling stations, pictographs, petroglyphs, rock rings, sacred sites, and resource gathering areas. Ma-

dera County also contains a significant number of potentially historic sites, including homesteads and ranches, mining and logging sites and associated features (such as small camps, railroad beds, logging chutes, and trash dumps.

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 waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

Discussion:

(a-i-iv) No Impact

The subject property and area is heavily disturbed with existing institutional, commercial, and agricultural operations. Therefore the proposal will not expose people or structures to potential adverse effects involving earthquakes, strong seismic ground shaking, liquefaction or landslides. The property is located on the valley floor on a developed parcel, it is not anticipated that substantial grading would occur as a result of this project.

(b) No Impact

The subject property and area is heavily disturbed with existing instutional, commercial, and agricultural operations. Therefore the proposal will not result in substantial soil erosion or the loss of top soil.

(c) No Impact

See a-i.

(d) No Impact

See a-i.

(e) No Impact

See a-i.

General Information

Madera County is divided into two major physiographic and geologic provinces: the Sierra Nevada Range and the Central Valley. The Sierra Nevada physiographic province in the northeastern portion of the county is underlain by metamorphic and igneous rock. It consists mainly of homogenous types of granitic rocks, with several islands of older metamorphic rock. The central and western parts of the county are part of the Central Valley province, underlain by marine and non-marine sedimentary rocks.

The foothill area of the county is essentially a transition zone, containing old alluvial soils that have been dissected by the west-flowing rivers and streams which carry runoff from the Sierra Nevada's.

Seismicity varies greatly between the two major geologic provinces represented in Madera County. The Central valley is an area of relatively low tectonic activity bordered by mountain ranges on either side. The Sierra Nevada's, partly within Madera County, are the result of movement of tectonic plates which resulted in the creation of the mountain range. The Coast Ranges on the west side of the Central Valley are also a result of these forces, and continued movement of the Pacific and North American tectonic plates continues to elevate the ranges. Most of the seismic hazards in Madera County result from movement along faults associated with the creation of these ranges.

There are no active or potentially active faults of major historic significance within Madera County. The County does not lie within any Alquist Priolo Special Studies Zone for surface faulting or fault creep.

However, there are two significant faults within the larger region that have been and will continue to be, the principle sources of potential seismic activity within Madera County.

San Andreas Fault: The San Andreas Fault lies approximately 45 miles west of the county line. The fault has a long history of activity and is thus a concern in determining activity in the area.

Owens Valley Fault Group: The Owens Valley Fault Group is a complex system containing both active and potentially active faults on the eastern base of the Sierra Nevada Range. This group is located approximately 80 miles east of the County line in Inyo County. This system has historically been the source of seismic activity within the County.

The *Draft Environmental Impact Report* for the state prison project near Fairmead identified faults within a 100 mile radius of the project site. Since Fairmead is centrally located along Highway 99 within the county, this information provides a good indicator of the potential seismic activity which might be felt within the County. Fifteen active faults (including the San Andreas and Owens Valley Fault Group) were identified in the *Preliminary Geotechnical Investigation*. Four of the faults lie along the eastern portion of the Sierra Nevada Range, approximately 75 miles to the northeast of Fairmead. These are the Parker Lake, Hartley Springs, Hilton Creek and Mono Valley Faults. The remaining faults are in the western portion of the San Joaquin Valley, as well as within the Coast Range, approximately 47 miles west of Fairmead. Most of the remaining 11 faults are associated with the San Andreas, Calaveras, Hayward and Rinconada Fault Systems which collectively form the tectonic plate boundary of the Central Valley.

In addition, the Clovis Fault, although not having any historic evidence of activity, is considered to be active within quaternary time (within the past two million years), is considered potentially active. This fault line lies approximately six miles south of the Madera County line in Fresno County. Activity along this fault could potentially generate more seismic activity in Madera County than the San Andreas or Owens Valley fault systems. However, because of the lack of historic activity along the Clovis Fault, there is inadequate evidence for assessing maximum earthquake impacts.

Seismic ground shaking, however, is the primary seismic hazard in Madera County because of the County's seismic setting and its record of historical activity (General Plan Background Element and Program EIR). The project represents no specific threat or hazard from seismic ground shaking, and all new construction will comply with current local and state building codes. Other geologic hazards, such as landslides, lateral spreading, subsidence, and liquefaction have not been known to occur within Madera County.

According to the Madera County General Plan Background Report, groundshaking is the primary seismic hazard in Madera County. The valley portion of Madera County is located on alluvium deposits, which tend to experience greater groundshaking intensities than areas located on hard rock. Therefore, structures located in the valley will tend to suffer greater damage from groundshaking than those located in the foothill and mountain

areas.

Liquefaction is a process whereby soil is temporarily transformed to a fluid form during intense and prolonged ground shaking. According to the Madera County General Plan Background Report, although there are areas of Madera County where the water table is at 30 feet or less below the surface, soil types in the area are not conducive to liquefaction because they are either too coarse in texture or too high in clay content; the soil types mitigate against the potential for liquefaction.

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, 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?	☐	☐	☒	☐

Discussion:

(a-b) Less than Significant Impact
The project would allow the construction of a community in-fill shopping center to directly serve the Madera Ranchos community. An Air Quality Analysis Report for the project was conducted by First Carbon Solution in August of 2014, the report and technical documentation concludes that the project will have a less than significant impact upon greenhouse gas emissions. The project will not conflict with any applicable plan, policy, or regulation.

General Information

Greenhouse Gas (GHG) Emissions: The potential effect of greenhouse gas emission on global climate change is an emerging issue that warrants discussion under CEQA. Unlike the pollutants discussed previously that may have regional and local effects, greenhouse gases have the potential to cause global changes in the environment. In addition, greenhouse gas emissions do not directly produce a localized impact, but may cause an indirect impact if the local climate is adversely changed by its cumulative contribution to a change in global climate. Individual development projects contribute relatively small amounts of greenhouse gases that when added to other greenhouse gas producing activities around the world would result in an increase in these emissions that have led many to conclude is changing the global climate. However, no threshold has been established for what would constitute a cumulatively considerable increase in greenhouse gases for individual development projects. The State of California has taken several actions that help to address potential global climate change impacts.

Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, outlines goals for local agencies to follow in order to bring Greenhouse Gas (GHG) emissions to 1990 levels (a 25% overall reduction) by the year 2020. The California Air Resources Board (CARB) holds the responsibility of monitoring and reducing GHG emissions through regulations, market mechanisms and other actions. A Draft Scoping Plan was adopted by CARB in order to provide guidelines and policy for the State to follow in its steps to reduce GHG. According to CARB, the scoping plan's GHG reduction actions include: direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

Following the adoption of AB 32, the California State Legislature adopted Senate Bill 375, which became the first major bill in the United States that would aim to limit climate change by linking directly to "smart growth" land use principles and transportation. It adds incentives for projects which intend to be in-fill, mixed use, affordable and self-contained developments. SB 375 includes the creation of a Sustainable Communities Strategy (SCS) through the local Metropolitan Planning Organizations (MPO) in order to create land use patterns

which reduce overall emissions and vehicle miles traveled. Incentives include California Environmental Quality Act streamlining and possible exemptions for projects which fulfill specific criteria.

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 compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Discussion:

(a) Less than Significant Impact

The project is a request for a General Plan Amendment and Rezone to permit the development of commercial and institutional uses on the subject property. It is not anticipated that the project would create a significant hazard in any form to the public through the routine transport, use, or disposal of hazardous materials. The proposed zoning districts on the subject property would not permit a use which would typically handle hazardous waste..

(b) Less than Significant Impact

See a.

(c) Less than Significant Impact

See a.

(d) No Impact

The property is not located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

(e) No Impact

The project site is not located within an airport land use plan or within two miles of a public airport.

(f) No Impact

The project site is not located within the vicinity of a private airstrip.

(g) No Impact

The project will not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The project site has adequate access to a through road.

(h) No Impact

The project site is not located in a wildland area impacted by wildland fires.

General Information

Any hazardous material because of its quantity, concentration, physical or chemical properties, pose a significant present or potential hazard to human health and safety, or the environment the California legislature adopted Article I, Chapter 6.95 of the Health and Safety Code, Sections 25500 to 25520 that requires any business handling or storing a hazardous material or hazardous waste to establish a Business Plan. The information obtained from the completed Business Plans will be provided to emergency response personnel for a better-prepared emergency response due to a release or threatened release of a hazardous material and/or hazardous waste.

Business owners that handle or store a hazardous material or mixtures containing a hazardous material, which has a quantity at any one time during the year, equal to or greater than:

1) A total of 55 gallons,
2) A total of 500 pounds,
3) 200 cubic feet at standard temperature and pressure of compressed gas,
4) Any quantity of Acutely Hazardous Material (AHM).

Assembly Bill AB 2286 requires all business and agencies to report their Hazardous Materials Business Plans to the Certified Unified Program Agency (CUPA) information electronically at http://cers.calepa.ca.gov

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 or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒

i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Discussion:

(a) Less than Significant Impact
The project is a request for a General Plan Amendment and Rezone to permit the development of commercial and institutional uses on the subject property. The property has been farmed with crops in the past, however is currently not in agriculture production. The operation of a community shopping center will not result in violation of any water quality or waste discharge requirements, when following the adopted California Building Codes.

(b) Less than Significant Impact
The subject project will hook into the existing Maintenance District 10A services for portable water. The project must pay a significant hook-up fee, and provide increased infrastructure to the Maintenance District to serve the proposed project. The requirement to hook into the existing service provider will result in a less than significant impact, in addition the proposed use would utilized a fraction of the water an agricultural commodity would require on the subject property.

(c) No Impact
The project site has been significantly graded and deep ripped for historical agricultural production.

(d) No Impact
See c.

(e) Less than Significant Impact
See a.

(f) Less than Significant Impact
See a.

(g) No Impact
This project does not have any housing associated with it and will not generate a need for additional housing in the project area, therefore no impact would occur.

(h) No Impact
The subject property is not located within a 100-year flood hazard zone.

(i) No Impact
See h.

(j) No Impact
See a.

General Information
Groundwater quality contaminants of concern in the Valley Floor include high salinity (total dissolved solids), nitrate, uranium, arsenic, methane gas, iron, manganese, slime production, and dibromochloropropane with the maximum contaminant level exceeded in some areas. Despite the water quality issues noted above, most of the groundwater in the Valley Floor is of suitable quality for irrigation. Groundwater of suitable quality for public consumption has been demonstrated to be present in most of the area at specific depths.

Groundwater quality contaminants of concern in the Foothills and Mountains include manganese, iron, high salinity, hydrogen sulfide gas, uranium, nitrate, arsenic, and methylbutylethylene (MTBE) with the maximum concentration level being exceeded in some areas. Despite these problems, there are substantial amounts of good-quality groundwater in each of the areas evaluated in the Foothills and Mountains. Iron and manganese are commonly removed by treatment. Uranium treatment is being conducted on a well by the Bass Lake Water Company.

A seiche is an occasional and sudden oscillation of the water of a lake, bay or estuary producing fluctuations in the water level and caused by wind, earthquakes or changes in barometric pressure. A tsunami is an unusually large sea wave produced by seaquake or undersea volcanic eruption (from the Japanese language, roughly translated as “harbor wave”). According to the California Division of Mines and Geology, there are no active or potentially active faults of major historic significance within Madera County. As this property is not located near any bodies of water, no impacts are identified.

The flood hazard areas of the County of Madera are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare. These flood losses are caused by uses that are inadequately

elevated, floodproofed, or protected from flood damage. The cumulative effect of obstruction in areas of special flood hazards which increase flood height and velocities also contribute to flood loss.

X. LAND USE AND PLANNING – Would the project result in:	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?	☐	☐	☐	☒

Discussion:
(a) No Impact
The proposed project does not have the potential to divide an established community.
(b) No Impact
The project proposes a General Plan Amendment and Rezone to commercial designations, thereby creating consistency with the proposed end use and the surrounding community.
(c) No Impact
The project site is not within a habitat conservation plan or natural community conservation plan. There will be no impact.

XI. MINERAL RESOURCES – Would the project result in:	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?	☐	☐	☐	☒

Discussion:

(a) No Impact
The proposed project is not located within an area with the potential for this project to 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) No Impact
See a.

XII. NOISE – Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐

c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d)	A substantial temporary or periodic increase in ambient 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?	☐	☐	☒	☐

Discussion:

(a-f) Less than Significant Impact
The project would allow the construction of a community shopping center. The project is in an area planned and zoned for agricultural, commercial, institutional, and residential uses. The project site is surrounded on three sides by residential, commercial, and institutional uses. With the area being planned and developed as community commercial, this project would not expose people or generate noise levels or groundborne vibration levels in excess of standards established by the Madera County General Plan. The project would not cause a substantial increase of ambient noise levels that what is in existence, with the largest noise generator Avenue 12. The project is not located within an airport land use plan, and would not impact a private air strip.

General Discussion
The Noise Element of the Madera County General Plan (Policy 7.A.5) provides that noise which will be created by new non-transportation noise sources shall be mitigated so as not to exceed the Noise Element noise level standards on lands designated for noise-sensitive uses. However, this policy does not apply to noise levels associated with agricultural operations. All the surrounding properties, while include some residential units, are designated and zoned for agricultural uses. This impact is therefore considered less than significant.

Construction noise typically occurs intermittently and varies depending upon the nature or phase of construction (e.g. demolition/land clearing, grading and excavation, erection). The United States Environmental Protection Agency has found that the average noise levels associated with construction activities typically range from approximately 76 dBA to 84 dBA Leq, with intermittent individual equipment noise levels ranging from approximately 75 dBA to more than 88 dBA for brief periods.

Short Term Noise

Noise from localized point sources (such as construction sites) typically decreases by approximately 6 dBA with each doubling of distance from source to receptor. Given the noise attenuation rate and assuming no noise shielding from either natural or human-made features (e.g. trees, buildings, and fences), outdoor receptors within approximately 400 feet of construction site could experience maximum noise levels of greater than 70 dBA when onsite construction-related noise levels exceed approximately 89 dBA at the project site boundary. Construction activities that occur during the more noise-sensitive eighteen hours could result in increased levels of annoyance and sleep disruption for occupants of nearby existing residential dwellings. As a result, noise-generating construction activities would be considered to have a potentially significant short-term impact. However with implementation of mitigation measures, this impact would be considered less than significant.

Long Term Noise

Mechanical building equipment (e.g. heating, ventilation and air conditioning systems, and boilers), associated with the proposed structures, could generate noise levels of approximately 90 dBA at 3 feet from the source. However, such mechanical equipment systems are typically shielded from direct public exposure and usually housed on rooftops, within equipment rooms, or within exterior enclosures.

Landscape maintenance equipment, such as leaf blowers and gasoline powered mowers, associated with the proposed operations could result in intermittent noise levels that range from approximately 80 to 100 dBA at 3 feet, respectively. Based on an equipment noise level of 100 dBA, landscape maintenance equipment (assuming a noise attenuation rate of 6 dBA per doubling of distance from the source) may result in exterior noise le-

vels of approximately 75 dBA at 50 feet.

MAXIMUM ALLOWABLE NOISE EXPOSURE FOR
NON-TRANSPORTATION NOISE SOURCES*

		Residential	Commercial	Industrial (L)	Industrial (H)	Agricultural
Residential	AM	50	60	55	60	60
	PM	45	55	50	55	55
Commercial	AM	60	60	60	65	60
	PM	55	55	55	60	55
Industrial (L)	AM	55	60	60	65	60
	PM	50	55	55	60	55
Industrial (H)	AM	60	65	65	70	65
	PM	55	60	60	65	60
Agricultural	AM	60	60	60	65	60
	PM	55	55	55	60	55

*As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers at the property line.

AM = 7:00 AM to 10:00 PM
PM = 10:00 PM to 7:00 AM
L = Light
H = Heavy

Note: Each of the noise levels specified above shall be lowered by 5 dB for pure tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g. caretaker dwellings).

Vibration perception threshold: The minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects. The perception threshold shall be presumed to be a motion velocity of one-tenth (0.1) inches per second over the range of one to one hundred Hz.

Reaction of People and Damage to Buildings from Continuous Vibration Levels		
Velocity Level, PPV (in/sec)	**Human Reaction**	**Effect on Buildings**
0.006 to 0.019	Threshold of perception; possibility of intrustion	Damage of any type unlikely
0.08	Vibration readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10	Continuous vibration begins to annoy people	Virtually no risk of architectural damage to normal buildings
0.20	Vibration annoying to people in buildings	Risk of architectural damage to normal dwellings such as plastered walls or ceilings

0.4 to 0.6	Vibration considered unpleasant by people subjected to continuous vibrations vibration	Architectural damage and possibly minor structural damage
Source: Whiffen and Leonard 1971		

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 (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion:

(a-c) No Impact
The project is a request for a General Plan Amendment and Rezone to permit the development of commercial and institutional uses on the subject property. This project is considered to be an in-fill development project directly serving the needs of the existing Madera Ranchos Community. This project does not have the potential to induce substantial population growth. The property and surrounding area are developed industrial properties, agricultural, and commercial.

General Information

According to the California Department of Finance, in January of 2012, the County wide population was 152,074 with a total of 49,334 housing units. This works out to an average of 3.33 persons per housing unit. The vacancy rate was 11.84%.

XIV. PUBLIC SERVICES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) 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:				
i) Fire protection?	☐	☐	☒	☐
ii) Police protection?	☐	☐	☒	☐
iii) Schools?	☐	☐	☒	☐
iv) Parks?	☐	☐	☒	☐
v) Other public facilities?	☐	☐	☒	☐

Discussion:
(a-i-v) Less than Significant Impact

The project would allow the construction of a commercial shopping center and governmental library on the subject property. Although the proposed use may require addition police protection due primarily to thefts and vandalism it is not anticipated to be a significant impact due primarily to its location and visibility on a main vehicular corridor. The project would not require additional schools or parks, or fire equipment.

General Information

The proposed project site is within the jurisdiction of the Madera County Fire Department. Crime and emergency response is provided by the Madera County Sherriff's Department. The proposed project will have no impact on local parks and will not create demand for additional parks.

The Madera County Fire Department exists through a contract between Madera County and the CALFIRE (California Department of Forestry and Fire Prevention) and operates six stations for County responses in addition to the state-funded CALFIRE stations for state responsibility areas. Under an "Amador Plan" contract, the County also funds the wintertime staffing of four fire seasonal CALFIRE stations. In addition, there are ten paid-call (volunteer) fire companies that operate from their own stations. The administrative, training, purchasing, warehouse, and other functions of the Department operate through a single management team with County Fire Administration.

A Federal Bureau of Investigations 2009 study suggests that there is on average of 2.7 law enforcement officials per 1,000 population for all reporting counties. The number for cities had an average of 1.7 law enforcement officials per 1,000 population.

Single Family Residences have the potential for adding to school populations. The average per Single Family Residence is:

Grade	Student Generation per Single Family Residence
K – 6	0.425
7 – 8	0.139
9 – 12	0.214

The Madera County General Plan allocates three acres of park available land per 1,000 residents' population.

XV. RECREATION

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

Discussion:

(a-b) No Impact
The project is a request for a General Plan Amendment and Rezone to permit the development of commercial and institutional uses on the subject property. The proposed community shopping center and library will not require any additional parks or recreational facilities.

General Information

The Madera County General Plan allocates three acres of park available land per 1,000 residents' population.

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 congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☒	☐

Discussion:

(a) Less than Significant Impact

The project is a request for a General Plan Amendment and Rezone to permit the development of commercial and institutional uses on the subject property. This project is considered to be an in-fill development project directly serving the needs of the existing Madera Ranchos Community. This project does not have the potential to induce substantial population growth. KD Anderson & Associates prepared a traffic impact analysis of the proposed project in 2014. The project includes improvements to the Avenue 12 corridor which result in a less than significant impact.

(b) Less than Significant Impact

See a.

(c) No Impact

The project is approximately 9 miles from the public airport and will not result in a change in air traffic patterns.

(d) Less than Significant Impact

See a.

(e) Less than Significant Impact

See a.

(f) Less than Significant Impact

See a.

General Information

According to the Institute of Traffic Engineers (7th Edition, pg. 268-9) the trips per day for one single-family residence are 9.57.

Madera County currently uses Level Of Service "D" as the threshold of significance level for roadway and intersection operations. The following charts show the significance of those levels.

Level of Service	Description	Average Control Delay (sec./car)
A	Little or no delay	0 – 10
B	Short traffic delay	>10 – 15
C	Medium traffic delay	> 15 – 25
D	Long traffic delay	> 25 – 35
E	Very long traffic delay	> 35 – 50
F	Excessive traffic delay	> 50

Unsignalized intersections.

Level of Service	Description	Average Control Delay (sec./car)
A	Uncongested operations, all queues clear in single cycle	< 10
B	Very light congestion, an occasional phase is fully utilized	>10 – 20
C	Light congestion; occasional queues on approach	> 20 – 35
D	Significant congestion on critical approaches, but intersection is functional. Vehicles required to wait through more than one cycle during short peaks. No long-standing queues formed.	> 35 – 55
E	Severe congestion with some long-standing queues on critical approaches. Traffic queues may block nearby intersection(s) upstream of critical approach(es)	> 55-80
F	Total breakdown, significant queuing	> 80

Signalized intersections.

Level of service	Freeways	Two-lane rural highway	Multi-lane rural highway	Expressway	Arterial	Collector
A	700	120	470	720	450	300
B	1,100	240	945	840	525	350
C	1,550	395	1,285	960	600	400
D	1,850	675	1,585	1,080	675	450
E	2,000	1,145	1,800	1,200	750	500

Capacity per hour per lane for various highway facilities

Madera County is predicted to experience significant population growth in the coming years (62.27 percent between 2008 and 2030). Accommodating this amount of growth presents a challenge for attaining and maintain air quality standards and for reducing greenhouse gas emissions. The increase in population is expected to be accompanied by a similar increase in vehicle miles traveled (VMT) (61.36 percent between 2008 and 2030).

Horizon Year	Total Population (thousands)	Employment (thousands)	Average Weekday VMT (millions)	Total Lane Miles
2010	175	49	5.4	2,157
2011	180	53	5.5	NA
2017	210	63	6.7	NA
2020	225	68	7.3	2,264
2030	281	85	8.8	2,277

Source: MCTC 2007 RTP

The above table displays the predicted increase in population and travel. The increase in the lane miles of roads that will serve the increase in VMT is estimated at 120 miles or 0.94 percent by 2030. This indicates that roadways in Madera County can be expected to become much more crowded than is currently experienced.

Emissions of CO (Carbon Monoxide) are the primarily mobile-source criteria pollutant of local concern. Local mobile-source CO emissions near roadway intersections are a direct function of traffic volume, speed and delay. Carbon monoxide transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions. Under certain meteorological conditions, however, CO concentrations close to congested roadway or intersection may reach unhealthy levels, affecting local sensitive receptors (residents, school children, hospital patients, the elderly, etc.). As a result, the SJVAPCP recommends analysis of CO emissions of at a local rather than regional level. Local CO concentrations at intersections projected to operate at level of service (LOS) D or better do not typically exceed national or state ambient air quality standards. In addition, non-signalized intersections located within areas having relatively low background concentrations do not typically have sufficient traffic volumes to warrant analysis of local CO concentrations.

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

Discussion:

(a) Less than Significant Impact
The project is a request for a General Plan Amendment and Rezone to permit the development of commercial and institutional uses on the subject property. This project is considered to be an in-fill development project directly serving the needs of the existing Madera Ranchos Community. This project does not have the potential to induce substantial population growth. The applicant is proposing to install an Orenco decentralized waterwater treatment system. With the conditions the project would have a less than significant impact. The project will not exceed the waste water treatment requirements of the Regional Water Quality Control Board

(b) Less than Significant Impact
See a.
(c) Less than Significant Impact
See a.
(d) Less than Significant Impact
The project as proposed will connect into the existing MD10A community water system to provide for potable water for the development.
(e) No Impact
The project is not served by a wastewater treatment provider therefore no impact would occur.
(f) No Impact
The project would not increase the solid waste disposal to a significant level.
(g) No Impact
See f.

General Discussion

Madera County has 34 County Service Areas and Maintenance Districts that together operate 30 small water systems and 16 sewer systems. Fourteen of these special districts are located in the Valley Floor, and the remaining 20 special districts are in the Foothills and Mountains. MD-1 Hidden Lakes, Bass Lake (SA-2B and SA-2C) and SA-16 Sumner Hill have surface water treatment plants, with the remaining special districts relying solely on groundwater.

The major wastewater treatment plants in the County are operated in the incorporated cities of Madera and Chowchilla and the community of Oakhurst. These wastewater systems have been recently or are planned to be upgraded, increasing opportunities for use of recycled water. The cities of Madera and Chowchilla have adopted or are in the process of developing Urban Water Management Plans. Most of the irrigation and water districts have individual groundwater management plans. All of these agencies engage in some form of groundwater recharge and management.

Groundwater provides almost the entire urban and rural water use and about 75 percent of the agricultural water use in the Valley Floor. The remaining water demand is met with surface water. Almost all of the water use in the Foothills and Mountains is from groundwater with only three small water treatment plants relying on surface water from the San Joaquin River and its tributaries.

In areas of higher precipitation (Oakhurst, North Fork, and the topographically higher part of the Coarsegold Area), groundwater recharge is adequate for existing uses. However, some problems have been encountered in parts of these areas due to well interference and groundwater quality issues. In areas of lower precipitation (Raymond-Hensley Lake and the lower part of the Coarsegold area), groundwater recharge is more limited, possibly requiring additional water supply from other sources to support future development.

Madera County is served by a solid waste facility (landfill) in Fairmead. There is a transfer station in North Fork. The Fairmead facility also provides for Household Hazardous Materials collections on Saturdays. The unincorporated portion of the County is served by Red Rock Environmental Group. Above the 1000 foot elevation, residents are served by EMADCO services for solid waste pick-up.

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 will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

Discussion:

(a) Less than Significant Impact

The subject property and area is heavily disturbed with agricultural operations. Therefore the proposal will not degrade the quality of the environment, reduce habitat of a fish or wildlife population, or threaten to eliminate any species.

(b) Less than Significant Impact

The subject property and area is heavily disturbed with agricultural operations. However there are impacts associated with aesthetics of the project that require incorporation of mitigation measures to reduce the level of impact.

(c) Less than Significant Impact

See a.

General Information

CEQA defines three types of impacts or effects:

- Direct impacts are caused by a project and occur at the same time and place (CEQA §15358(a)(1).

- Indirect or secondary impacts are reasonably foreseeable and are caused by a project but occur at a different time or place. They may include growth inducing effects and other effects related to changes in the pattern of land use, population density or growth rate and related effects on air, water and other natural systems, including ecosystems (CEQA §15358(a)(2).

- Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA §15355(b)). Impacts from individual projects may be considered minor, but considered retroactively with other projects over a period of time, those impacts could be significant, especially where listed or sensitive species are involved.

Documents/Organizations/Individuals Consulted
In Preparation of this
Initial Study

Madera County General Plan

Traffic Impact Analysis for Madera Ranchos Retail Center KD Anderson & Associates, Inc. 2014

Cultural Resource Survey by Sierra Valley Cultural Planning 2007

Biological Resources Analysis for Madera Ranchos Retail Center John C. Stebbins 2006

Air Quality Analysis Report First Carbon Solution 2014

California Department of Finance

California Integrated Waste Management Board

California Environmental Quality Act Guidelines

United States Environmental Protection Agency

Caltrans website http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm accessed October 31, 2008

California Department of Fish and Game "California Natural Diversity Database" http://www.dfg.ca.gov/biogeodata/cnddb/

Madera County Integrated Regional Water Management Plan.

State of California, Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011 and 2012, with 2010 Benchmark.* Sacramento, California, May 2012

MITIGATED NEGATIVE DECLARATION MND

RE: Project #2014-006 – Russell Shaw

LOCATION AND DESCRIPTION OF PROJECT:
The project is a proposal to amend the area now shown as RR (Rural Residential) Designation to CC (Community Commercial) Designation, and a Rezone from ARE-40 (Agricultural Rural Exclusive 40-Acre) District to CUM (Commercial Urban Median) and PDD (Planned Development District) Designations for a community shopping center and public park and library.

The project is located on the southwest corner of Avenue 12 and Road 36 (No Situs Available), Madera.

ENVIRONMENTAL IMPACT:

No adverse environmental impact is anticipated from this project. The following mitigation measures are included to avoid any potential impacts.

BASIS FOR NEGATIVE DECLARATION:

1. See Attached

_____

Madera County Environmental Committee

A copy of the negative declaration and all supporting documentation is available for review at the Madera County Planning Department, 2037 West Cleveland Avenue, Madera, California.

DATED:

FILED:

PROJECT APPROVED:

M T AT ON MON TOR N RE ORT

MND

N .	M M	M	E A	M A	A	V	D	R
A								
1	Any development of the properties must have all lighting downshielded to protect from night time glare.							
A R								
A								
R								
1	The project developer shall conduct 30 day preconstruction site survey according to CDFG approved protocals by a qualified biologist for burrowing owls be performed in any project areas prior to ground disturbance.							
R								
S								
H H M								
H								
U								
M R								

N .	M M	M	E A	M A	A	V	D	R
N								
1	The construction activities associated with the development on the property shall be restricted between the hours of 7am-7pm, Monday-Saturday.							
	H							
S								
R								
T	T							
U	S S							

OND T ONS O A ROVA

ROJE T NAME	Russell Shaw - Project - Madera (047-190-025)
ROJE T O AT ON	On the southwest corner of the intersection of Avenue 12 and Road 36 in Madera
ROJE T DES R T ON	General Plan Amendment from RR (Rural Residential) to CC (Community Commercial) and a Rezone from ARE-40 (Agricultural Rural Exclusive 40-Acre) to CUM (Commercial Urban Median) and PDD (Planned Development District) Designations.
A ANT	Russell Shaw
OUNT ONTA T ERSON TE E HONE NUM ER	Matthew Treber 559-675-7821

N .		D A	V		
				D	R
E					
1	Prior to the start of any construction projects, the applicant shall secure a Building Permit from the Engineering Department. All construction shall meet the standards of all applicable Codes. All plans must be prepared by a licensed architect or registered civil engineer.				
E H					
1	This proposed project shall be served by a community water system. Water services for any structure(s), within this development must be connected to an approved community water system. [MCC 17.48.020] This development is located within Madera County Service Area (CSA) MD 10A and is included with the County Sewer Master Plan and therefore shall connect to it as an approved community water system. The project shall comply with all CSA requirements.				
2	The proposed project shall be served by a community sewer system to which all of the structure(s) within the proposed project shall connect. Sewer service for all structure(s) within the project must be connected to an approved community sewer system that is approved by Regional Water Quality Control Board (RWQCB).				
3	The construction and then ongoing operation must be done in a manner that shall not allow any type of public nuisance(s) to occur including but not limited to the following nuisance(s); Dust, Odor(s), Noise(s), Lighting, Vector(s) or Litter. This must be accomplished under accepted and approved Best Management Practices (BMP) and as required by the County General Plan, County Ordinances and any other related State and/or Federal jurisdiction.				
4	Solid waste collection with sorting for green, recycle, and garbage is required.				
1	The existing water system supplying the fire hydrant system in the area is currently unable to support the demand of the current proposal. This project will be required to meet the Fire Flow requirements for commercial buildings per the California Fire Code adopted at the time building permits are applied for.				

N .		D A	V		
				D	R
1	Shall comply with all mitigation measures as listed in mitigation monitoring and reporting program.				
2	Prior to development a landscape plan must be submitted to and approved by the Planning Director.				
3	Development must comply with the land use plans submitted and identified improvements on Avenue 12				
R					
1	As a condition of approval of the PRJ, the applicant shall grant deed a strip of land 8 ft wide contiguous to Avenue 12.				
2	Proposed access location along the project site as depicted by the exihibits provided with the application package has been given preliminary approval.				
3	Prior to any construction within the right of way, the applicant is required to apply for and obtain an Encroachment Permit from the Road Department. Once this permit is secured, the applicant may commence with construction.				

N .		D A	V		
				D	R

EXHIBIT P

Air Quality Analysis Report
Liberty Village Neighborhood Shopping Center
County of Madera, California

Prepared for:
Shaw Real Estate and Development
PO Box 1569
Oakhurst, CA 93644
555.683.6222

Prepared by:
FirstCarbon Solutions
7265 N. First Street, Suite 101
Fresno, CA, 93720
559.246.3732

Contact: Dave M. Mitchell, Air Quality Services Manager

Date: August 18, 2014

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ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AB	Assembly Bill
AQI	Air Quality Index
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CEQA	California Environmental Quality Act
CO	carbon monoxide
District	San Joaquin Valley Air Pollution Control District
DPM	diesel particulate matter
EPA	Environmental Protection Agency
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
LEV	Low-Emission Vehicle
NO_x	nitrogen oxides
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
ppt	parts per trillion
ROG	reactive organic gases
SB	Senate Bill
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_X	sulfur oxides
VOC	volatile organic compounds

SECTION 1: EXECUTIVE SUMMARY

1.1 - Purpose and Methods of Analysis

The following air quality analysis was prepared to evaluate whether the estimated criteria air pollutant and greenhouse gas emissions generated from the Liberty Village Neighborhood Shopping Center Project (project) would cause significant impacts to air resources in the project area. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.). The methodology follows the Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) prepared by the SJVAPCD for quantification of emissions and evaluation of potential impacts to air resources (SJVAPCD 2002).

1.2 - Project Description

The 40.2-acre project site is located on the southwest corner of Avenue 12 and Road 36 within Bonadelle Ranchos-Madera Ranchos, which is a census-designated area, located in the eastern portion of the Madera County, California; refer to Exhibit 1. The project site is bounded by the developed agricultural land (west), Liberty High School along Avenue 12 (north), residential uses along Road 36 (east), and vacant and develop agricultural land (south); refer to Exhibit 2. The project site is located on the Gregg, California, United States Geologic Survey 7.5-minute quadrangle, Township 12 South, Range 19 East, Section 4 (Latitude: 36°55'20" North; Longitude: 119°53'45" West). The project is located at 305 feet above mean sea level.

The project would consist of a 53,800-square-foot shopping center, which would include a 25,300-square-foot supermarket, a 16,000-square-foot pharmacy, two 4,000-square-foot fast-food restaurants, and a 4,500-square-foot convenience store with a 12-pump fuel station. Exhibit 3 provides the site plan for the project.

1.3 - Summary of Analysis Results

Impact AIR-1: The project would not conflict with or obstruct implementation of the applicable air quality plan. **Less than significant impact.**

Impact AIR-2: The project would not violate air quality standards or contribute substantially to an existing or projected air quality violation. **Less than significant impact.**

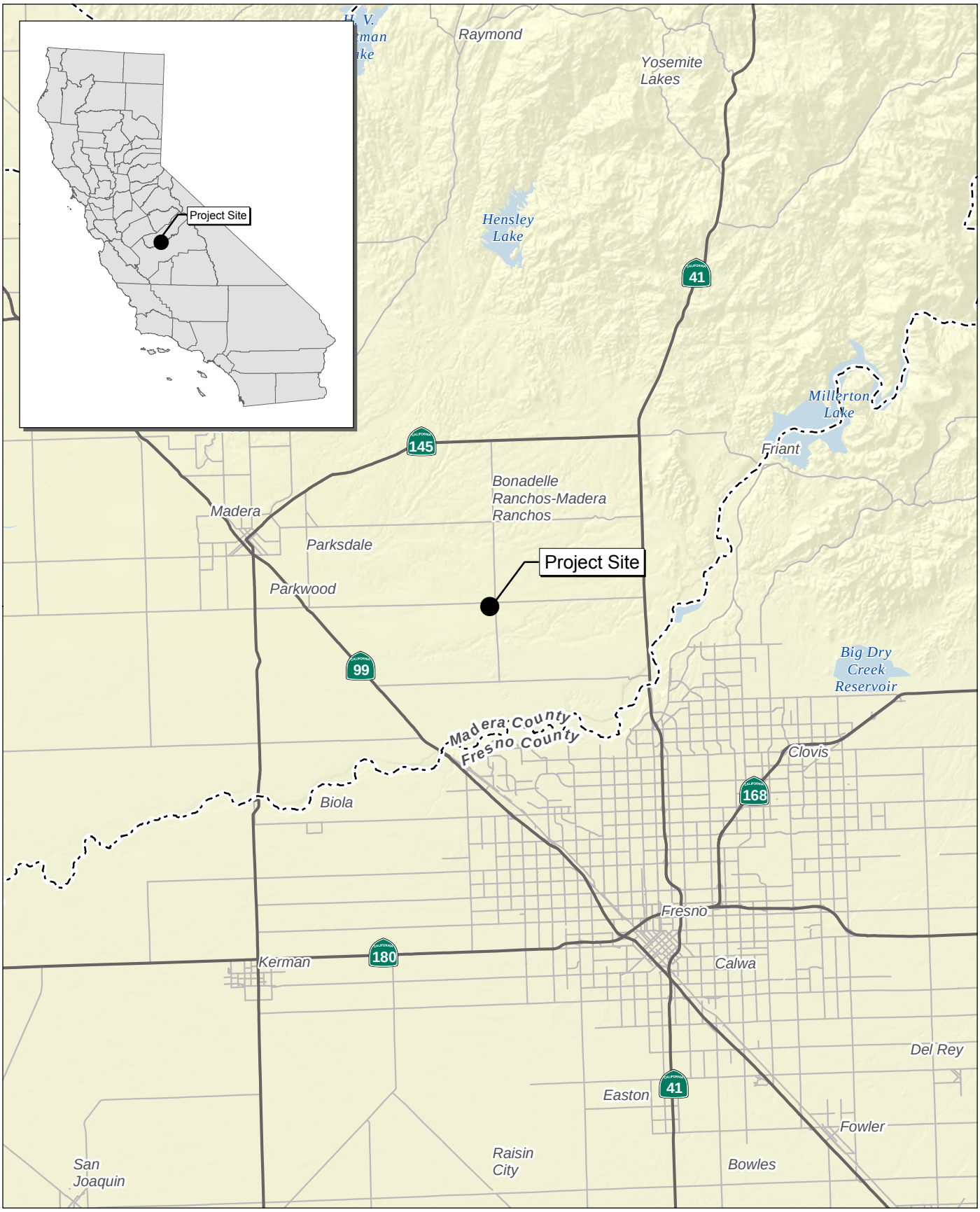
Impact AIR-3: The project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors). **Less than significant impact.**

Impact AIR-4: The project would not expose sensitive receptors to substantial pollutant concentrations. **Less than significant impact.**

Impact AIR-5: The project would not create objectionable odors affecting a substantial number of people. **Less than significant impact.**

1.4 - Standard Conditions and Mitigation Measures Applied to the Project

No mitigation measures beyond compliance with mandatory regulations were required to demonstrate that the project would have less than significant air quality impacts.



Source: Census 2000 Data, The CaSIL

FirstCarbon SOLUTIONS

5 2.5 0 5 Miles

Figure 1
Regional Location Map

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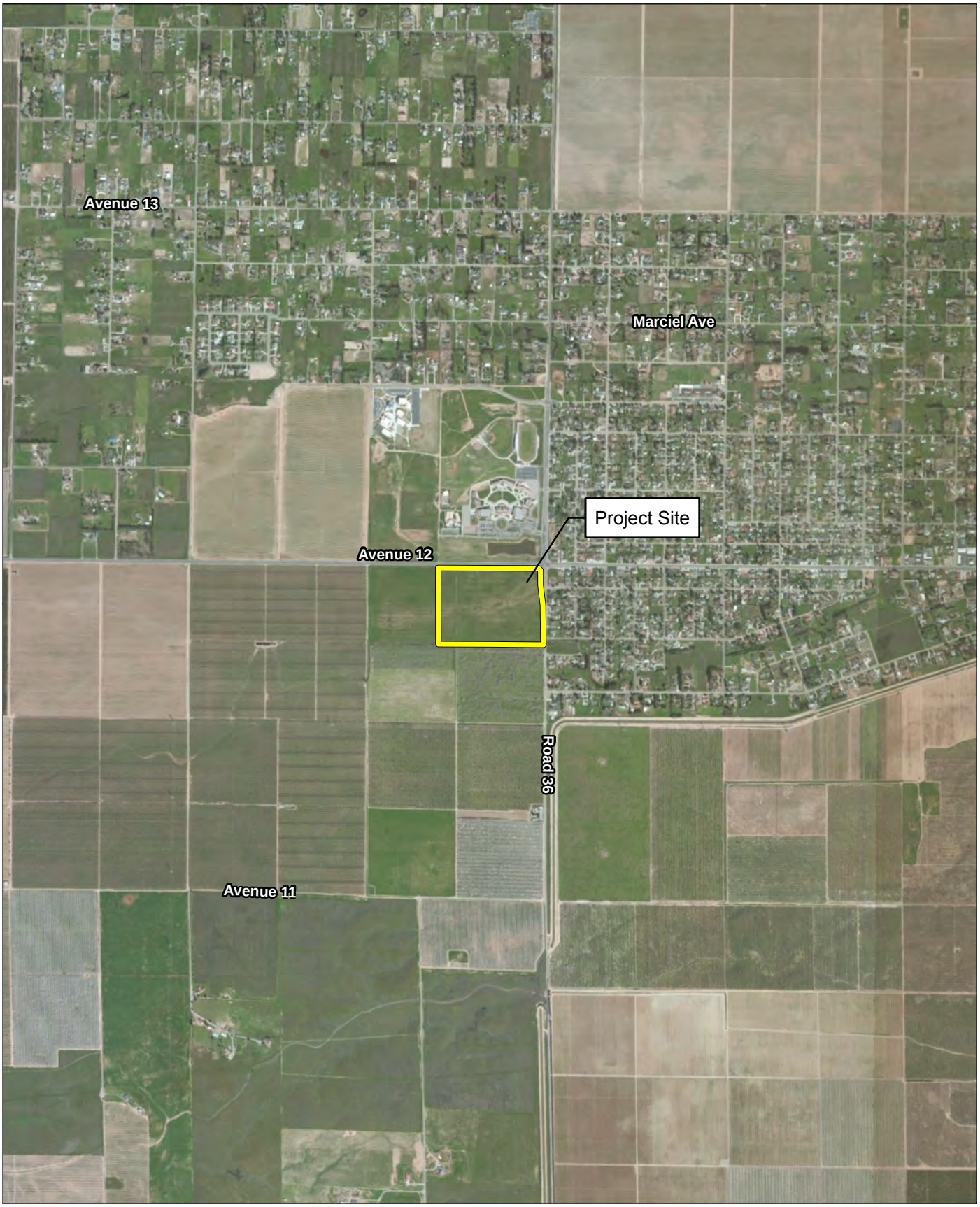
SHAW REAL ESTATE AND DEVELOPMENT
LIBERTY VILLAGE NEIGHBORHOOD SHOPPING CENTER
AIR QUALITY REPORT



Source: ESRI Imagery

FirstCarbon SOLUTIONS

2,000 1,000 0 2,000 Feet

Exhibit 2
Local Vicinity Map
Aerial Base

BUILDING AREA (SQ. FT.)		RATIO	REQUIRED	PROVIDED
ANCHOR 'A'	16,000	1:333	48	69
ANCHOR 'B'	25,300	1:333	76	120
CONVENIENCE	4,500	1:200	23	29
FAST FOOD	4,000	1:150	27	48
FAST FOOD	4,000	1:150	27	35
TOTAL	53,800		201	301

Source: KD Anderson & Associates Inc, 2014

FirstCarbon SOLUTIONS

Exhibit 3
Site Plan

SECTION 2: AIR QUALITY SETTING

2.1 - Environmental Setting

The project is located in the San Joaquin Valley Air Basin (Air Basin). The Air Basin consists of Kings, Madera, San Joaquin, Merced, Stanislaus, and Fresno counties, as well as a portion of Kern County. The local agency with jurisdiction over air quality in the Basin is the SJVAPCD. Regional and local air quality is impacted by topography, dominant airflows, atmospheric inversions, location, and season. The following section describes these conditions as they pertain to the Air Basin, as well as a description of pollutants and their health effects.

2.1.1 - San Joaquin Valley Air Basin Environmental Setting

The information in this section is primarily from the District's Guide for Assessing and Mitigating Air Quality Impacts and the accompanying Technical Document (San Joaquin Valley Air Pollution Control District 2002).

Topography

The topography of a region is important for air quality because mountains can block airflow that would help disperse pollutants and can channel air from upwind areas that transports pollutants to downwind areas. The SJVAPCD covers the entirety of the San Joaquin Valley Air Basin (SJVAB). The Air Basin is generally shaped like a bowl. It is open in the north and is surrounded by mountain ranges on all other sides. The Sierra Nevada mountains are along the eastern boundary (8,000 to 14,000 feet in elevation), the Coast Ranges are along the western boundary (3,000 feet in elevation), and the Tehachapi Mountains are along the southern boundary (6,000 to 8,000 feet in elevation).

Dominant Airflow

Dominant airflows provide the driving mechanism for transport and dispersion of air pollution. The mountains surrounding the Air Basin form natural horizontal barriers to the dispersion of air contaminants. The wind generally flows south-southeast through the valley, through the Tehachapi Pass and into the Southeast Desert Air Basin portion of Kern County. As the wind moves through the Air Basin, it mixes with the air pollution generated locally, generally transporting air pollutants from the north to the south in the summer and in a reverse flow in the winter.

Inversions

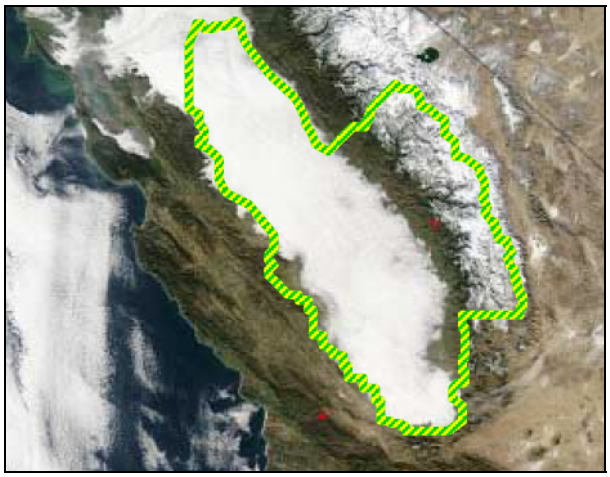
Generally, the temperature of air decreases with height, creating a gradient from warmer air near the ground to cooler air at elevation. This gradient of cooler air over warm air is known as the environmental lapse rate. Inversions occur when warm air sits over cooler air, trapping the cooler air near the ground. These inversions trap pollutants from dispersing vertically, and the mountains surrounding the San Joaquin Valley trap the pollutants from dispersing horizontally. Strong temperature inversions occur throughout the Air Basin in the summer, fall, and winter. Daytime

temperature inversions occur at elevations of 2,000 to 2,500 feet above the San Joaquin Valley floor during the summer and at 500 to 1,000 feet during the winter.

The result is a relatively high concentration of air pollution in the valley during inversion episodes. These inversions cause haziness, which in addition to moisture may include suspended dust, a variety of chemical aerosols emitted from vehicles, particulates from wood stoves, and other pollutants. In the winter, these conditions can lead to carbon monoxide (CO) "hotspots" along heavily traveled roads and at busy intersections. During summer's longer daylight hours, stagnant air, high temperatures, and plentiful sunshine provide the conditions and energy for the photochemical reaction between reactive organic gases (ROG) and NO_x, which results in the formation of ozone.

Figure 1 displays how pollution is trapped in the Valley in the winter months.

Figure 1: San Joaquin Valley Air Basin Inversion



Source: San Joaquin Valley Air Pollution Control District 2007, 2007 Ozone Plan

Location and Season

Because of the prevailing daytime winds and time-delayed nature of ozone, concentrations are highest in the southern portion of the Air Basin, such as around Bakersfield. Summers are often periods of hazy visibility and occasionally unhealthful air, while winter air quality impacts tend to be localized and can consist of (but are not exclusive to) odors from agricultural operations; soot or smoke around residential, agricultural, and hazard-reduction wood burning; or dust near mineral resource recovery operations.

Temperatures

The Air Basin has an "inland Mediterranean" climate and is characterized by long, hot, dry summers and short, foggy winters. Sunlight can be a catalyst in the formation of some air pollutants (such as ozone); the Air Basin averages over 260 sunny days per year.

2.1.2 - Air Quality and Pollutants

The United States Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards, also known as federal standards. There are federal standards for the following criteria air pollutants, which were identified from provisions of the Clean Air Act of 1970:

- Ozone
- Nitrogen dioxide
- Lead
- Particulate matter (PM_{10} and $PM_{2.5}$)
- Carbon monoxide (CO)
- Sulfur dioxide

The federal standards were set to protect public health, including that of sensitive individuals; thus, the standards continue to change as more medical research is available regarding the health effects of the criteria pollutants. Primary federal standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health (ARB 2013a).

The California Air Resources Board (ARB) also administers California Ambient Air Quality Standards (state standards) for the 10 air pollutants designated in the California Clean Air Act. The 10 state air pollutants are the six federal standards listed above as well visibility-reducing particulates, hydrogen sulfide, sulfates, and vinyl chloride.

The federal and state ambient air quality standards, relevant effects, properties, and sources of the pollutants are summarized in Table 1. Several pollutants listed in Table 1 are not addressed in this analysis. Analysis of lead is not included in this report because the project is not anticipated to emit lead. Visibility-reducing particles are not explicitly addressed in this analysis because particulate matter is addressed. The project is not expected to generate or be exposed to vinyl chloride because proposed project uses do not utilize the chemical processes that create this pollutant and there are no such uses in the project vicinity. The proposed project is not expected to cause exposure to hydrogen sulfide because it would not generate hydrogen sulfide in any substantial quantity.

Table 1: Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Ozone	1 Hour	0.09 ppm	—	Irritate respiratory system; reduce lung function; breathing pattern changes; reduction of breathing capacity; inflame and damage cells that line the lungs; make lungs more susceptible to infection; aggravate asthma; aggravate other chronic lung diseases; cause permanent lung damage; some immunological changes; increased mortality risk; vegetation and property damage.	Ozone is a photochemical pollutant as it is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between volatile organic compounds (VOC), NO_x, and sunlight. Ozone is a regional pollutant that is generated over a large area and is transported and spread by the wind.	Ozone is a secondary pollutant; thus, it is not emitted directly into the lower level of the atmosphere. The primary sources of ozone precursors (VOC and NO_x) are mobile sources (on-road and off-road vehicle exhaust).
	8 Hour	0.070 ppm	0.075 ppm			
Carbon monoxide (CO)	1 Hour	20 ppm	35 ppm	Ranges depending on exposure: slight headaches; nausea; aggravation of angina pectoris (chest pain) and other aspects of coronary heart disease; decreased exercise tolerance in persons with peripheral vascular disease and lung disease; impairment of central nervous system functions; possible increased risk to fetuses; death.	CO is a colorless, odorless, toxic gas. CO is somewhat soluble in water; therefore, rainfall and fog can suppress CO conditions. CO enters the body through the lungs, dissolves in the blood, replaces oxygen as an attachment to hemoglobin, and reduces available oxygen in the blood.	CO is produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). Sources include motor vehicle exhaust, industrial processes (metals processing and chemical manufacturing), residential wood burning, and natural sources.
	8 Hour	9.0 ppm	9 ppm			
Nitrogen dioxide[b] (NO_2)	1 Hour	0.18 ppm	0.100 ppm	Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; contribution to atmospheric discoloration; increased visits to hospital for respiratory illnesses.	During combustion of fossil fuels, oxygen reacts with nitrogen to produce nitrogen oxides - NO_x (NO, NO_2, NO_3, N_2O, N_2O_3, N_2O_4, and N_2O_5). NO_x is a precursor to ozone, PM_{10}, and $PM_{2.5}$ formation. NO_x can react with compounds to form nitric acid and related small particles and result in PM related health effects.	NO_x is produced in motor vehicle internal combustion engines and fossil fuel-fired electric utility and industrial boilers. Nitrogen dioxide (NO_2) forms quickly from NO_x emissions. NO_2 concentrations near major roads can be 30 to 100 percent higher than those at monitoring stations.
	Annual	0.030 ppm	0.053 ppm			

Table 1 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Sulfur dioxide[c] (SO_2)	1 Hour	0.25 ppm	0.075 ppm	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient sulfur dioxide levels. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.	Sulfur dioxide is a colorless, pungent gas. At levels greater than 0.5 ppm, the gas has a strong odor, similar to rotten eggs. Sulfur oxides (SO_x) include sulfur dioxide and sulfur trioxide. Sulfuric acid is formed from sulfur dioxide, which can lead to acid deposition and can harm natural resources and materials. Although sulfur dioxide concentrations have been reduced to levels well below state and federal standards, further reductions are desirable because sulfur dioxide is a precursor to sulfate and PM_{10}.	Human caused sources include fossil-fuel combustion, mineral ore processing, and chemical manufacturing. Volcanic emissions are a natural source of sulfur dioxide. The gas can also be produced in the air by dimethylsulfide and hydrogen sulfide. Sulfur dioxide is removed from the air by dissolution in water, chemical reactions, and transfer to soils and ice caps. The sulfur dioxide levels in the State are well below the maximum standards.
	3 Hour	—	0.5 ppm			
	24 Hour	0.04 ppm	0.14 (for certain areas)			
	Annual	—	0.030 ppm (for certain areas)			
Particulate matter (PM_{10})	24 hour	50 µg/m^3	150 µg/m^3	• Short-term exposure (hours/days): irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravate existing lung disease, causing asthma attacks and acute bronchitis; those with heart disease can suffer heart attacks and arrhythmias. • Long-term exposure: reduced lung function; chronic bronchitis; changes in lung morphology; death.	Suspended particulate matter is a mixture of small particles that consist of dry solid fragments, droplets of water, or solid cores with liquid coatings. The particles vary in shape, size, and composition. PM_{10} refers to particulate matter that is between 2.5 and 10 microns in diameter, (1 micron is one-millionth of a meter). $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter, about one-thirtieth the size of the average human hair.	Stationary sources include fuel or wood combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal, and recycling. Mobile or transportation related sources are from vehicle exhaust and road dust. Secondary particles form from reactions in the atmosphere.
	Mean	20 µg/m^3	—			
Particulate matter ($PM_{2.5}$)	24 Hour	—	35 µg/m^3			
	Annual	12 µg/m^3	15 µg/m^3			
Visibility-reducing particles	8 Hour	See note below[d]				

Table 1 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Sulfates	24 Hour	25 µg/m^3	—	(a) Decrease in ventilatory function; (b) aggravation of asthmatic symptoms; (c) aggravation of cardio-pulmonary disease; (d) vegetation damage; (e) degradation of visibility; (f) property damage.	The sulfate ion is a polyatomic anion with the empirical formula SO_4^{2-}. Sulfates occur in combination with metal and/or hydrogen ions. Many sulfates are soluble in water.	Sulfates are particulates formed through the photochemical oxidation of sulfur dioxide. In California, the main source of sulfur compounds is combustion of gasoline and diesel fuel.
Lead[e]	30-day	1.5 µg/m^3	—	Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. It can cause impairment of blood formation and nerve conduction, behavior disorders, mental retardation, neurological impairment, learning deficiencies, and low IQs.	Lead is a solid heavy metal that can exist in air pollution as an aerosol particle component. Leaded gasoline was used in motor vehicles until around 1970. Lead concentrations have not exceeded state or federal standards at any monitoring station since 1982.	Lead ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources include dust from soils contaminated with lead-based paint, solid waste disposal, and crustal physical weathering.
	Quarter	—	1.5 µg/m^3			
	Rolling 3-month average	—	0.15 µg/m^3			
Vinyl chloride[e]	24 Hour	0.01 ppm	—	Short-term exposure to high levels of vinyl chloride in the air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers.	Vinyl chloride, or chloroethene, is a chlorinated hydrocarbon and a colorless gas with a mild, sweet odor. In 1990, ARB identified vinyl chloride as a toxic air contaminant and estimated a cancer unit risk factor.	Most vinyl chloride is used to make polyvinyl chloride plastic and vinyl products, including pipes, wire and cable coatings, and packaging materials. It can be formed when plastics containing these substances are left to decompose in solid waste landfills. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites.

Table 1 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Hydrogen sulfide	1 Hour	0.03 ppm	—	High levels of hydrogen sulfide can cause immediate respiratory arrest. It can irritate the eyes and respiratory tract and cause headache, nausea, vomiting, and cough. Long exposure can cause pulmonary edema.	Hydrogen sulfide (H_2S) is a flammable, colorless, poisonous gas that smells like rotten eggs.	Manure, storage tanks, ponds, anaerobic lagoons, and land application sites are the primary sources of hydrogen sulfide. Anthropogenic sources include the combustion of sulfur containing fuels (oil and coal).
Volatile organic compounds (VOC)		There are no State or federal standards for VOCs because they are not classified as criteria pollutants.		Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations because of interference with oxygen uptake. In general, concentrations of VOCs are suspected to cause eye, nose, and throat irritation; headaches; loss of coordination; nausea; and damage to the liver, the kidneys, and the central nervous system. Many VOCs have been classified as toxic air contaminants.	Reactive organic gases (ROG), or VOCs, are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROG and VOCs, the two terms are often used interchangeably.	Indoor sources of VOCs include paints, solvents, aerosol sprays, cleansers, tobacco smoke, etc. Outdoor sources of VOCs are from combustion and fuel evaporation. A reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOCs are transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility.
Diesel particulate matter (DPM)		There are no ambient air quality standards for DPM.		Some short-term (acute) effects of DPM exposure include eye, nose, throat, and lung irritation, coughs, headaches, light-headedness, and nausea. Studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems. Human	DPM is a source of $PM_{2.5}$—diesel particles are typically 2.5 microns and smaller. Diesel exhaust is a complex mixture of thousands of particles and gases that is produced when an engine burns diesel fuel. Organic compounds account for 80 percent of the total particulate matter mass, which consists of compounds such as hydrocarbons and their derivatives, and polycyclic	Diesel exhaust is a major source of ambient particulate matter pollution in urban environments. Typically, the main source of DPM is from combustion of diesel fuel in diesel-powered engines. Such engines are in on-road vehicles such as diesel trucks, off-road construction vehicles, diesel electrical generators, and various pieces of stationary construction

Table 1 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
				studies on the carcinogenicity of DPM demonstrate an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure.	aromatic hydrocarbons and their derivatives. Fifteen polycyclic aromatic hydrocarbons are confirmed carcinogens, a number of which are found in diesel exhaust.	equipment.

Notes:
ppm = parts per million (concentration) $\mu g/m^3$ = micrograms per cubic meter Annual = Annual Arithmetic Mean 30-day = 30-day average Quarter = Calendar quarter

[a] Federal standard refers to the primary national ambient air quality standard, or the levels of air quality necessary, with an adequate margin of safety to protect the public health. All standards listed are primary standards except for 3 Hour SO_2, which is a secondary standard. A secondary standard is the level of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[b] To attain the 1-hour NO_2 national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (0.100 ppm).

[c] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[d] Visibility-reducing particles: In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

[e] The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source of effects, properties, and sources: South Coast Air Quality Management District 2007; California Environmental Protection Agency 2002; California Air Resources Board 2009a; U.S. Environmental Protection Agency 2003, 2009a, 2009b, 2010, 2011, and 2012a; National Toxicology Program 2011a and 2011b.
Source of standards: California Air Resources Board 2013a.

Toxic Air Contaminants

A toxic air contaminant (TAC) is defined as an air pollutant that may cause or contribute to an increase in mortality or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. The California Almanac of Emissions and Air Quality (ARB 2009b) presents the relevant concentration and cancer risk data for the ten TACs that pose the most substantial health risk in California based on available data. These TACs are as follows: acetaldehyde, benzene, 1.3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and DPM).

Some studies indicate that DPM poses the greatest health risk among the TACs listed above. A 10-year research program (ARB 1998) demonstrated that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. In addition to increasing the risk of lung cancer, exposure to diesel exhaust can have other health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. Diesel exhaust is a major source of fine particulate pollution as well, and studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems.

Diesel particulate matter (DPM) differs from other TACs in that it is not a single substance but a complex mixture of hundreds of substances. Although DPM is emitted by diesel-fueled, internal combustion engines, the composition of the emissions varies, depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, however, no ambient monitoring data are available for DPM because no routine measurement method currently exists. The ARB has made preliminary concentration estimates based on a DPM exposure method. This method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of DPM.

Limited data on levels and health risks attributable to the top 10 TACs listed above available from the ARB as part of their California Almanac of Emissions and Air Quality - 2013 Edition (ARB 2013b). As shown therein for data collected at the 1st Street air monitoring station in Fresno, cancer risks from attributable to all of the listed TACs above with the exception of DPM have declined about 70 percent from the mid-1990s to 2007. Unfortunately, risks associated with DPM emissions are only provided for the year 2000 and have not been updated in the Almanac. The total cancer risk including DPM is approximately 270 in a million in Madera County. The actual risk at any location can vary substantially, due to the presence of local sources such as freeways and distribution centers.

Asbestos

Asbestos is listed as a toxic air contaminant by ARB and as a Hazardous Air Pollutant by the EPA. Asbestos is the name given to a number of naturally occurring fibrous silicate minerals that have been mined for their useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. The three most common types of asbestos are chrysotile, amosite, and

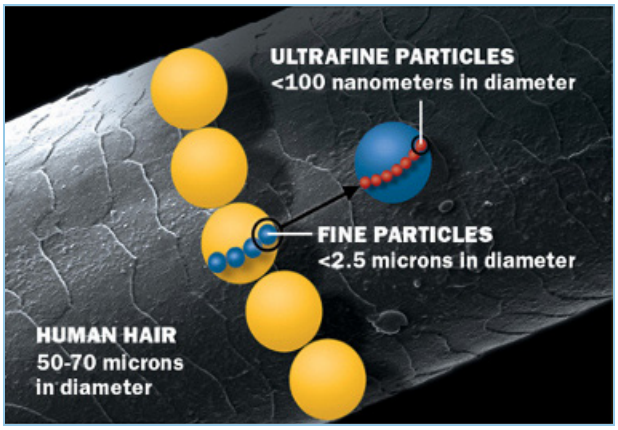
crocidolite. Chrysotile, also known as white asbestos, is the most common type of asbestos found in buildings. Chrysotile makes up approximately 90 to 95 percent of all asbestos contained in buildings in the United States. Exposure to asbestos is a health threat; exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma (a rare cancer of the thin membranes lining the lungs, chest, and abdominal cavity), and asbestosis (a non-cancerous lung disease that causes scarring of the lungs).

Asbestos occurs naturally in surface deposits of several types of rock formations. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be found associated with ultramafic rock, particularly near faults. Crushing or breaking these rocks, through construction or other means, can release asbestoform fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. There is no known naturally occurring asbestos in the project area (U.S. Geological Survey 2011).

Ultrafine Particles

Ultrafine particles are particulate matter (PM) that exists in the ambient air and are less than 0.1 micrometer (µm or microns) in diameter. Ultrafine particles (UFP or $PM_{0.1}$) are included in the group called $PM_{2.5}$, particulate matter less than 2.5 micrometers in diameter. Figure 2 displays the relative size of the particles compared with a human hair, with PM_{10} (particulate matter less than 10 micrometers in diameter) indicated as yellow circles, $PM_{2.5}$ shown as blue circles, and ultrafine particles are shown as red circles.

Figure 2: Ultrafine Particles



Source: Levin 2012.

In its recent revisions to the national ambient air quality standards for particulate matter, the EPA states that, “In considering both the currently available health effects evidence and the air quality data, the Policy Assessment concluded that this information was still too limited to provide support for consideration of a distinct PM standard for ultrafine particles” (EPA 2013).

This assessment does not specifically distinguish between ultrafine particles and $PM_{2.5}$ or quantify in particular ultrafine particles. However, $PM_{2.5}$ emissions are estimated and a significance finding is provided for them.

2.2 - Existing Air Quality Conditions

The local air quality can be evaluated by reviewing relevant air pollution concentrations near the project area. Table 2 summarizes 2011 through 2013 published monitoring data, which is the most recent 3-year period available. The table displays data from three monitoring stations closest to the project site: Madera-Pump Yard (approximately 7.26 miles southwest of the project site), Madera-Avenue 14 (approximately 7.82 miles west of the project site), and Fresno-1st Street (now closed, was approximately 11.70 miles southeast of the project site). The data shows that during the past few years, the project area has exceeded the ozone state standard and the ozone and $PM_{2.5}$ national standards. The data in Table 2 reflects the concentration of the pollutants in the air, measured using air monitoring equipment. This differs from emissions, which are calculations of a pollutant being emitted over a period of time.

Table 2: Air Quality Monitoring Summary

Air Pollutant	Averaging Time	Item	2011	2012	2013
Ozone[1]	1 Hour	Max 1 Hour (ppm)	0.098	0.107	0.100
		Days > State Standard (0.09 ppm)	**2**	**1**	**2**
	8 Hour	Max 8 Hour (ppm)	0.085	0.092	0.088
		Days > State Standard (0.07 ppm)	**19**	**21**	**24**
		Days > National Standard (0.075 ppm)	**8**	**7**	**6**
Carbon monoxide[2]	8 Hour	Max 8 Hour (ppm)	2.29	2.22	ND
		Days > State Standard (9.0 ppm)	0	0	ND
		Days > National Standard (9 ppm)	0	0	ND
Nitrogen dioxide[1]	Annual	Annual Average (ppm)	0.008	ID	ID
	1 Hour	Max 1 Hour (ppm)	0.043	0.048	0.060
		Days > State Standard (0.18 ppm)	0	0	0
Sulfur dioxide[2]	Annual	Annual Average (ppm)	ID	ID	ID
	24 Hour	Max 24 Hour (ppm)	0.004	ID	ID
		Days > State Standard (0.04 ppm)	0	ID	ID
Inhalable coarse particles (PM_{10})[3]	Annual	Annual Average (µg/m^3)	31.2	36.3	37.4
	24 hour	24 Hour (µg/m^3)	118.8	115.3	110.3
		Days > State Standard (50 µg/m^3)	ID	ID	ID
		Days > National Standard (150 µg/m^3)	0	0	0

Table 2 (cont.): Air Quality Monitoring Summary

Air Pollutant	Averaging Time	Item	2011	2012	2013
Fine particulate matter ($PM_{2.5}$)[3]	Annual	Annual Average (µg/m^3)	20.4	15.9	17.8
	24 Hour	24 Hour (µg/m^3)	71.2	58.8	87.5
		Days > National Standard (35 µg/m^3)	**34**	**16**	**24**

Notes and Abbreviations:
> = exceed ppm = parts per million µg/m^3 = micrograms per cubic meter
ID = insufficient data ND = no data max = maximum
Bold = exceedance
State Standard = California Ambient Air Quality Standard
National Standard = National Ambient Air Quality Standard
[1] Data from Madera-Pump Yard monitoring station.
[2] Data from Fresno-1st Street monitoring station.
[3] Data from Madera-28261 Avenue 14 monitoring station.
Source: California Air Resources Board 2013a.

The health impacts of the various air pollutants of concern can be presented in a number of ways. Comparison to the state and federal ozone standards is the most straightforward. If concentrations are below the standard, it is safe to say that no health impact would occur to anyone. When concentrations exceed the standard, impacts will vary based on how much the standard is exceeded. The EPA developed the Air Quality Index (AQI) as an easy to understand measure of health impact. Table 3 provides a description of the health impacts ozone at different concentrations.

Table 3: Air Quality Index and Health Effects

Air Quality Index/ 8-hour Ozone Concentration	Health Effects Description
AQI – 100 - Moderate Concentration 75 ppb	**Sensitive Groups**: Children and people with asthma are the groups most at risk.
	Health Effects Statements: Unusually sensitive individuals may experience respiratory symptoms.
	Cautionary Statements: Unusually sensitive people should consider limiting prolonged outdoor exertion.
AQI – 150 – Unhealthy for Sensitive Groups Concentration 95 ppb	**Sensitive Groups**: Children and people with asthma are the groups most at risk.
	Health Effects Statements: Increasing likelihood of respiratory symptoms and breathing discomfort in active children and adults and people with respiratory disease, such as asthma.
	Cautionary Statements: Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.

Table 3 (cont.): Air Quality Index and Health Effects

Air Quality Index/ 8-hour Ozone Concentration	Health Effects Description
AQI – 200 – Unhealthy Concentration 115 ppb	**Sensitive Groups**: Children and people with asthma are the groups most at risk
	Health Effects Statements: Greater likelihood of respiratory symptoms and breathing difficulty in active children and adults and people with respiratory disease, such as asthma; possible respiratory effects in general population
	Cautionary Statements: Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
AQI – 210 – Very Unhealthy Concentration 139 ppb	**Sensitive Groups**: Children and people with asthma are the groups most at risk
	Health Effects Statements: Increasingly severe symptoms and impaired breathing likely in active children and adults and people with respiratory disease, such as asthma; increasing likelihood of respiratory effects in general population
	Cautionary Statements: Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
Source: EPA 2014.	

Based on the AQI scale for the 8-hour ozone standard, Madera experienced no days in the last 3 years that would be categorized as unhealthful for sensitive groups (AQI 150 or unhealthful (AQI 200), and as many as 8 days that were moderate (AQI 100) as measured at the Madera monitoring station. The highest reading was 92 ppb in 2012 compared with the 95-ppb cut off point for unhealthful for sensitive groups (AQI 150).

The other nonattainment pollutant of concern is $PM_{2.5}$. An AQI of 100 or lower is considered moderate and would be triggered by a 24-hour average concentration of 35.4 µg/m^3, which is considered an exceedance of the federal $PM_{2.5}$ standard. Monitoring stations in Madera County exceeded this amount on 34 days in 2011. People with respiratory or heart disease, the elderly and children are the groups most at risk. Unusually sensitive people should consider reducing prolonged or heavy exertion. Unusually sensitive people should consider reducing prolonged or heavy exertion. The AQI of 150 is classified as unhealthful for sensitive groups with a $PM_{2.5}$ concentration of 55.4 µg/m^3. At this concentration, there is increasing likelihood of respiratory symptoms in sensitive individuals, aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease, and in the elderly. People with respiratory or heart disease, the elderly, and children should limit prolonged exertion. AQI 151—unhealthful with a concentration of 55.5 µg/m^3—was also exceeded on at least three days in the last three years. At this concentration, increased aggravation of heart or lung disease and premature mortality in persons with

cardiopulmonary disease and the elderly and increased respiratory effects in general population would occur. People with respiratory or heart disease, the elderly, and children should avoid prolonged exertion; everyone else should limit prolonged exertion when the AQI exceeds this level.

2.2.1 - Attainment Status

The EPA and the ARB designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or "form" of what constitutes attainment, based on specific air quality statistics. For example, the federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the federal annual $PM_{2.5}$ standard is met if the three-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard.

The current attainment designations for the basin are shown in Table 4. The basin is designated as nonattainment for ozone, PM_{10}, and $PM_{2.5}$.

Table 4: San Joaquin Valley Air Basin Attainment Status

Pollutant	State Status	National Status
Ozone	Nonattainment	Nonattainment
Carbon monoxide	Merced, Madera, and Kings County are unclassified; others in Attainment	Attainment
Nitrogen dioxide	Attainment	Attainment
Sulfur dioxide	Attainment	Attainment
PM_{10}	Nonattainment	Attainment
$PM_{2.5}$	Nonattainment	Nonattainment
Lead	Attainment	Attainment
Source of State status: California Air Resources Board 2013a. Source of National status: U.S. Environmental Protection Agency 2012b.		

2.3 - Regulatory Setting

Air pollutants are regulated at the national, state, and air basin or county level; each agency has a different level of regulatory responsibility. The EPA regulates at the national level. The EPA is responsible for national and interstate air pollution issues and policies. The EPA sets national vehicle and stationary source emission standards, oversees approval of all State Implementation Plans, and provides research and guidance for air pollution programs. The ARB regulates at the state level. The

SJVAPCD regulates at the air basin level. The following section describes these federal, state, and regional standards and the health effects of the regulated pollutants.

A State Implementation Plan is a document prepared by each state describing existing air quality conditions and measures that will be followed to attain and maintain federal standards. The State Implementation Plan for the State of California is administered by the ARB, which has overall responsibility for statewide air quality maintenance and air pollution prevention. California's State Implementation Plan incorporates individual federal attainment plans for regional air districts—air district prepares their federal attainment plan, which sent to ARB to be approved and incorporated into the California State Implementation Plan. Federal attainment plans include the technical foundation for understanding air quality (e.g., emission inventories and air quality monitoring), control measures and strategies, and enforcement mechanisms.

2.3.1 - Federal Regulations

Clean Air Act

Congress established much of the basic structure of the Clean Air Act (CAA) in 1970, and made major revisions in 1977 and 1990. Six common air pollutants (also known as "criteria pollutants") are addressed in the CAA. These are particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. EPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally based criteria (science-based guidelines) for setting permissible levels. The set of limits based on human health is called primary standards. Another set of limits intended to prevent environmental and property damage is called secondary standards (EPA 2014. Clean Air Act Requirements and History. http://www.epa.gov/air/caa/requirements.html). The federal standards are called National Ambient Air Quality Standards (NAAQS). The air quality standards provide benchmarks for determining whether air quality is healthy at specific locations and whether development activities will cause or contribute to a violation of the standards. The criteria pollutants are:

- Ozone
- Nitrogen dioxide
- Lead
- Particulate matter (PM_{10} and $PM_{2.5}$)
- Carbon monoxide (CO)
- Sulfur dioxide

The federal standards were set to protect public health, including that of sensitive individuals; thus, EPA is tasked with updating the standards as more medical research is available regarding the health effects of the criteria pollutants. Primary federal standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health (ARB 2012a).

2.3.2 - State of California Regulations

California Clean Air Act

The California Legislature enacted the California Clean Air Act (CCAA) in 1988 to address air quality issues of concern not adequately addressed by the federal CAA at the time. California's air quality problems were and are some of the most severe in the nation and required additional actions

beyond the federal mandates. The ARB administers California Ambient Air Quality Standards (CAAQS) for the 10 air pollutants designated in the CCAA. The 10 state air pollutants are the six federal standards listed above as well visibility-reducing particulates, hydrogen sulfide, sulfates, and vinyl chloride. EPA authorized California to adopt its own regulations for motor vehicles and other sources that are more stringent than similar federal regulations implementing the CAA. Generally, the planning requirements of the CCAA are less stringent than federal CAA; therefore, consistency with the CAA will also demonstrate consistency with the CCAA.

The 1990 Clean Air Act Amendments, significantly expanded EPA's authority to regulate hazardous air pollutants (HAP). Section 112 of the Clean Air Act lists 187 hazardous air pollutants to be regulated by source category. Authority to regulate these pollutants was delegated to the States. ARB and local air districts regulate toxic air contaminants (TACs) and HAPs in California. TACs are regulated in terms of health risks to individuals and populations exposed to the pollutants.

Federal Air Quality Plans

A State Implementation Plan is a document prepared by each state describing existing air quality conditions and measures that will be followed to attain and maintain federal standards. The State Implementation Plan for the State of California is administered by the ARB, which has overall responsibility for statewide air quality maintenance and air pollution prevention. California's State Implementation Plan incorporates individual federal attainment plans for regional air districts—air district prepares their federal attainment plan, which is sent to ARB to be approved and incorporated into the California State Implementation Plan. Federal attainment plans include the technical foundation for understanding air quality (e.g., emission inventories and air quality monitoring), control measures and strategies, and enforcement mechanisms. The most recent attainment plans for the SJVAPCD are the 2008 8-hour Ozone Plan and the 2012 $PM_{2.5}$ Plan.

Areas designated non-attainment must develop air quality plans and regulations to achieve standards by specified dates depending on the severity of the exceedances. For much of the country, implementation of federal motor vehicle standards and compliance with federal permitting requirements for industrial sources are adequate to attain air quality standards on schedule. For many areas of California; however, additional state and local regulation is required to achieve the standards. Regulations adopted by California are described below.

Low-Emission Vehicle Program

The ARB first adopted LEV program standards in 1990. These first LEV standards ran from 1994 through 2003. LEV II regulations, running from 2004 through 2010, represent continuing progress in emission reductions. As the State's passenger vehicle fleet continues to grow and more sport utility vehicles and pickup trucks are used as passenger cars rather than work vehicles, the more stringent LEV II standards were adopted to provide reductions necessary for California to meet federally mandated clean air goals outlined in the 1994 State Implementation Plan. In 2012, ARB adopted the LEV III amendments to California's LEV regulations. These amendments include more stringent emission standards for both criteria pollutants and greenhouse gases for new passenger vehicles (ARB 2012a).

On-Road Heavy-Duty Vehicle Program

The ARB has adopted standards for emissions from various types of new on-road heavy-duty vehicles. Section 1956.8, Title 13, California Code of Regulations contains California's emission standards for on-road heavy-duty engines and vehicles, and test procedures. ARB has also adopted programs to reduce emissions from in-use heavy-duty vehicles including the Heavy-Duty Diesel Vehicle Idling Reduction Program, the Heavy-Duty Diesel In-Use Compliance Program, the Public Bus Fleet Rule and Engine Standards, and the School Bus Program and others (ARB 2013b).

Air pollutants are regulated at the national, state, and air basin or county level; each agency has a different level of regulatory responsibility. The United States Environmental Protection Agency (EPA) regulates at the national level. The ARB regulates at the state level. The SJVAPCD regulates at the air basin level.

ARB Regulation for In-Use Off-Road Diesel Vehicles

On July 26, 2007, the ARB adopted a regulation to reduce diesel particulate matter and NO_x emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The regulation limits idling to no more than five consecutive minutes, requires reporting and labeling, and requires disclosure of the regulation upon vehicle sale. The ARB is enforcing that part of the rule with fines up to $10,000 per day for each vehicle in violation. Performance requirements of the rule are based on a fleet's average NO_x emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirements making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501–5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less).

ARB Airborne Toxic Control Measure for Asbestos

In July 2001, the ARB approved an Air Toxic Control Measure for construction, grading, quarrying and surface mining operations to minimize emissions of naturally occurring asbestos. The regulation requires application of best management practices to control fugitive dust in areas known to have naturally occurring asbestos and requires notification to the local air district prior to commencement of ground-disturbing activities. The measure establishes specific testing, notification and engineering controls prior to grading, quarrying or surface mining in construction zones where naturally occurring asbestos is located on projects of any size. There are additional notification and engineering controls at work sites larger than one acre in size. These projects require the submittal of a "Dust Mitigation Plan" and approval by the air district prior to the start of a project.

Construction sometimes requires the demolition of existing buildings where construction occurs. Buildings often include materials containing asbestos, but no demolition is associated with this project. However, asbestos is also found in a natural state, known as naturally occurring asbestos. Exposure and disturbance of rock and soil that naturally contain asbestos can result in the release of fibers into the air and consequent exposure to the public. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be

found associated with ultramafic rock, particularly near faults. Sources of asbestos emissions include unpaved roads or driveways surfaced with ultramafic rock, construction activities in ultramafic rock deposits, or rock quarrying activities where ultramafic rock is present.

The ARB has an Air Toxics Control Measure for construction, grading, quarrying, and surface mining operations requiring the implementation of mitigation measures to minimize emissions of asbestos-laden dust. The measure applies to road construction and maintenance, construction and grading operations, and quarries and surface mines when the activity occurs in an area where naturally occurring asbestos is likely to be found. Areas are subject to the regulation if they are identified on maps published by the Department of Conservation as ultramafic rock units or if the Air Pollution Control Officer or owner/operator has knowledge of the presence of ultramafic rock, serpentine, or naturally occurring asbestos on the site. The measure also applies if ultramafic rock, serpentine, or asbestos is discovered during any operation or activity.

Diesel Risk Reduction Plan

The ARB's Diesel Risk Reduction Plan has led to the adoption of new state regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce DPM emissions by about 90 percent overall from year 2000 levels as stated on page 1 of the plan. The projected emission benefits associated with the full implementation of this plan, including federal measures, are reductions in DPM emissions and associated cancer risks of 75 percent by 2010 and 85 percent by 2020 (ARB 2000).

Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 horsepower and Greater. Effective February 19, 2011, each fleet shall comply with weighted reduced particulate matter emission fleet averages by compliance dates listed in the regulation.

ARB Regulation for In-Use Off-Road Diesel Vehicles. On July 26, 2007, the ARB adopted a regulation to reduce diesel particulate matter and NO_x emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The regulation limits idling to no more than five consecutive minutes, requires reporting and labeling, and requires disclosure of the regulation upon vehicle sale. The ARB is enforcing that part of the rule with fines up to $10,000 per day for each vehicle in violation. Performance requirements of the rule are based on a fleet's average NO_x emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirements making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501-5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less).

ARB Airborne Toxic Control Measure. In July 2001, the ARB approved an Air Toxic Control Measure for construction, grading, quarrying and surface mining operations to minimize emissions of naturally occurring asbestos. The regulation requires application of best management practices to control fugitive dust in areas known to have naturally occurring asbestos and requires notification to the local air district prior to commencement of ground-disturbing activities. The measure establishes specific testing, notification and engineering controls prior to grading, quarrying or

surface mining in construction zones where naturally occurring asbestos is located on projects of any size. There are additional notification and engineering controls at work sites larger than one acre in size. These projects require the submittal of a "Dust Mitigation Plan" and approval by the air district prior to the start of a project.

2.3.3 - San Joaquin Valley Air Pollution Control District

The District is responsible for controlling emissions primarily from stationary sources. The District, in coordination with the eight countywide transportation agencies, is also responsible for developing, updating, and implementing air quality attainment plans for the Air Basin. The District also has roles under CEQA.

Ozone Plans

The Air Basin is designated nonattainment of state and federal health-based air quality standards for ozone. To meet Clean Air Act requirements for the one-hour ozone standard, the District adopted an Extreme Ozone Attainment Demonstration Plan in 2004, with an attainment date of 2010. Although EPA revoked the federal 1-hour ozone standard effective June 15, 2005 and replaced it with an 8-hour standard, the requirement to submit a plan for that standard remained in effect for the San Joaquin Valley.

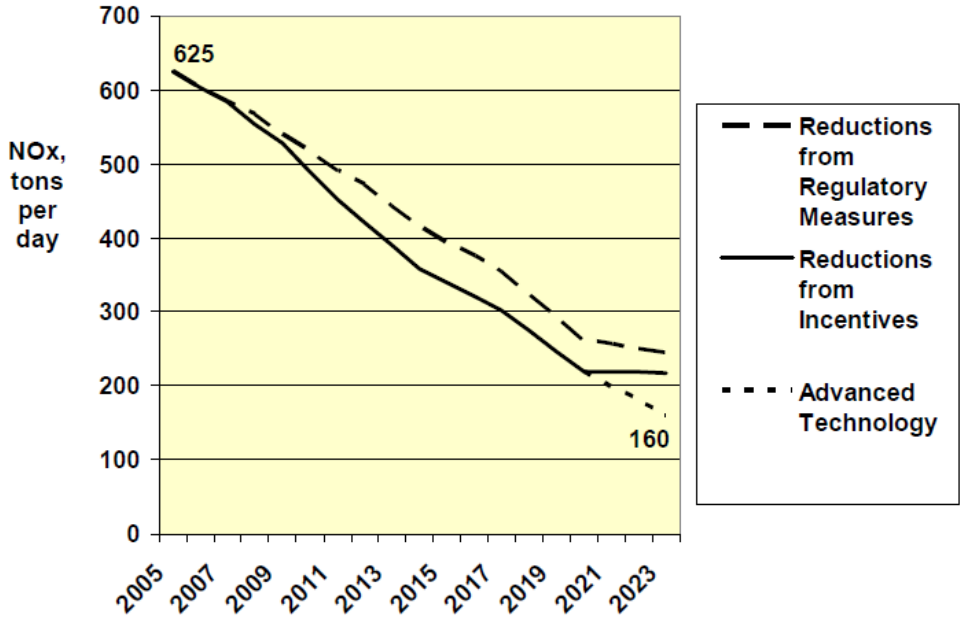
The planning requirements for the 1-hour plan remain in effect until replaced by a federal 8-hour ozone attainment plan. The EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan, including revisions to the plan, on March 8, 2010, effective April 7, 2010. However, the Air Basin failed to attain the standard in 2010 and was subject to a $29-million Clean Air Act penalty. The penalty is being collected through an additional $12 motor vehicle registration surcharge for each passenger vehicle registered in the Air Basin that will be applied to pollution reduction programs in the region. The District also instituted a more robust ozone episodic program to reduce emissions on days with the potential to exceed the ozone standards.

The Air Basin is classified as serious nonattainment for the federal 8-hour ozone standard with an attainment date of 2013. On April 30, 2007, the District's Governing Board adopted the 2007 Ozone Plan, which contained analysis showing a 2013 attainment target to be unfeasible. The 2007 Ozone Plan details the plan for achieving attainment on schedule with an "extreme nonattainment" deadline of 2026. At its adoption of the 2007 Ozone Plan, the District also requested a reclassification to extreme nonattainment. ARB approved the plan in June 2007, and EPA approved the request for reclassification to extreme nonattainment on April 15, 2010.

The 2007 Ozone Plan contains measures to reduce ozone and particulate matter precursor emissions to bring the Basin into attainment with the federal 8-hour ozone standard. The 2007 Ozone Plan calls for a 75-percent reduction of NO_x and a 25-percent reduction of ROG. Figure 3 displays the anticipated NO_x reductions attributed in the 2007 Ozone Plan (Source: 2007 Ozone Plan). The plan, with innovative measures and a "dual path" strategy, assures expeditious attainment of the federal 8-hour ozone standard for all Basin residents. The District Governing Board adopted the 2007 Ozone Plan on April 30, 2007. The ARB approved the plan on June 14, 2007.

State ozone standards do not have an attainment deadline but require implementation of all feasible measures to achieve attainment at the earliest date possible. This is achieved through compliance with the federal deadlines and control measure requirements.

Figure 3: San Joaquin Valley NO_x Emissions Forecast



Particulate Matter Plans

The Air Basin was designated nonattainment of state and federal health-based air quality standards for PM_{10}. The Air Basin is also designated nonattainment of state and federal standards for $PM_{2.5}$.

To meet Clean Air Act requirements for the PM_{10} standard, the District adopted a PM_{10} Attainment Demonstration Plan (Amended 2003 PM_{10} Plan and 2006 PM_{10} Plan), which has an attainment date of 2010. The District adopted the 2007 PM_{10} Maintenance Plan in September 2007 to assure the San Joaquin Valley's continued attainment of the EPA's PM_{10} standard. The EPA designated the valley as an attainment/maintenance area for PM_{10} on September 25, 2008. Although the San Joaquin Valley has exceeded the standard since then, those days were considered exceptional events that are not considered a violation of the standard for attainment purposes.

The 2008 $PM_{2.5}$ Plan builds upon the comprehensive strategy adopted in the 2007 Ozone Plan to bring the Basin into attainment of the 1997 national standards for $PM_{2.5}$. The EPA has identified NO_x and sulfur dioxide as precursors that must be addressed in air quality plans for the 1997 $PM_{2.5}$ standards. The 2008 $PM_{2.5}$ Plan is a continuation of the District's strategy to improve the air quality in the Basin. The EPA issued final approval of the 2008 $PM_{2.5}$ Plan on November 9, 2011 effective January 9, 2012. The EPA approved the emissions inventory, the reasonably available control measures/reasonably available control technology demonstration, reasonable further progress demonstration, attainment demonstration and associated air quality modeling, and the transportation conformity motor vehicle emissions budgets. The EPA also granted California's

request to extend the attainment deadline for the San Joaquin Valley to April 5, 2015 and approved commitments to measures and reductions by the District and the ARB. Finally, it disapproved the State Implementation Plan's contingency provisions and issued a protective finding for transportation conformity determinations.

In December 2012, the District adopted the 2012 $PM_{2.5}$ Plan to bring the San Joaquin Valley into attainment of the EPA's 2006 24-hour $PM_{2.5}$ standard of 35 µg/m³. The ARB approved the District's 2012 $PM_{2.5}$ Plan for the 2006 standard at a public hearing on January 24, 2013 (SJVAPCD 2012a). This plan seeks to bring the Valley into attainment with the standard by 2019, with the expectation that most areas will achieve attainment before that time.

SJVAPCD Rules and Regulations

- Rule 4601 – Architectural Coatings. The purpose of this rule is to limit Volatile Organic Compounds (VOC) emissions from architectural coatings. Emissions are reduced by limits on VOC content and providing requirements on coatings storage, cleanup, and labeling.
- Rule 4641 – Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations. The purpose of this rule is to limit VOC emissions from asphalt paving and maintenance operations. If asphalt paving will be used, then the paving operations will be subject to Rule 4641.
- Regulation VIII – Fugitive PM_{10} Prohibitions. Rules 8011-8081 are designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and trackout, etc. All development projects that involve soil disturbance are subject to at least one provision of the Regulation VIII series of rules.
- Rule 9510 – Indirect Source Review. This rule reduces the impact of NO_x and PM_{10} emissions from growth on the Air Basin. The rule places application and emission reduction requirements on development projects meeting applicability criteria in order to reduce emissions through onsite mitigation, offsite District -administered projects, or a combination of the two. This project must comply with Rule 9510 because it would develop more than 50 residential dwelling units.

CEQA

The District has three roles under CEQA:

1. Lead Agency: responsible for preparing environmental analyses for its own projects (adoption of rules, regulations, or plans) or permit projects filed with the District where the District has primary approval authority over the project.
2. Responsible Agency: The discretionary authority of a Responsible Agency is more limited than a Lead Agency; having responsibility for mitigating or avoiding only the environmental effects of those parts of the project which it decides to approve, carry out, or finance. The District defers to the Lead Agency for preparation of environmental documents for land use projects that also have discretionary air quality permits unless no document is prepared by

the Lead Agency and potentially significant impacts related to the permit are possible. The District comments on documents prepared by Lead Agencies to ensure that District concerns are addressed.

3. Commenting Agency: the District reviews and comments on air quality analyses prepared by other public agencies (such as the proposed project).

The District also provides guidance and thresholds for CEQA air quality analyses. The result of this guidance as well as state regulations to control air pollution is an overall improvement in the Basin. In particular, the District's draft 2012 GAMAQI states the following:

1. The District's Air Quality Attainment Plans include measures to promote air quality elements in county and city general plans as one of the primary indirect source programs. The general plan is the primary long-range planning document used by cities and counties to direct development. Since air districts have no authority over land use decisions, it is up to cities and counties to ensure that their general plans help achieve air quality goals. Section 65302.1 of the California Government Code requires cities and counties in the San Joaquin Valley to amend appropriate elements of their general plans to include data, analysis, comprehensive goals, policies, and feasible implementation strategies to improve air quality in their next housing element revisions.
2. The Air Quality Guidelines for General Plans (AQGGP), adopted by the District in 1994 and amended in 2005, is a guidance document containing goals and policy examples that cities and counties may want to incorporate into their General Plans to satisfy Section 65302.1. When adopted in a general plan and implemented, the suggestions in the AQGGP can reduce vehicle trips and miles traveled and improve air quality. The specific suggestions in the AQGGP are voluntary. The District strongly encourages cities and counties to use their land use and transportation planning authority to help achieve air quality goals by adopting the suggested policies and programs.

2.3.4 - Local

The Madera County's General Plan adopted in 2010 contains general provisions for air quality under Air Quality Element of the General Plan. The County's air quality goals and policies applicable towards the project are listed below.

Madera County Air Quality Goals and Policies

- **Goal E1:** Minimize air emissions and potential climate change impacts related to energy consumption in the County.
- **Objective E1.1:** Increase the use of energy conservation features, renewable sources of energy and low-emission equipment in new and existing development projects within the County.
- **Policy E1.1.1:** Initiate and sustain ongoing efforts with local water and energy utilities and developers to establish and implement voluntary incentive based programs to encourage the use of energy efficient designs and equipment in new and existing development projects within the County.

- **Policy E1.1.2:** Initiate and sustain ongoing efforts with agriculture, the building industry water and energy utilities and the SJCAPCD to promote enhanced energy conservation and sustainable building standards for new construction.
- **Goal F1:** Minimized exposure of the public to hazardous air pollutant emissions, particles and noxious odors form freeways, major arterial roadways, industrial, manufacturing, and processing facilities.
- **Objective F1.2:** Reduce emissions of PM_{10}, $PM_{2.5}$, and other particulates from sources with local control potential or under the jurisdiction of the County.
- **Policy F2.1.1:** Coordinate with the SJCAPCD to ensure that construction, grading, excavation, and demolition, activities within County's jurisdiction are regulated and controlled to reduce particulate emissions to the maximum extent feasible.
- **Policy F2.1.2:** Require all access roads, driveways, and parking areas serving new commercial and industrial development are constructed with materials that minimized particulate emissions and are appropriate to the scale and intensity of use.

SECTION 3: MODELING PARAMETERS AND ASSUMPTIONS

3.1 - Model Selection and Guidance

Air pollutant emissions can be estimated by using emission factors and a level of activity. Emission factors are the emission rate of a pollutant given the activity over time; for example, grams of NO_X per horsepower hour. The ARB has published emission factors for on-road mobile vehicles/trucks in the EMFAC mobile source emissions model and emission factors for off-road equipment and vehicles in the OFFROAD emissions model. An air emissions model (or calculator) combines the emission factors and the various levels of activity and outputs the emissions for the various pieces of equipment.

The California Emissions Estimator Model (CalEEMod) version 2013.2.2 was developed in cooperation with the South Coast Air Quality Management District and other air districts throughout the state. CalEEMod is designed as a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas emissions associated with construction and operation from a variety of land uses.

The modeling follows District guidance where applicable from its GAMAQI.

The models used in this analysis are summarized as follows:

- Construction emissions: CalEEMod, version 2013.2.2
- Operational emissions: CalEEMod, version 2013.2.2

3.2 - Air Pollutants Assessed

3.2.1 - Criteria Pollutants Assessed

The following air pollutants are assessed in this analysis:

- Reactive organic gases (ROG)
- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Sulfur oxides (SO_x)
- Particulate matter less than 10 microns in diameter (PM_{10})
- Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)

Note that the project would emit ozone precursors ROG and NO_x. However, the project would not directly emit ozone, since it is formed in the atmosphere during the photochemical reaction of ozone precursors.

As noted previously, the project would emit ultrafine particles. However, there is currently no accepted methodology to quantify or assess the significance of such particles.

3.3 - Construction

Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and prevailing weather conditions. Construction emissions result from onsite and offsite activities. Onsite emissions principally consist of exhaust emissions from the activity levels of heavy-duty construction equipment, motor vehicle operation, and fugitive dust (mainly PM_{10}) from disturbed soil. Additionally, paving operations and application of architectural coatings would release VOC emissions. Offsite emissions are caused by motor vehicle exhaust from delivery vehicles, worker traffic, and road dust (PM_{10} and $PM_{2.5}$).

The activity for construction equipment is based on the horsepower and load factors of the equipment. In general, the horsepower is the power of an engine—the greater the horsepower, the greater the power. The load factor is the average power of a given piece of equipment while in operation compared with its maximum rated horsepower. A load factor of 1.0 indicates that a piece of equipment continually operates at its maximum operating capacity.

The construction equipment assumed for the project is shown in the CalEEMod output contained in Appendix A. The CalEEMod default construction equipment fleet mix was used in the analysis.

The construction schedule is shown in Table 5. CalEEMod default phase lengths for construction was used in the analysis.

Table 5: Construction Duration

Phase	Phase Start Date	Phase End Date
Site Preparation	4/1/2016	4/7/2016
Grading	4/8/2016	4/19/2016
Building Construction	4/20/2016	3/7/2017
Paving	3/8/2017	3/31/2017
Architectural Coating	4/1/2017	4/26/2017
FirstCarbon Solutions and CalEEMod.		

Construction Equipment Emission Factors

CalEEMod contains an inventory of construction equipment that incorporates estimates of the number of equipment, their age, their horsepower, and equipment tier from which rates of emissions are developed. The CalEEMod default tier mix was used in this analysis for the estimation of emissions from onsite construction equipment for the unmitigated scenario. CalEEMod's off-road emission factors are based on the equipment populations from the OFFROAD model.

Grading

During grading activities, fugitive dust can be generated from the movement of dirt on the project site. CalEEMod estimates dust from dozers moving dirt around, dust from graders or scrapers

leveling the land, and loading or unloading dirt into haul trucks. Each of those activities is calculated differently in CalEEMod, based on the number of acres traversed by the grading equipment.

Only some pieces of equipment generate fugitive dust in CalEEMod. The CalEEMod manual identifies various equipment and the acreage disturbed in an 8-hour day:

- Crawler tractors, graders, and rubber tired dozers: 0.5 acre per 8-hour day
- Scrapers: 1 acre per 8-hour day

Therefore, the following acres are the quantity disturbed per day, per phase, according to the quantities of acreage disturbed listed above:

- Site preparation = 1.5 acres per day
- Grading = 2.5 acres per day
- Building Construction = 1.5 acres per day

It was also assumed that soil will be balanced onsite and therefore there would be no material imported or exported from the project site. Additionally, with implementation of the detention basin onsite, a total of 14,662 cubic yards of soil would be excavated during grading. It was determined that the default equipment CalEEMod provided would be sufficient in excavation of the basin.

Construction Offsite Trips

Worker trips are accounted for the construction phases based on 1.25 trips per piece of equipment (the CalEEMod default). The CalEEMod default worker trip length of 10.8 miles was kept. The CalEEMod default vehicle fleet (LD Mix) was used for employee trips.

Vendor trips for the building construction phase are calculated from a study performed by the Sacramento Metropolitan Air Quality Management District (SMAQMD) based on land use and size. The CalEEMod defaults for vendor trips, trip length, and vehicle fleet (Heavy-Duty Truck Mix) were used.

There were no haul trips expected for this project.

A summary of the construction related trips is shown in Table 6. Note that the total number of offsite construction trips would not necessarily occur on the same day, since construction activities would vary each day.

Table 6: Construction Offsite Trips

Activity	Construction Trips per Day		
	Worker	Vendor	Haul
Site Preparation	18	0	0
Grading	15	0	0
Building Construction	68	28	0

Table 6 (cont.): Construction Offsite Trips

Activity	Construction Trips per Day		
	Worker	Vendor	Haul
Paving	20	0	0
Architectural Coating	14	0	0
Source: FirstCarbon Solutions and CalEEMod.			

3.4 - Operation

Operational emissions are those emissions that occur during operation of the project. The major sources are summarized below.

Motor Vehicles

The emission estimation process requires the identification and quantification of the local sources of air emissions from the project. Each piece of equipment that emits is identified as to location and physical characteristics (release height, release temperature, etc.) as well as the chemical nature of the emissions. The criteria pollutant emissions from the operation of the project would consist of the pollutants NO_2, PM_{10}, $PM_{2.5}$, SO_x, and CO. The primary sources of these pollutants include:

- Delivery truck traffic (exhaust, idling, and transportation refrigeration units while operating on the project site);
- Customer-generated vehicular traffic operating within the parking lot on the project site; and
- Delivery truck and customer traffic along local roadways leading to and from the project.

The estimation of emissions from the above emission sources requires the specification of several key pieces of information including the number of vehicle trips by vehicle type, trip travel lengths, vehicle idling time, vehicle speed, and emission factors that define the amount of emissions as a function of vehicle speed and distance traveled or amount of idling time per vehicle as discussed below. The operational phasing and trip generation rates are shown in Table 7. The trip generation rates are from the project specific traffic study (KD Anderson and Associates, Inc. 2014).

Table 7: Trip Generation Rates

Land Use	Quantity	Units	Trip Generation Rate (trips/unit/day)		
			Weekday	Saturday	Sunday
Supermarket	25.3	ksf	121.10	177.59	166.44
Pharmacy/Drugstore with Drive Thru	16.0	ksf	96.91	96.91	96.91

Table 7 (cont.): Trip Generation Rates

Land Use	Quantity	Units	Trip Generation Rate (trips/unit/day)		
			Weekday	Saturday	Sunday
Fast Food Restaurant with Drive Thru	8.0	ksf	496.12	722.03	542.72
Gasoline Station with Convenience Store	12	Pump	152.84	152.84	152.84

Note:
ksf = thousand square feet
Source: Kimley-Horn and Associates and FirstCarbon Solutions.

A pass-by trip accounts for vehicles already on the roadway network that stop at the project site as they pass-by; the pass-by trips are existing vehicle trips in the community. The CalEEMod default pass-by trip rates of 36 percent, 49 percent, 50 percent and 56 percent were used for the land uses, Supermarket, Pharmacy/Drugstore with Drive Thru, Fast Food Restaurant with Drive Thru, and Gasoline Station with Convenience Store respectively.

The vehicle fleet mix is defined as the mix of motor vehicle classes active during the operation of the project. Emission factors are assigned to the expected vehicle mix as a function of vehicle class, speed, and fuel use (gasoline and diesel-powered vehicles). The passenger vehicle fleet mix used in this analysis is assumed to include all vehicle types except for light heavy-duty trucks, medium heavy-duty trucks, and urban buses. The passenger vehicle fleet mix is shown in Table 8, and is based on a redistribution of the CalEEMod default vehicle fleet.

Table 8: Passenger Vehicle Fleet Mix

Type of Vehicle	Fleet Fraction	
	CalEEMod Default	Project Analysis
Light duty automobile (LDA)	0.362060	0.424036
Light duty truck (LDT1)	0.068504	0.080230
Light duty truck (LDT2)	0.188353	0.220595
Medium duty vehicle (MDV)	0.183475	0.183475
Light-heavy duty truck (LHDT1)	0.063753	0.063753
Light-heavy duty truck (LHDT2)	0.009428	0.009428
Medium-heavy duty truck (MHDT)	0.016399	0.000890
Heavy-heavy duty truck (HHDT)	0.091103	0.000668
Other bus (OBUS)	0.002882	0.002882
Urban bus (UBUS)	0.000808	0.000808
Motorcycle (MCY)	0.008529	0.008529

Table 8 (cont.): Passenger Vehicle Fleet Mix

Type of Vehicle	Fleet (%)	
	CalEEMod Default	Project Analysis
School bus (SBUS)	0.001182	0.001182
Motor home (MH)	0.003525	0.003525
Source: FirstCarbon Solutions and CalEEMod.		

Architectural Coatings (Painting)

Paints release VOC emissions. The buildings in the project would be repainted on occasion. CalEEMod defaults were used for this purpose.

Consumer Products

Consumer products are various solvents used in non-industrial applications, which emit VOCs during their product use. "Consumer Product" means a chemically formulated product used by household and institutional consumers, including but not limited to detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products, but it does not include other paint products, furniture coatings, or architectural coatings (ARB 2011a). The default emission factor developed for CalEEMod was used.

Landscape Equipment

CalEEMod estimated the landscaping equipment using the default assumptions in the model.

Natural Gas

There would be emissions from the combustion of natural gas used for the project (water heaters, heat, etc.). CalEEMod has two categories for natural gas consumption: Title 24 and non-Title 24. For a pharmacy, approximately 100 percent of the natural gas consumption is impacted by Title 24 regulations; for a fast-food restaurant with drive-through, approximately 30 percent of the natural gas consumption is impacted by Title 24 (see Appendix D of the CalEEMod manual).

SECTION 4: AIR QUALITY IMPACT ANALYSIS

This section calculates the expected emissions from construction and operation of the project as a necessary requisite for assessing the regulatory significance of project emissions on a regional and localized level.

4.1 - CEQA Guidelines

The CEQA Guidelines define a significant effect on the environment as "a substantial, or potentially substantial, adverse change in the environment." To determine if a project would have a significant impact on air quality, the type, level, and impact of emissions generated by the project must be evaluated.

The following air quality significance thresholds are contained in Appendix G of the CEQA Guidelines. A significant impact would occur if the project would:

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 nonattainment under an applicable national or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

d) Expose sensitive receptors to substantial pollutant concentrations; or

e) Create objectionable odors affecting a substantial number of people.

While the final determination of whether a project is significant is within the purview of the Lead Agency pursuant to Section 15064(b) of the CEQA Guidelines, the District recommends that its quantitative air pollution thresholds be used to determine the significance of project emissions. If the Lead Agency finds that the project has the potential to exceed these air pollution thresholds, the project should be considered to have significant air quality impacts. The applicable District thresholds and methodologies are contained under each impact statement below.

4.2 - Impact Analysis

Consistency with Air Quality Management Plan

Impact AIR-1:	**The project would not conflict with or obstruct implementation of the applicable air quality plan.**

Impact Analysis

The CEQA Guidelines indicate that a significant impact would occur if the proposed project would conflict with or obstruct implementation of the applicable air quality plan. The GAMAQI does not

provide specific guidance on analyzing conformity with the Air Quality Plan (AQP). Therefore, this document proposes the following criteria for determining project consistency with the current AQPs:

1. Will the project result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQPs? This measure is determined by comparison to the regional and localized thresholds identified by the District for Regional and Local Air Pollutants.
2. Will the project conform to the assumptions in the AQPs?
3. Will the project comply with applicable control measures in the AQPs?

The use of the criteria listed above is a standard approach for CEQA analysis of projects in the District's jurisdiction, as well as within other air districts, for the following reasons:

- Significant contribution to existing or new exceedances of the air quality standards would be inconsistent with the goal of attaining the air quality standards.
- Air Quality Plan (AQP) emissions inventories and attainment modeling are based on growth assumptions for the area within the air district's jurisdiction.
- AQPs rely on a set of air district-initiated control measures as well as implementation of federal and state measures to reduce emissions within their jurisdictions, with the goal of attaining the air quality standards.

AQPs are plans for reaching attainment of air quality standards. The assumptions, inputs, and control measures are analyzed to determine if the Air Basin can reach attainment for the ambient air quality standards. In order to show attainment of the standards, the District analyzes the growth projections in the valley, contributing factors in air pollutant emissions and formations, and existing and future emissions controls. The District then formulates a control strategy to reach attainment.

Contribution to Air Quality Violations

A measure of determining if the project is consistent with the air quality plans is if the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the air quality plans. Because of the region's nonattainment status for ozone, $PM_{2.5}$, and PM_{10}, if project-generated emissions of either of the ozone precursor pollutants (ROG and NO_x), PM_{10}, or $PM_{2.5}$ would exceed the District's significance thresholds, then the project would be considered to conflict with the attainment plans.

As discussed in Impact AIR-2 and AIR-3 below, emissions of ROG, NO_x, PM_{10}, and $PM_{2.5}$ associated with the construction and operation of the project would not exceed the District's significance thresholds; therefore, impacts would be considered less than significant. As shown in Impact AIR-2 below, the project would not result in CO hotspots that would violate CO standards. Therefore, the project would not contribute to air quality violations.

Consistency with Assumptions in AQPs

The primary way of determining consistency with the AQP's assumptions is determining consistency with the applicable General Plan to ensure that the project's population density and land use are consistent with the growth assumptions used in the AQPs for the air basin.

As required by California law, city and county General Plans contain a Land Use Element that details the types and quantities of land uses that the city or county estimates will be needed for future growth, and designates locations for land uses to regulate growth. Existing and future pollutant emissions computed in the AQP are based on land uses from area general plans. AQPs detail the control measures and emission reductions required for reaching attainment of the air standards based on these growth and emission estimates.

The applicable General Plan for the project is the Madera County General Plan, which was adopted in 2010. The General Plan is not unchangeable, as circumstances or the County's desires change, the General Plan may be amended following review by the Planning Commission. Therefore, if the project is consistent with the General Plan, then the project is automatically consistent with the applicable AQPs as described in Section 2.2.2. The project site would not involve a general plan amendment or require rezoning; additionally, the proposed land use intensity would not exceed the current land use intensity of the surrounding area because areas to the north and east are developed. Areas surrounding the project site primarily consists of agriculture uses to the south and west with development to the north (Liberty High School) and east (existing residences), however the project site falls within the idle land (I) land use designation, which allows for development. Therefore, the project's land use is consistent with the General Plan and would not alter the current land use designation. The impact would be less than significant.

Control Measures

The AQP contains a number of control measures, which are enforceable requirements through the adoption of rules and regulations. A detailed description of rules and regulations that apply to this project is provided in Section 2.2, Regulatory Setting. The project would comply with all of the District's applicable rules and regulations. Therefore, the project complies with this criterion and would not conflict with or obstruct implementation of the applicable air quality attainment plan.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

Potential for Air Quality Standard Violation

Impact AIR-2: **The project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation.**

Impact Analysis

Regional Emissions

Air pollutant emissions have regional effects and localized effects. This analysis assesses the regional effects of the project's criteria pollutant emissions in comparison to District thresholds of significance for short-term construction activities and long-term operation of the project. Localized emissions from project construction and operation are also assessed using concentration-based thresholds compared with ambient air quality standards or significance thresholds.

The primary pollutants of concern during project construction and operation are ROG, NO_x, PM_{10}, and $PM_{2.5}$. The District current GAMAQI adopted in 2002 contains thresholds for ROG and NO_x; however, pending completion of an update to the GAMAQI, the District recommends using thresholds for PM_{10}, and $PM_{2.5}$ based on Rule 2201 New Source Review offset thresholds.

Ozone is a secondary pollutant that can be formed miles away from the source of emissions through reactions of ROG and NO_x emissions in the presence of sunlight. Therefore, ROG and NO_x are termed ozone precursors. The Basin often exceeds the state and national ozone standards. Therefore, if the project emits a substantial quantity of ozone precursors, the project may contribute to an exceedance of the ozone standard. The Basin also exceeds air quality standards for PM_{10}, and $PM_{2.5}$; therefore, substantial project emissions may contribute to an exceedance for these pollutants. The District's annual emission significance thresholds used for the project define substantial contribution both operational and construction emissions are as follows:

- 10 tons per year ROG
- 10 tons per year NO_x
- 15 tons per year PM_{10}
- 15 tons per year $PM_{2.5}$

The Draft 2012 GAMAQI contains significance thresholds for CO (100 tons per year) and SO_x (27 tons per year). Sulfur dioxide and CO are not included in the regional analysis because these pollutants are in attainment and the District has not issued final significance thresholds for these pollutants. Additionally, only minor amounts of sulfur dioxide are emitted during construction and operation, as shown in the output files contained in Appendix A.

Construction Emissions

Construction emissions associated with the project are shown in Table 9. For assumptions in estimating the emissions, please refer to Section 4, Modeling Parameters and Assumptions. As shown in Table 9, the emissions are below the significance thresholds and, therefore, are less than significant on a project basis.

Table 9: Construction Air Pollutant Emissions

Source	Emissions (tons per year)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Site Preparation	0.01	0.14	0.05	0.03
Grading	0.01	0.15	0.04	0.02
Building Construction 2016	0.38	2.97	0.25	0.19
Building Construction 2017	0.09	0.69	0.06	0.05
Paving	0.02	0.15	0.01	0.01
Architectural Coating	0.38	0.02	0.00	0.00
Total	0.90	4.05	0.41	0.30
Significance threshold	10	10	15	15
Exceed threshold – significant impact?	No	No	No	No

Notes:
ROG = reactive organic gases NO_x = nitrogen oxides PM_{10} and $PM_{2.5}$ = particulate matter
Source: Appendix A.

Operational Emissions

Operational emissions occur over the lifetime of the project and are from two main sources: area sources and motor vehicles, or mobile sources. Operational emissions are shown in Table 10. For assumptions in estimating the emissions, please refer to Section 4, Modeling Parameters and Assumptions. As shown in the table, the emissions are below the adopted and recommended District significance thresholds for ROG, PM_{10}, $PM_{2.5}$ and NO_x, therefore, the project results in a less than significant impact. Although not required to demonstrate that the project is less than significant, it will be required to comply with Rule 9510 – Indirect Source Review that requires operational emission reductions of NO_x of 33 percent and PM_{10} of 50 percent from the unmitigated project emissions. Rule 9510 helps to reduce the cumulative air quality impacts of development in the SJVAB.

Table 10: Operational Air Pollutant Emissions

Source	Emissions (tons per year)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Area	0.23	0.00	0.00	0.00
Energy	0.01	0.12	0.01	0.01
Mobile	5.57	6.04	3.62	1.01
Total	5.81	6.15	3.63	1.02
Significance threshold	10	10	15	15
Exceed threshold - significant impact?	No	No	No	No

Table 10 (cont.): Operational Air Pollutant Emissions

Source	Emissions (tons per year)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Notes: ROG = reactive organic gases NO_x = nitrogen oxides PM_{10} and $PM_{2.5}$ = particulate matter Area source emissions include emissions from natural gas, landscape, and painting. Source: Appendix A.				

Localized Pollutant Analysis

Emissions occurring at or near the project have the potential to create a localized impact also referred to as an air pollutant hotspot. Localized emissions are considered significant if when combined with background emissions, they would result in exceedance of any health-based air quality standard. In locations that already exceed standards for these pollutants, significance is based on a significant impact level (SIL) that represents the amount that is considered a cumulatively considerable contribution to an existing violation of an air quality standard. The pollutants of concern for localized impact in the SJVAB are nitrogen dioxide (NO_2), sulfur dioxide (SO_x), and CO.

The Air Basin is in attainment for the nitrogen dioxide ambient air quality standards. The national ambient air quality standard for 1 hour nitrogen dioxide is 0.100 parts per million (ppm). As shown in Table 2, the highest 1-hour concentration of nitrogen dioxide is 0.055 ppm, which is well below the standard. Localized NO_2 emissions are primarily a concern where there are large concentrations of heavy-duty diesel trucks. The project will generate limited numbers of truck trips. Therefore, the project would not substantial amounts of NO_2 emissions to the ambient background levels. This impact is less than significant and the project would not contribute to an exceedance of the nitrogen dioxide standard.

Sulfur oxides (SOx) emissions are primarily generated by the combustion of fuels containing sulfur, The sulfur content of fuels has been substantially reduced through state and federal fuel regulations on sulfur content. As shown in Table 2, the highest background 24-hour concentration of sulfur dioxide is 0.004 ppm, substantially under the state ambient air quality standard of 0.04 ppm. The project would produce minimal emissions of sulfur oxides (SO_x). Therefore, the project emissions would not cause or contribute to an air quality standard violation for sulfur dioxide. This impact is less than significant.

Other pollutants such as visibility reducing particles, lead, hydrogen sulfide, and vinyl chloride emissions would either not be emitted or would be at low levels.

Carbon Monoxide Hot Spot Analysis

Localized high levels of CO are associated with traffic congestion and idling or slow-moving vehicles. The SJVAPCD provides screening criteria to determine when to quantify local CO concentrations based on impacts to the level of service (LOS) of roadways in the project vicinity.

This proposed project would construct a 53,800-square-feet shopping center on approximately 40.2 acres of land. Construction of the proposed project would result in minor increases in traffic for the surrounding road network during the 11 months of construction. As shown in the Traffic Analysis (KD Anderson and Associates, Inc. 2014) operational vehicle would result in minor increase in daily trips would not substantially reduce the LOS, intersections would continue to operate at LOS A or LOS B. In addition, the highest background 24-hour concentration of CO, as shown in Table 2, is 2.29 ppm, approximately 75 percent lower than the state ambient air quality standard of 9.00 ppm. Therefore, the project would not significantly contribute to an exceedance that will exceed state or federal CO standards.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

Cumulative Impacts

Impact AIR-3:	**The project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).**

Impact Analysis

To result in a less than significant impact, the following criteria must be true:

1. Regional analysis: emissions of nonattainment pollutants must be below the District's regional significance thresholds. This is an approach recommended by the District in its GAMAQI.
2. Summary of projections: the project must be consistent with current air quality attainment plans including control measures and regulations. This is an approach consistent with Section 15130(b) of the CEQA Guidelines.
3. Cumulative health impacts: the project must result in less than significant cumulative health effects from the nonattainment pollutants. This approach correlates the significance of the regional analysis with health effects, consistent with the court decision, *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1219-20.

Step 1: Regional Analysis

If an area is in nonattainment for a criteria pollutant, then the background concentration of that pollutant has historically exceeded the ambient air quality standard. It follows that if a project

exceeds the regional threshold for that nonattainment pollutant, then it would result in a cumulatively considerable net increase of that pollutant and result in a significant cumulative impact.

The Air Basin is in nonattainment for PM_{10}, $PM_{2.5}$, and ozone. Therefore, if the project exceeds the regional thresholds for PM_{10}, or $PM_{2.5}$, then it contributes to a cumulatively considerable impact for those pollutants. If the project exceeds the regional threshold for NO_x or VOC, then it follows that the project would contribute to a cumulatively considerable impact for ozone.

Regional emissions include those generated from all onsite and offsite activities. Regional significance thresholds have been established by the District because emissions from projects in the Air Basin can potentially contribute to the existing emission burden and possibly affect the attainment and maintenance of ambient air quality standards. Projects within the Air Basin region with regional emissions in excess of any of the thresholds presented previously are considered to have a significant regional air quality impact.

The criteria pollutant emissions analysis assessed whether the project would exceed the District's thresholds of significance. As shown in Table 9 and Table 10, criteria pollutant emissions would not exceed any threshold of significance during project construction or operation. Therefore, the combination of unmitigated project emissions with the criteria pollutants from other sources within the Basin would not cumulatively contribute to a significant impact according to this criterion.

Step 2: Plan Approach

Section 15130(b) of the CEQA Guidelines states the following:

> The following elements are necessary to an adequate discussion of significant cumulative impacts: 1) Either: (A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact.

In accordance with CEQA Guidelines 15130(b), this analysis of cumulative impacts is based on a summary of projections analysis. This analysis considers the current CEQA Guidelines, which includes the recent amendments approved by the Natural Resources Agency and effective on March 18, 2010. The Air Basin is in nonattainment for ozone and particulate matter (PM_{10} and $PM_{2.5}$), which means that concentrations of those pollutants currently exceed the ambient air quality standards for those pollutants. When concentrations of ozone, PM_{10}, or $PM_{2.5}$ exceed the ambient air quality standard, then those sensitive to air pollution (such as children, the elderly, and the infirm) could experience health effects such as decrease of pulmonary function and localized lung edema in humans and animals, increased mortality risk, and risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans.

Under the amended CEQA Guidelines, cumulative impacts may be analyzed using other plans that evaluate relevant cumulative effects. The geographic scope for cumulative criteria pollution from air quality impacts is the Air Basin, because that is the area in which the air pollutants generated by the sources within the basin circulate and are often trapped. The District is required to prepare and maintain air quality attainment plans and a State Implementation Plan to document the strategies and measures to be undertaken to reach attainment of ambient air quality standards. While the District does not have direct authority over land use decisions, it is recognized that changes in land use and circulation planning are necessary to maintain clean air. The District evaluated the entire Basin when it developed its attainment plans.

In accordance with CEQA Guidelines Section 15064, subdivision (h)(3), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously approved plan or mitigation program.

The history and development of the District's current Ozone Attainment Plan is described in Section 2.3, Regulatory Setting. The Ozone Attainment Plan contains measures to achieve reductions in emissions of ozone precursors and sets plans towards attainment of ambient ozone standards. As discussed in Impact AIR-1, the project is consistent with all applicable control measures in the air quality attainment plans. The project would comply with any District rules and regulations that may pertain to implementation of the AQPs. Therefore, impacts would be less than significant with regard to compliance with applicable rules and regulations.

Step 3: Cumulative Health Impacts

The Basin is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$, which means that the background levels of those pollutants are at times higher than the ambient air quality standards. The air quality standards were set to protect public health, including the health of sensitive individuals (such as children, the elderly, and the infirm). Therefore, when the concentration of those pollutants exceeds the standard, it is likely that some sensitive individuals in the population would experience health effects that were described in Table 1. However, the health effects are a factor of the dose-response curve. Concentration of the pollutant in the air (dose), the length of time exposed, and the response of the individual are factors involved in the severity and nature of health impacts. If a significant health impact results from project emissions, it does not mean that 100 percent of the population would experience health effects. See Table 3 for additional discussion regarding the health impacts from existing ozone concentrations.

The regional analysis of construction and operational emissions indicates that the project would not exceed the District's significance thresholds. The project would not result in cumulative health impacts.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

Sensitive Receptors

Impact AIR-4:	**The project would not expose sensitive receptors to substantial pollutant concentrations.**

Impact Analysis

Sensitive Receptors

Those who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. The District considers a sensitive receptor to be a location that houses or attracts children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Examples of sensitive receptors include hospitals, residences, convalescent facilities, and schools.

The closest sensitive receptors are residences 80 feet from the project site to the east.

Impacts to Onsite Workers

There are a variety of state and national programs that protect workers from safety hazards, including high air pollutant concentrations (California OSHA and CDC 2012). Onsite workers are not required to be addressed through the health risk assessment process. A document published by the California Air Pollution Control Officers Association (CAPCOA 2009), Health Risk Assessments for Proposed Land Use Projects, indicates that onsite receptors are included in risk assessments if they are persons not employed by the project. Persons not employed by the project would not remain onsite for any significant period. Therefore, a health risk assessment for onsite workers is not required or recommended.

Construction: ROG

During the application of architectural coatings (painting), ROG is emitted. The amount emitted is dependent on the amount of ROG (or VOC) in the paint. ROG emissions are typically an indoor air quality health hazard concern and not an outdoor air quality health hazard concern. Therefore, exposure of ROG during architectural coatings is a less than significant health impact.

Three types of asphalt are typically used in paving: asphalt cements, cutback asphalts, and emulsified asphalts. However, District Rule 4641 prohibits the use of the following types of asphalt: rapid cure cutback asphalt; medium cure cutback asphalt; slow cure asphalt that contains more than one-half (0.5) percent of organic compounds that evaporate at 500 degrees Fahrenheit (°F) or lower; and emulsified asphalt containing organic compounds, in excess of 3 percent by volume, that evaporate at 500°F or lower. An exception to this is medium cure asphalt when the National Weather Service official forecast of the high temperature for the 24-hour period following application is below 50°F.

The acute (short-term) health effects from worker direct exposure to asphalt fumes include irritation of the eyes, nose, and throat. Other effects include respiratory tract symptoms and pulmonary function changes. The studies were based on occupational exposure of fumes. The closest residents

to the project site are located approximately 40 feet east of the project site, and any such fumes would be temporary in nature; therefore, they would not be subjected to concentrations high enough to evoke a negative response. In addition, the restrictions that are placed on asphalt in the San Joaquin Valley reduce ROG emissions from asphalt and exposure. The impact to nearby sensitive receptors from ROG during construction is less than significant.

Operation: ROG

During operation, ROG would be emitted primarily from motor vehicles. Direct exposure to ROG from project motor vehicles would not result in health effects, because the ROG would be distributed across miles and miles of roadway and in the air. The concentrations would not be great enough to result in direct health effects.

Construction: NO_x, PM_{10}, $PM_{2.5}$

As discussed in Impact AIR-2, emissions during construction would not exceed the significance thresholds.

Operation: PM_{10}, $PM_{2.5}$, CO, NO_2

As discussed in Impact AIR-2, localized concentrations of PM_{10}, $PM_{2.5}$, CO, and NO_2 would not exceed the ambient air quality standards. The ambient air quality standards were set to protect the health of sensitive individuals. If the concentration of those pollutants is under the ambient air quality standards, then no significant health effects would be observed. Therefore, the project would not expose sensitive receptors to substantial criteria air pollutant concentrations during operation.

Construction: Toxic Air Contaminants

Although construction of the project would involve the use of diesel-fueled vehicles, construction risks were not analyzed because of the short duration of the construction phase. While operational emissions are ongoing, the construction phase emissions are short-term. The California Office of Environmental Health Hazard Assessment (OEHHA) provides exposure variants for 9-, 30-, and 70-year exposures its Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2003). These exposures are chosen to coincide with the EPA's estimates of the average (9 years), high-end estimates (30 years) of residence time, and a typical lifetime (70 years). OEHHA states its support for the use of cancer potency factors for estimating cancer risk for these exposure durations. However, as the exposure duration decreases, the uncertainties introduced by applying cancer potency factors derived from very-long-term studies increases. Short-term high exposures are not necessarily equivalent to longer-term lower exposures even when the total dose is the same. OEHHA therefore does not support the use of current cancer potency factor to evaluate cancer risk for exposures of less than 9 years (refer to page 8-4 of OEHHA 2003).

In addition, guidance published by the Health Risk Assessments for Proposed Land Use Projects (CAPCOA 2009) does not include guidance for health risks from construction projects addressed in CEQA; risks near construction projects are expected to be included later when the toxic emissions from construction activities are better understood.

Construction phase risks would be considered acute health risks as opposed to cancer risks, which are long-term. OEHHA has yet to define acute risk factors for diesel particulates that would allow

the calculation of a hazards risk index; thus, evaluation of this impact would be speculative and no further discussion is necessary.

Operation: Toxic Air Contaminants

The ARB Air Quality and Land Use Handbook (2005) contains recommendations that will "help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of air pollution," including recommendations for distances between sensitive receptors and certain land uses. These recommendations are assessed as follows.

- **Heavily traveled roads**. ARB recommends avoiding new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day. Epidemiological studies indicate that the distance from the roadway and truck traffic densities were key factors in the correlation of health effects, particularly in children. The project is immediately adjacent to Avenue 12 to the north, which is estimated to currently have 2,600 vehicles per day (California Environmental Health Tracking Program 2011).
- **Distribution centers**. ARB also recommends avoiding siting new sensitive land uses within 1,000 feet of a distribution center. The proposed project would not site new sensitive land uses and would not include development of a distribution center.
- **Fueling stations**. ARB recommends avoiding new sensitive land uses within 300 feet of a large fueling station (a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gas dispensing facilities. The project would include the development of a 12-pump gas station, which would be located more than 600 feet from existing residences.
- **Dry cleaning operations**. ARB recommends avoiding siting new sensitive land uses within 300 feet of any dry cleaning operation that uses perchloroethylene. For operations with two or more machines, ARB recommends a buffer of 500 feet. For operations with three or more machines, ARB recommends consultation with the local air district. The proposed project does not include the development of or would be located in a way that would expose sensitive land uses within 300 feet of any dry cleaning operation.

Although not on the ARB's list of projects of concern, shopping centers with grocery stores and pharmacies receive deliveries from diesel trucks that emit toxic air contaminants. The grocery is relatively small neighborhood market with 25,300 square feet of retail space. Based on truck trip generation from projects containing a similar range of uses, FCS estimated there would be an average of 6 heavy-duty truck trips per day and 10 medium-heavy truck deliveries per day to the stores in the shopping center. The SJVAPCD Health Risk Assessment Screening Tool was used to determine whether there was a potential to exceed the SJVAPCD risk threshold of an increased cancer risk of 10 in a million. The results of the screening analysis showed an increase of 0.43 in a million at the closest receptors located east and southeast of the project site. Therefore, the impacts from toxic air contaminant emissions will be less than significant. The results of the screening analysis are included in Appendix A.

Valley Fever

Valley fever, or coccidioidomycosis, is an infection caused by inhalation of the spores of the fungus, *Coccidioides immitis (C. immitis*). The spores live in soil and can live for an extended time in harsh environmental conditions. Activities or conditions that increase the amount of fugitive dust contribute to greater exposure, and they include dust storms, grading, and recreational off-road activities.

The San Joaquin Valley is considered an endemic area for Valley fever. The California Department of Public Health (CDPH) received reports of 16,107 incident cases of Valley fever, estimated symptom onset dates were from 2009 to 2012. Incident cases peaked at 5,182 in 2011, which was the highest annual number since the increasing trend from 2001. From 2009 through 2012, 213 or 1.3 percent case patients were reported to have died with Valley fever with Madera County having among the highest average annual incidence rate in the state at 20.7 incidences per 100,000.

The distribution of *C. immitis* within endemic areas is not uniform and growth sites are commonly small (a few tens of meters) and widely scattered. Known sites appear to have some ecological factors in common suggesting that certain physical, chemical, and biological conditions are more favorable for *C. immitis* growth. Avoidance, when possible, of sites favorable for the occurrence of *C. immitis* is a prudent risk management strategy. Listed below are ecologic factors and sites favorable for the occurrence of *C. immitis*:

1) Rodent burrows (often a favorable site for *C. immitis*, perhaps because temperatures are more moderate and humidity higher than on the ground surface)
2) Old (prehistoric) Indian campsites near fire pits
3) Areas with sparse vegetation and alkaline soils
4) Areas with high salinity soils
5) Areas adjacent to arroyos (where residual moisture may be available)
6) Packrat middens
7) Upper 30 centimeters of the soil horizon, especially in virgin undisturbed soils
8) Sandy well aerated soil with relatively high water holding capacities

Sites within endemic areas less favorable for the occurrence of *C. immitis* include:

1) Cultivated fields
2) Heavily vegetated areas (e.g. grassy lawns)
3) Higher elevations (above 7,000 feet)
4) Areas where commercial fertilizers (e.g. ammonium sulfate) have been applied
5) Areas that are continually wet
6) Paved (asphalt or concrete)or oiled areas
7) Soils containing abundant microorganisms
8) Heavily urbanized areas where there is little undisturbed virgin soil (USGS 2000).

The project site is in a suburban area that is developed to the north (Liberty High School) and east (existing residences), while the areas to the south and west consist of agriculture lands. This is an area cited above that would lead to a low probability of having *C. immitis* growth sites and exposure from disturbed soil.

Construction activities would generate fugitive dust that could contain *C. immitis* spores. The project will minimize the generation of fugitive dust during construction activities by complying with the District's Regulation VIII. Therefore, this regulation would reduce Valley fever impacts to less than significant.

During operations, dust emissions are anticipated to be negligible, because most of the project area would be occupied by buildings, pavement, and landscaped areas. This condition would preclude the possibility of the project from generating fugitive dust that may contribute to Valley fever exposure. Impacts would be less than significant.

Naturally Occurring Asbestos

According to a map of areas where naturally occurring asbestos in California are likely to occur (U.S. Geological Survey 2011), there are no such areas in the project area. Therefore, development of the project is not anticipated to expose receptors to naturally occurring asbestos. Impacts would be less than significant.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

Objectionable Odors

Impact AIR-5:	**The project would not create objectionable odors affecting a substantial number of people.**

Impact Analysis

Thresholds of Significance

Odor impacts on residential areas and other sensitive receptors, such as hospitals, day-care centers, schools, etc. warrant the closest scrutiny, but consideration should also be given to other land uses where people may congregate, such as recreational facilities, worksites, and commercial areas.

Two situations create a potential for odor impact. The first occurs when a new odor source is located near an existing sensitive receptor. The second occurs when a new sensitive receptor locates

near an existing source of odor. The District has determined the common land use types that are known to produce odors in the Basin. These types are shown in Table 11.

Table 11: Screening Levels for Potential Odor Sources

Odor Generator	Distance
Wastewater Treatment Facilities	2 miles
Sanitary Landfill	1 mile
Transfer Station	1 mile
Compositing Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	1 mile
Chemical Manufacturing	1 mile
Fiberglass Manufacturing	1 mile
Painting/Coating Operations (e.g., auto body shop)	1 mile
Food Processing Facility	1 mile
Feed Lot/Dairy	1 mile
Rendering Plant	1 mile
Source: San Joaquin Valley Air Pollution Control District, 2002.	

According to the District's 2002 GAMAQI, analysis of potential odor impacts should be conducted for the following two situations:

- **Generators:** projects that would potentially generate odorous emissions proposed to locate near existing sensitive receptors or other land uses where people may congregate, and
- **Receivers:** residential or other sensitive receptor projects or other projects built for the intent of attracting people locating near existing odor sources.

If the project were to result in sensitive receptors being located closer than the recommended distances to an odor generator listed in Table 11, a more detailed analysis including a review of District odor complaint records is recommended. The detailed analysis would involve contacting the District's Compliance Division for information regarding odor complaints. For a project locating near an existing source of odors, the project should be identified as having a significant odor impact if it is proposed for a site that is closer to an existing odor source than any location where there have been:

- More than one *confirmed* complaint per year averaged over a three-year period, or
- Three *unconfirmed* complaints per year averaged over a three-year period.

Project Analysis

Land uses that are typically identified as sources of objectionable odors include landfills, transfer stations, sewage treatment plants, wastewater pump stations, composting facilities, feed lots, coffee roasters, asphalt batch plants, and rendering plants. The project would not engage in any of these activities. Therefore, the proposed project would not be considered to have the potential to expose persons to substantial sources of objectionable odors.

During construction, the various diesel-powered vehicles and equipment in use onsite would create localized odors. These odors would be temporary and would not likely be noticeable for extended periods of time beyond the project's site boundaries. The potential for diesel odor impacts is therefore less than significant.

During operations, the project would not be a typical source of objectionable odors. Typical sources of objectionable odors include agricultural operations (dairies, feedlots, etc.), landfills, wastewater treatment plants, refineries, and other types of industrial land uses. The project would include a commercial kitchen at the fast food restaurant sites. Kitchens are not listed as a typical source of odor in its screening guidance or in the significance determination guidance; however, restaurants can generate odor from cooking processes and waste disposal. Odors from cooking will be dispersed through appropriate ventilation and fans in compliance with local and state regulations.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

SECTION 5: REFERENCES

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Appendix A:
Air Quality Modeling Output

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Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Pharmacy/Drugstore with Drive Thru	16.00	1000sqft	0.37	16,000.00	0
Parking Lot	301.00	Space	2.71	120,400.00	0
Fast Food Restaurant with Drive Thru	8.00	1000sqft	0.18	8,000.00	0
Gasoline/Service Station	12.00	Pump	0.04	1,694.10	0
Supermarket	25.30	1000sqft	0.58	25,300.00	0

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U	Urban	S	2.9	D	51
Z	3			O	2017
U	Pacific Gas & Electric Company				
O M	641.35	H M	0.029	N O M	0.006

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Project Characteristics - Construction Run

Land Use - Shopping Center includes: a 25.3 ksf Supermarket, 16 ksf Pharmacy with Drive Thru, two 4 ksf Fast Food Restaurants with Drive Thru, 12 pump Fuel Station with Convenience Store, and 301 spaces of parking.

Construction Phase - Construction starts April 2016 and completes April 2017.

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2017

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Tota	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4111	3.1901	2.8816	3.9000e-003	0.1383	0.2009	0.3392	0.0564	0.1883	0.2447						
2017	0.4908	0.8590	0.7943	1.1700e-003	0.0194	0.0535	0.0729	5.2400e-003	0.0502	0.0554						
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Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/1/2016	4/7/2016	5	5	
2	Grading	Grading	4/8/2016	4/19/2016	5	8	
3	Building Construction	Building Construction	4/20/2016	3/7/2017	5	230	
4	Paving	Paving	3/8/2017	3/31/2017	5	18	
5	Architectural Coating	Architectural Coating	4/1/2017	4/26/2017	5	18	

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	2	6.00	130	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

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Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	68.00	28.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248						
Off-Road	0.0127	0.1366	0.1028	1.0000e-004		7.3500e-003	7.3500e-003		6.7600e-003	6.7600e-003						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Worker	1.7000e-004	2.4000e-004	2.5200e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0262	0.0000	0.0262	0.0135	0.0000	0.0135						
Off-Road	0.0147	0.1538	0.1043	1.2000e-004		8.7900e-003	8.7900e-003		8.0900e-003	8.0900e-003						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Worker	2.3000e-004	3.2000e-004	3.3600e-003	1.0000e-005	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3117	2.6083	1.6934	2.4500e-003		0.1800	0.1800		0.1691	0.1691						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	0.0482	0.2575	0.6269	6.1000e-004	0.0165	4.3100e-003	0.0208	4.7100e-003	3.9600e-003	8.6600e-003						
Worker	0.0235	0.0333	0.3484	6.1000e-004	0.0496	4.2000e-004	0.0500	0.0132	3.9000e-004	0.0136						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0729	0.6205	0.4260	6.3000e-004		0.0419	0.0419		0.0393	0.0393						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	0.0106	0.0585	0.1444	1.6000e-004	4.2400e-003	9.3000e-004	5.1700e-003	1.2100e-003	8.6000e-004	2.0700e-003						
Worker	5.2000e-003	7.6200e-003	0.0795	1.6000e-004	0.0127	1.0000e-004	0.0128	3.3800e-003	1.0000e-004	3.4800e-003						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0149	0.1512	0.1124	1.7000e-004		9.0500e-003	9.0500e-003		8.3400e-003	8.3400e-003						
Paving	3.5500e-003					0.0000	0.0000		0.0000	0.0000						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Worker	5.9000e-004	8.6000e-004	8.9600e-003	2.0000e-005	1.4300e-003	1.0000e-005	1.4500e-003	3.8000e-004	1.0000e-005	3.9000e-004						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3797					0.0000	0.0000		0.0000	0.0000						
Off-Road	2.9900e-003	0.0197	0.0168	3.0000e-005		1.5600e-003	1.5600e-003		1.5600e-003	1.5600e-003						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Worker	4.1000e-004	6.0000e-004	6.2700e-003	1.0000e-005	1.0000e-003	1.0000e-005	1.0100e-003	2.7000e-004	1.0000e-005	2.7000e-004						
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Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Pharmacy/Drugstore with Drive Thru	16.00	1000sqft	0.37	16,000.00	0
Parking Lot	301.00	Space	2.71	0.00	0
Fast Food Restaurant with Drive Thru	8.00	1000sqft	0.18	8,000.00	0
Gasoline/Service Station	12.00	Pump	0.04	1,694.10	0
Supermarket	25.30	1000sqft	0.58	25,300.00	0

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U	Urban	S	2.9	D	51
Z	3			O	2017
U	Pacific Gas & Electric Company				
O M	641.35	H M	0.029	N O M	0.006

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Land Use - Zero out parking SF per CalEEMod Guidance

Construction Phase - Construction schedule provided by the applicant

Vehicle Trips - Trip generation from KD Anderson Traffic Study

Vechicle Emission Factors - Truck fleet mix revised based on survey from similar shopping center

Mobile Land Use Mitigation - Project design features

Energy Mitigation - 2013 Title 24 Compliance

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	120,400.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleEF	HHD	0.09	6.6800e-004
tblVehicleEF	LDA	0.36	0.42
tblVehicleEF	LDT1	0.07	0.08
tblVehicleEF	LDT2	0.19	0.22
tblVehicleEF	MHD	0.02	8.9000e-004
tblVehicleTrips	ST_TR	162.78	152.84
tblVehicleTrips	ST_TR	88.16	96.91
tblVehicleTrips	SU_TR	162.78	152.84
tblVehicleTrips	SU_TR	88.16	96.91
tblVehicleTrips	WD_TR	162.78	152.84
tblVehicleTrips	WD_TR	88.16	96.91

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2349	3.0000e-005	3.3900e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005						
Energy	0.0144	0.1305	0.1096	7.8000e-004		9.9200e-003	9.9200e-003		9.9200e-003	9.9200e-003						
Mobile	5.6464	6.3648	43.1939	0.0578	3.8417	0.0679	3.9096	1.0260	0.0624	1.0884						
Waste						0.0000	0.0000		0.0000	0.0000						
Water						0.0000	0.0000		0.0000	0.0000						
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2349	3.0000e-005	3.3900e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005						
Energy	0.0130	0.1177	0.0989	7.1000e-004		8.9500e-003	8.9500e-003		8.9500e-003	8.9500e-003						
Mobile	5.5719	6.0354	41.4509	0.0538	3.5572	0.0640	3.6212	0.9500	0.0589	1.0089						
Waste						0.0000	0.0000		0.0000	0.0000						
Water						0.0000	0.0000		0.0000	0.0000						
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	RO	**NO**	**O**	**SO**	**M**	**E M**	**M T**	**M .**	**E M .**	**M . T**	**O**	**N O**	**T O**	**H**	**N**	**O**
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Increase Density

Improve Walkability Design

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	5.5719	6.0354	41.4509	0.0538	3.5572	0.0640	3.6212	0.9500	0.0589	1.0089						
Unmitigated	5.6464	6.3648	43.1939	0.0578	3.8417	0.0679	3.9096	1.0260	0.0624	1.0884						

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	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Fast Food Restaurant with Drive Thru	3,968.96	5,776.24	4341.76	3,999,285	3,703,077
Gasoline/Service Station	1,834.08	1,834.08	1834.08	1,056,739	978,471
Parking Lot	0.00	0.00	0.00		
Pharmacy/Drugstore with Drive Thru	1,550.56	1,550.56	1550.56	1,765,632	1,634,860
Supermarket	2,586.67	4,493.03	4210.93	3,515,890	3,255,484
Total	9,940.27	13,653.91	11,937.33	10,337,545	9,571,892

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	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Fast Food Restaurant with Drive Thru	9.50	7.30	7.30	2.20	78.80	19.00	29	21	50
Gasoline/Service Station	9.50	7.30	7.30	2.00	79.00	19.00	14	27	59
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Pharmacy/Drugstore with Drive Thru	9.50	7.30	7.30	7.50	73.50	19.00	38	13	49
Supermarket	9.50	7.30	7.30	6.50	74.50	19.00	34	30	36

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.424036	0.080230	0.220595	0.183475	0.063753	0.009428	0.000890	0.000668	0.002882	0.000808	0.008529	0.001182	0.003525

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Historical Energy Use: N

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Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						
NaturalGas Mitigated	0.0130	0.1177	0.0989	7.1000e-004		8.9500e-003	8.9500e-003		8.9500e-003	8.9500e-003						
NaturalGas Unmitigated	0.0144	0.1305	0.1096	7.8000e-004		9.9200e-003	9.9200e-003		9.9200e-003	9.9200e-003						

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	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Gasoline/Service Station	36863.6	2.0000e-004	1.8100e-003	1.5200e-003	1.0000e-005		1.4000e-004	1.4000e-004		1.4000e-004	1.4000e-004						
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						
Pharmacy/Drugstore with Drive Thru	178400	9.6000e-004	8.7500e-003	7.3500e-003	5.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004						
Supermarket	748880	4.0400e-003	0.0367	0.0308	2.2000e-004		2.7900e-003	2.7900e-003		2.7900e-003	2.7900e-003						
Fast Food Restaurant with Drive Thru	1.69832e+006	9.1600e-003	0.0833	0.0699	5.0000e-004		6.3300e-003	6.3300e-003		6.3300e-003	6.3300e-003						
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	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						
Pharmacy/Drugstore with Drive Thru	134864	7.3000e-004	6.6100e-003	5.5500e-003	4.0000e-005		5.0000e-004	5.0000e-004		5.0000e-004	5.0000e-004						
Supermarket	630704	3.4000e-003	0.0309	0.0260	1.9000e-004		2.3500e-003	2.3500e-003		2.3500e-003	2.3500e-003						
Fast Food Restaurant with Drive Thru	1.6081e+006	8.6700e-003	0.0788	0.0662	4.7000e-004		5.9900e-003	5.9900e-003		5.9900e-003	5.9900e-003						
Gasoline/Service Station	27756.1	1.5000e-004	1.3600e-003	1.1400e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004						
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	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Fast Food Restaurant with Drive Thru	249520				
Gasoline/Service Station	16365				
Parking Lot	0				
Pharmacy/Drugstore with Drive Thru	146080				
Supermarket	877151				
T					

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	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Fast Food Restaurant with Drive Thru	230320				
Gasoline/Service Station	15150.3				
Parking Lot	0				
Pharmacy/Drugstore with Drive Thru	133552				
Supermarket	840947				
T					

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Tota	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2349	3.0000e-005	3.3900e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005						
Unmitigated	0.2349	3.0000e-005	3.3900e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005						

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Tota	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0355					0.0000	0.0000		0.0000	0.0000						
Consumer Products	0.1992					0.0000	0.0000		0.0000	0.0000						
Landscaping	3.3000e-004	3.0000e-005	3.3900e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005						

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0355					0.0000	0.0000		0.0000	0.0000						
Consumer Products	0.1992					0.0000	0.0000		0.0000	0.0000						
Landscaping	3.3000e-004	3.0000e-005	3.3900e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005						
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	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				
Unmitigated				

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	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Fast Food Restaurant with Drive Thru	2.42827 / 0.154996				
Gasoline/Service Station	0.159383 / 0.0976861				
Parking Lot	0 / 0				
Pharmacy/Drugstore with Drive Thru	1.12716 / 0.69084				
Supermarket	3.11869 / 0.0964542				

T				

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	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Fast Food Restaurant with Drive Thru	2.42827 / 0.154996				
Gasoline/Service Station	0.159383 / 0.0976861				
Parking Lot	0 / 0				
Pharmacy/Drugstore with Drive Thru	1.12716 / 0.69084				
Supermarket	3.11869 / 0.0964542				
T					

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	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				
Unmitigated				

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	Waste Disposed	Total CO2 CH4	N2O	CO2e
Land Use	tons	MT/yr		
Fast Food Restaurant with Drive Thru	92.15			
Gasoline/Service Station	6.47			
Parking Lot	0			
Pharmacy/Drugstore with Drive Thru	48.11			
Supermarket	142.69			
T				

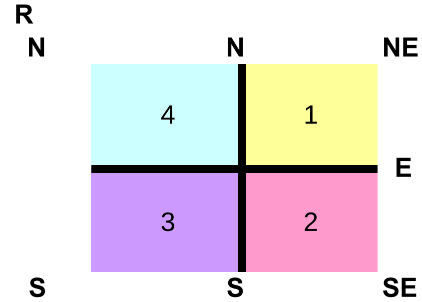
M

	Waste Disposed	Total CO2 CH4	N2O	CO2e
Land Use	tons	MT/yr		
Fast Food Restaurant with Drive Thru	92.15			
Gasoline/Service Station	6.47			
Parking Lot	0			
Pharmacy/Drugstore with Drive Thru	48.11			
Supermarket	142.69			
T				

Truck Idling & TRU's

Date : 18-Aug-14
Facility Name: Liberty Village
Facility Location: Fresno, CA
Facility ID #:

R



Unit #	Unit Type T = TRU HH = High Horizontal HV = High Vertical LL = Low Level	Operational Time / Event (Hour)	PM10 g/hr	Events/ Year	Receptor Distance (m)	Quad	Load %	Emissions Lb / Yr	U=Urban UB=Urban Near Building R=Rural RB=Rural Near Building	Unit Risk
6	HH	1.25	0.035112	365	50	2	59	2.08E-02	RB	. E
3	HH	0.75	0.012224	365	50	2	59	4.35E-03	RB	. E
							59	0.00E+00	RB	
						2	55	0.00E+00	RB	
						2	59	0.00E+00		
						2	60	0.00E+00		
						2	60	0.00E+00		
							60	0.00E+00		
							100	0.00E+00		. E
							100	0.00E+00		
							100	0.00E+00		
							100	0.00E+00		
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							100	0.00E+00		
							100	0.00E+00		
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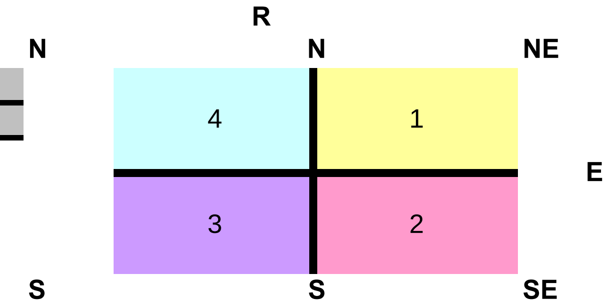
							100	0.00E+00		

0.06

Truck Travel

Date : 8/19/2014
Facility Name: Liberty Village
Facility Location: Madera, CA
Facility ID #:

R



Unit #	Segment Direction EW = East-West NS = North-South NWSE = Northwest-Southeast NESW = Northeast-Southwest	# (50m) Segments	PM10 g/mi	Events/ Year	Receptor Distance (m)	Quad	Load %	Emissions Lb / Yr	Location U=Urban R=Rural	Segment Risk
10	ns	24	0.0743502	365	50	2	100	4.46E-02	R	. E
6	ns	15	0.09729	365	50	2	100	3.65E-02	R	. E
							100	0.00E+00		
							100	0.00E+00		
							100	0.00E+00		
							100	0.00E+00		
							100	0.00E+00		. E
							100	0.00E+00		
							100	0.00E+00		
							100	0.00E+00		
							100	0.00E+00		
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							100	0.00E+00		
							100	0.00E+00		
							100	0.00E+00		

V	S	S	M	A
Deliveries Per Day		MHD	HHD	
Deliveries Per Day		5	3	
Idling per delivery (min)		15	15	
Total Minutes Idling per Day		75	45	
Total Idling (hours/day_		1.25	0.75	
Travel Distance Onsite (feet)		400	400	
Two way Trips per day		10	6	
Distance per day (feet)		4000	2400	
Convert to Meters		0.304	0.304	
Meters		1216	729.6	
50 m segments		24.32	14.592	
Distance per day (miles)		0.757576	0.454545	

TRAFFIC IMPACT ANALYSIS

FOR

MADERA RANCHOS RETAIL CENTER
Madera County, California

Prepared For:

Shaw Real Estate & Development Co.
P.O. Box 1569
Oakhurst, CA 93644

Prepared By:

KD Anderson & Associates, Inc.
3853 Taylor Road, Suite G
Loomis, CA 95650
(916) 660-1555

June 19, 2014

Job No. 6573-05
Madera Ranchos Retail.rpt

KD Anderson & Associates, Inc.
Transportation Engineers

APPENDIX I

TRAFFIC IMPACT ANALYSIS FOR
MADERA RANCHOS RETAIL CENTER
Madera County, California

TABLE OF CONTENTS

June 19, 2014

KDA

TRAFFIC IMPACT ANALYSIS FOR
MADERA RANCHOS RETAIL CENTER
Madera County, California

INTRODUCTION

This report documents **KD Anderson & Associates'** analysis of the traffic impacts associated with developing the **Madera Ranchos Retail Center** in rural Madera County. The proposed project is located in the area south of Avenue 12 and west of Road 36 in the un-incorporated community of Madera Ranchos.

This analysis identifies the current traffic conditions, estimates the amount of traffic associated with the business expected in the project, evaluates traffic operating conditions after the project is completed and confirms the adequacy of site access.

Project Description

Location / Access. The project is located immediately south of Avenue 12 at its intersection with Road 36 at the western end of the Madera Ranchos community, as noted in Figure 1. As shown, in Figure 2, the site will be developed with access to Avenue 12 and to Road 36. Full access will be available at two driveways on Road 36. Access to Avenue 12 will be provided at two controlled locations. A raised median would prohibit outbound left turns at both driveways, but westbound left turns from Avenue 12 into the site will be accommodated at the western driveway.

Land Use. The project anticipates development of a range of retail / service businesses that would cater to the existing Madera Ranchos community while also attracting customers from the stream of traffic passing the site on Avenue 12. As noted in Figure 2, the project may include a market and pharmacy, as well as highway commercial uses such as gasoline sales and restaurants.

VICINITY MAP

KD Anderson & Associates, Inc.
Transportation Engineers
6573-05 LT 6/19/2014

figure 1

SITE PLAN

KD Anderson & Associates, Inc.
Transportation Engineers
6573-05 LT 6/19/2014

figure 2

EXISTING SETTING

This report section describes the facilities that are available today serving vehicular, pedestrian, and bicycle traffic and transit users in the Madera Ranchos area of Madera County.

Study Area Circulation System - Roads

Regionally, the Madera Ranchos area is served by Madera County roads that link the community with state highways. State Route 99 is located roughly seven miles to the west of the project and links Madera County with the City of Madera and other Central Valley communities. State Route 41 lies roughly five miles to the east and provides access to the eastern Fresno Metropolitan area, the developing Rio Mesa area of Madera County and the foothill communities of Coarsegold and Oakhurst.

The text which follows provides additional detail regarding the Madera County roads included in the immediate study area.

Avenue 12. Avenue 12 is an east-west roadway that is Madera County's primary link between SR 99 and SR 41. Avenue 12 is designated an arterial – limited expressway in the Madera County General Plan Circulation Element. Avenue 12 is a limited expressway west of Road 36 and is an arterial immediately east of Road 36. Avenue 12 extends for roughly 37 miles from the Merced County line across SR 99 through the Madera Ranchos to SR 41. Avenue 12 also provides local access to residences and businesses in the Madera Ranchos. Avenue 12 is ultimately envisioned as a four lane facility, although a two lane facility exists in most areas in the vicinity of the project. Avenue 12 has been widened to a four lane facility in the area immediately adjoining its signalized intersection with Road 36. The posted speed limit on Avenue 12 is 40 mph east of the Road 36 intersection and 55 mph to the west. A 25 mph school zone is also posted along Avenue 12 in area of Liberty H.S. near the proposed project.

New daily traffic volume counts made in May 2014 for this study revealed that Avenue 12 carried 7,520 vehicles per day west of Road 36.

County Road 36. Road 36 is a north-south roadway that extends south from an intersection on State Route 145 across Avenue 12 to its southern terminus on Avenue 9. Road 36 is designated as an Arterial in the Madera County General Plan Circulation Element. Road 36 is generally a two lane facility, but the road has been widened to four lanes at the signalized Avenue 12 intersection. There is a 25 mph school zone beginning south of the project site that continues north across Avenue 12 beyond Liberty H.S.

New daily traffic counts were made for this study on Road 36 south of Avenue 12. The daily volume was 1,837 vehicles.

Orange Grove Avenue. Orange Grove Avenue is a local east-west street that serves existing residences south of Avenue 12. Orange Grove Avenue lies one block south of Avenue 12 and

extends east from an intersection on Road 36 for about 9/10 mile to Loren Way. Orange Grove Avenue is a two lane street with gravel shoulders. A prima facie 25 mph speed limit applies.

Fender Avenue. Fender Avenue is another local east-west street that serves existing residences south of Avenue 12. Orange Grove Avenue lies 1,000 feet south of Avenue 12 and extends east from an intersection on Road 36 for about ½ mile to Road 36½. At that point Fender Avenue turns to the north and intersections Orange Grove Avenue. Fender Avenue is a two lane street with gravel shoulders. A prima facie 25 mph speed limit applies.

Study Area Circulation System - Intersections

The quality of traffic flow in developed areas is often governed by the operation of key intersections. The following two intersections have been identified for evaluation in this study.

The **Avenue 12 / Road 36 intersection** is controlled by one of the few traffic signals on Avenue 12 between SR 99 and SR 41. Left turn lanes exist in all four approaches. The westbound Avenue 12 and northbound Road 36 approaches have been widened to add short second through lanes in each direction. The eastbound Avenue 12 and southbound Road 36 approaches have also been widened, but striped with separate right turn and through lanes. Crosswalks have been striped on each leg of the intersection.

The **Road 36 / Orange Grove Avenue Drive intersection** is currently a "tee" intersection controlled by a stop sign on the Orange Grove Avenue approach. While single lanes exist today on each approach, part of the Road 36 widening completed to provide auxiliary lanes at the Avenue 12 intersection extends south through Orange Grove Avenue. There are no sidewalks or crosswalks at this intersection.

Standards of Significance: Levels of Service - Methodology

Levels of Service were calculated at study area intersections in order to assess the quality of existing traffic conditions and to provide a basis for assessing project impacts. "Level of Service" is a qualitative measure of traffic operating conditions whereby a letter grade "A" through "F", corresponding to progressively worsening operating conditions, is assigned to an intersection or roadway segment.

Analysis Methodology for Intersections. For this analysis both signalized and unsignalized intersections are analyzed using the methodologies described *2000 Highway Capacity Manual* (HCM). HCM techniques base Level of Service on the length of delays experienced by motorists waiting at traffic signals or at stop signs. Delay values can be reported as an average value for the overall operation of the intersection or for each movement where motorists are required to yield the right of way to other traffic, in the case of side street stops. This analysis bases Level of service on the overall delay at signalized intersections and the "worst case" side street delay at un-signalized intersections.

Table 2 presents general characteristics associated with each Level of Service grade.

TABLE 2
LEVEL OF SERVICE DEFINITIONS

Level of Service	Signalized Intersection	Unsignalized Intersection	Roadway (Daily)
"A"	Uncongested operations, all queues clear in a single-signal cycle. V/C < 0.60	Little or no delay. Ave Delay ≤ 10 sec/veh	Completely free flow.
"B"	Uncongested operations, all queues clear in a single cycle. V/C > 0.61 and < 0.70	Short traffic delays. Delay > 10 sec/veh and ≤ 15 sec/veh	Free flow, presence of other vehicles noticeable.
"C"	Light congestion, occasional backups on critical approaches. V/C > 0.71 and < 0.80	Average traffic delays. Delay > 15 sec/veh and ≤ 25 sec/veh	Ability to maneuver and select operating speed affected.
"D"	Significant congestions of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. V/C > 0.81 and < 0.90	Long traffic delays. Delay > 25 sec/veh and ≤ 35 sec/veh	Unstable flow, speeds and ability to maneuver restricted.
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). V/C > 0.91 and < 1.00	Very long traffic delays, failure, extreme congestion. Delay > 35 sec/veh and ≤ 50 sec/veh	At or near capacity, flow quite unstable.
"F"	Total breakdown, stop-and-go operation. V/C > 1.01	Intersection often blocked by external causes. Delay > 50 sec/veh	Forced flow, breakdown.
Sources: 2000 Highway Capacity Manual, and Transportation Research Board (TRB) Special Report 209.			

At intersections, Level of Service calculations can reflect average conditions occurring over the breadth of the hour or can be indicative of conditions occurring during the highest volume 15 minute period within that hour. The choice of perspective is made by local agencies as part of their development of standards of significance. Based on Caltrans traffic study guidelines, this analysis addresses conditions occurring during the peak 15 minutes within the peak hour.

Standards of Significance. Caltrans and local jurisdictions adopt minimum standards for operating Levels of Service. The Madera County General Plan indicates that LOS D is the minimum acceptable Level of Service at signalized intersections and on side street approaches controlled by stop signs.

Existing Traffic Volumes / Levels of Service

Traffic Volume Counts. New traffic counts were made for this study on May 28, 2014. These counts were conducted on days when local schools were in session. Intersection turning movement counts were made at study intersections during the period from 4:00 p.m. to 6:00 p.m. The highest hourly traffic volume period within this two hour window was identified as the p.m. peak hour peak hour.

It is recognized that the quality of traffic flow can vary throughout the day and that some trip generators can result in localized traffic peaks that fall outside of the traditional peak periods. This may be the case on streets providing access to local schools.

Figure 3 illustrates the intersection turning movement count data recorded for the p.m. peak hour count period. This figure also notes the existing geometric layout of each intersection and the location of traffic controls. This data has been used to determine the operating Level of Service at each intersection.

Intersection Level of Service. Table 3 identifies current intersection Levels of Service at the two existing study locations. As shown, the Level of Service at the signalized Avenue 12 /Road 36 intersection is LOS B, while the stop controlled Road 36 / Orange Grove Avenue intersection operates at LOS A. Both intersections meet minimum Madera County standards today, and improvements are not needed.

TABLE 3
EXISTING INTERSECTION LEVEL OF SERVICE

Intersection	Control	PM Peak Hour	
		LOS	Average Delay (sec/veh)
Avenue 12 / Road 36	Signal	B	13.8
Road 36 / Orange Grove Ave Westbound left+thru right turn	Westbound Stop	A	9.2
Bold indicates conditions in excess of adopted minimum LOS standard			

EXISTING TRAFFIC VOLUMES
AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers
6573-05 LT 6/19/2014

figure 3

DEVELOPMENT CHARACTERISTICS

Characteristics

The characteristics of identified study area development are described in terms of *Trip Generation* and *Trip Distribution.*

Trip Generation Rates. The amount of new traffic associated with development projects is typically forecast using information developed from recognized national sources. The Institute of Transportation Engineers (ITE) publication *Trip Generation, 9th Edition* is a source recognized by Madera County and Caltrans, and applicable average trip generation rates for the various types of land uses expected in the study area are noted in Table 4.

Trip Generation Forecasts. Table 4 identifies the trip generation forecast for the development identified with the project. As shown, the project may generate 10,403 daily trips with 855 trips occurring during the p.m. peak hour. This would be the total traffic count at the project's driveways. However, an appreciable share of the trips attracted to retail businesses are "Pass-by" trips drawn from the stream of traffic already passing the site. Based on information from the ITE *Trip Generation Handbook, 3rd Edition,* slightly less than ½ of the project's trips would be drawn from traffic already on Avenue 12 or Road 36. After accounting for "pass-by" trips, the project is expected to generate 5,536 new daily trips, with 458 trips generated during the p.m. peak hour.

TABLE 4
TRIP GENERATION RATES

ITE Code	Description	Unit	Quantity	Trips per Unit				Trips			
				Daily	PM Peak Hour			Daily	PM Peak Hour		
					In	Out	Total		In	Out	Total
850	Supermarket	ksf	25.3	121.10	51%	49%	11.15	3,064	144	138	282
	Pass-By Trips			36%			36%	1,103	52	50	102
	Net New Trips			64%			64%	1,961	92	88	180
881	Pharmacy	ksf	16.0	96.91	50%	50%	9.10	1,538	73	73	146
	Pass-By Trips			49%				753	36	36	72
	Net New Trips			51%				785	37	37	74
934	Fast Food Restaurant	ksf	8.0	496.12	52%	48%	32.65	3,967	136	125	261
	Pass-By Trips			50%			50%	1,984	68	62	130
	Net new Trips			50%			50%	1,983	68	63	131
946	Gasoline Sales with Convenience Store	Fueling position	12	152.84	51%	49%	13.86	1,834	85	81	166
	Pass-By Trips			56%			56%	1,027	48	45	93
	Net New Trips			44%			44%	807	37	36	73
Total								**10,403**	**438**	**417**	**855**
Pass-By Trips								**4,867**	**204**	**193**	**397**
Net New Trips								**5,536**	**234**	**224**	**458**

Source: *Trip Generation Manual, 9th Edition,* Institute of Transportation Engineers (ITE)

Vehicle Trip Distribution. Having determined the number of vehicle trips that is expected to be generated by the project, it is next necessary to identify the directional distribution of project-generated traffic. The directional distribution for "new" trips (i.e., those trips that are not "pass-by") has been determined based on review of current travel patterns in the study area and understanding of the location of residences within the trade area of the businesses that are assumed. In this case, the project may attract customers from the rural area outside of the Madera Ranchos, but the majority of the project's new trips will likely originate east of the project and arrive via Avenue 12 or Road 36, as noted in Table 5.

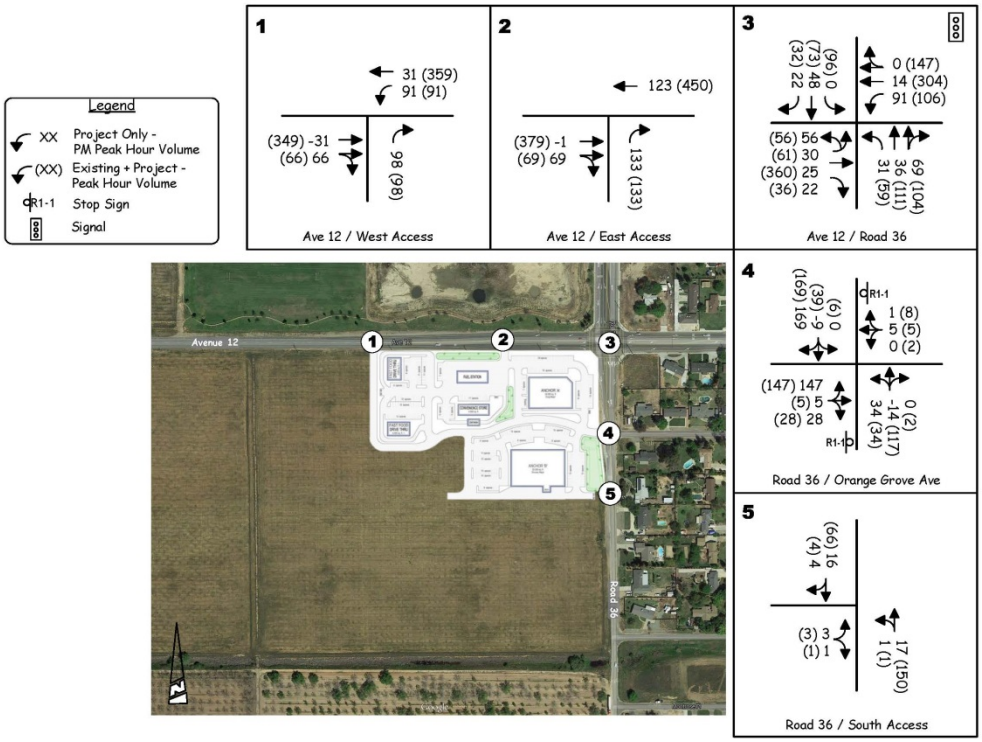
Pass-by trips would be drawn from the streets adjoining the site in relative proportion to the volume of traffic on each street. However, the lanes immediately adjoining the site would provide more pass-by trips because motorists prefer to simply turn right into convenience oriented destinations. Thus, we have based on the allocation of the p.m. peak hour volume but assumed that the eastbound and southbound lanes adjoining the site are twice as likely to be the source of pass-by trips.

TABLE 5
REGIONAL TRIP DISTRIBUTION ASSUMPTIONS

Direction	Route	Percent of New Trips	Percent of Pass-By Trips
West	Avenue 12	15.0%	
North	Road 36	30.0%	
South	Road 36	7.5%	
east	Avenue 12	45.0%	
	Orange Grove Avenue	2.5%	
Total		100.00%	
Eastbound Avenue 12			57.0%
Westbound Avenue 12			25.0%
Southbound Road 36			8.0%
Northbound Road 36			10.0%
Total			100.0%

Trip Assignment. The new and pass-by trips generated by the proposed project were assigned to the local street system through the proposed driveways based on the identified distribution patterns and the location of individual parking fields. Where alternative routes will be available the relative travel time through the site was considered.

Figure 4 identifies "project only trips".



EXISTING PLUS PROJECT
TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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6573-05 LT 6/19/2014

figure 4

EXISTING PLUS PROJECT TRAFFIC CONDITIONS

This section addresses conditions occurring in the near future with completion of the project and its planned frontage improvements.

Traffic Volume Forecasts

Circulation System Improvements. Development of the project site will be accompanied by frontage improvements to Avenue 12. Avenue 12 will be widened along the project frontage to Madera County standards. The resulting section will include two eastbound lanes that will match the layout of the eastbound approach to the Avenue 12 / Road 36 intersection. A raised median will be constructed on Avenue 12 to control left turning traffic, and the median will include a channelized westbound left turn lane at the project's western driveway.

Traffic Volumes. Figure 4 superimposes trips generated by the project onto the current background traffic volumes.

Existing Plus Project Conditions

Traffic Levels of Service at Intersections. Table 6 compares current Levels of Service with those occurring when the proposed project is completed. As shown, intersections will operate at LOS A or LOS B. Because the Level of Service at each intersection will remain within adopted minimum LOS standard (i.e., LOS D or better), the project's traffic impact isn't significant measured in terms of intersection Level of Service. Therefore no additional improvements are required to mitigate traffic impacts.

TABLE 6
EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE

Intersection	Control	PM Peak Hour			
		Existing		Existing Plus Project	
		LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
Avenue 12 / West Access	Northbound Stop				
Westbound left turn		-	-	A	8.6
Northbound right turn				B	10.4
Avenue 12 / East Access	Northbound Stop				
Northbound right turn		-	-	B	10.9
Avenue 12 / Road 36	Signal	B	13.8	B	18.8
Road 36 / Orange Grove Avenue	Westbound /		9.2		
Westbound left+thru right turn	Eastbound Stops	A		A	10.5
Eastbound left+thru+right turn		-	-	B	13.7
Road 36 / South Access	Eastbound Stop				
Eastbound left+right turn		-	-	A	9.5

Bold indicates conditions in excess of adopted minimum LOS standard

Sight / Access Design. As plans for the project are finalized and actual tenants are known, it will be necessary to confirm that important design issues are addressed.

Truck Paths. The paths of full size truck-trailers servicing the gasoline sales and the other businesses will need to be identified. That information will be used to confirm that these routes can be followed without encroaching onto raised curbs or traveling into opposing lanes on public streets.

Driveway approaches. As noted in the preliminary site plan, it will be necessary to install standard rural road approach tapers at the two Avenue 12 driveways to accommodate truck traffic and to provide deceleration opportunities. On Road 36 it will be necessary to widen the southbound approach to the project's driveway to provide adequate deceleration areas and to accommodate truck turns.

Avenue 12 median. The raised median on Avenue 12 should extend west beyond the western driveway to ensure that motorists leaving the site do not attempt to make a left turn using the eastbound travel lanes. The site plan indicates that the median shall extend for at least 50 feet beyond the driveway.

The median will occupy the area between the western driveway and Road 36 intersection which is roughly 780 feet long. Today the eastbound left turn lane approaching Road 36 is 300 feet long. The recommended configuration of the "back-to-back" left turn lanes would provide a 300 foot long westbound lane, a 120 foot long taper and a 360 foot long eastbound left turn lane.

APPENDIX

Year 2014 Traffic Counts

Level of Service Worksheets

ALL TRAFFIC DATA

6573-05

Madera County
All Vehicles on Unshifted
Nothing on Bank 1
Nothing on Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 14-7365-001 Road 36-Avenue 12
Date : 5/28/2014

Unshifted Count = All Vehicles

	Road 36 Southbound					Avenue 12 Westbound					Road 36 Northbound					Avenue 12 Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturn Total
16:00	24	3	1	0	28	4	73	32	0	109	2	14	6	0	22	5	73	1	0	79	238	0
16:15	22	3	1	0	26	1	69	39	0	109	4	15	8	0	27	8	71	5	0	84	246	0
16:30	17	8	4	0	29	2	78	43	0	123	3	16	7	0	26	7	83	4	0	94	272	0
16:45	19	3	4	0	26	3	73	35	0	111	8	14	9	0	31	6	90	5	0	101	269	0
Total	82	17	10	0	109	10	293	149	0	452	17	59	30	0	106	26	317	15	0	358	1025	0
17:00	16	7	2	0	25	3	72	29	0	104	3	16	4	0	23	6	77	3	0	86	238	0
17:15	22	8	3	0	33	4	71	47	0	122	10	24	8	0	42	10	92	3	0	105	302	0
17:30	39	7	1	0	47	5	74	36	0	115	7	21	14	0	42	9	76	3	0	88	292	0
17:45	27	6	4	0	37	4	51	51	0	106	5	18	16	0	39	11	67	4	0	82	264	0
Total	104	28	10	0	142	16	268	163	0	447	25	79	42	0	146	36	312	13	0	381	1096	0
Grand Total	186	45	20	0	251	26	561	312	0	899	42	138	72	0	252	62	629	28	0	719	2121	0
Apprch %	74.1%	17.9%	8.0%	0.0%		2.9%	62.4%	34.7%	0.0%		16.7%	54.8%	28.6%	0.0%		8.6%	87.5%	3.9%	0.0%			
Total %	8.8%	2.1%	0.9%	0.0%	11.8%	1.2%	26.4%	14.7%	0.0%	42.4%	2.0%	6.5%	3.4%	0.0%	11.9%	2.9%	29.7%	1.3%	0.0%	33.9%	100.0%	

PM PEAK HOUR	Road 36 Southbound					Avenue 12 Westbound					Road 36 Northbound					Avenue 12 Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	19	3	4	0	26	3	73	35	0	111	8	14	9	0	31	6	90	5	0	101	269
17:00	16	7	2	0	25	3	72	29	0	104	3	16	4	0	23	6	77	3	0	86	238
17:15	22	8	3	0	33	4	71	47	0	122	10	24	8	0	42	10	92	3	0	105	302
17:30	39	7	1	0	47	5	74	36	0	115	7	21	14	0	42	9	76	3	0	88	292
Total Volume	96	25	10	0	131	15	290	147	0	452	28	75	35	0	138	31	335	14	0	380	1101
% App Total	73.3%	19.1%	7.6%	0.0%		3.3%	64.2%	32.5%	0.0%		20.3%	54.3%	25.4%	0.0%		8.2%	88.2%	3.7%	0.0%		
PHF	.615	.781	.625	.000	.697	.750	.980	.782	.000	.928	.700	.781	.625	.000	.821	.775	.910	.700	.000	.905	.911

Prepared by NDS/ATD

Volumes for: Wednesday, May 28, 2014 City: Madera County Project #: 14-7366-001
Location: Avenue 12 west of Road 36 *6573-05*

Start	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	6	58			4	59				
12:15	2	68			6	43				
12:30	5	61			4	60				
12:45	4	53	17	240	4	60	18	222	35	462
1:00	2	49			1	62				
1:15	5	66			2	56				
1:30	2	59			5	55				
1:45	1	53	10	227	2	54	10	227	20	454
2:00	1	49			1	58				
2:15	1	67			4	71				
2:30	0	83			1	87				
2:45	0	76	2	275	3	88	9	304	11	579
3:00	5	81			1	69				
3:15	1	85			1	70				
3:30	4	86			2	62				
3:45	5	90	15	342	2	63	6	264	21	606
4:00	4	95			2	78				
4:15	6	70			7	80				
4:30	1	99			7	78				
4:45	12	95	23	359	6	93	22	329	45	688
5:00	22	100			11	74				
5:15	16	91			13	87				
5:30	36	95			24	75				
5:45	41	78	115	364	13	63	61	299	176	663
6:00	32	51			23	62				
6:15	34	59			25	43				
6:30	43	46			27	35				
6:45	41	38	150	194	42	21	117	161	267	355
7:00	46	37			43	27				
7:15	85	29			51	24				
7:30	91	35			61	22				
7:45	106	37	328	138	76	31	231	104	559	242
8:00	60	23			53	33				
8:15	59	27			45	23				
8:30	74	23			32	35				
8:45	47	32	240	105	44	23	174	114	414	219
9:00	71	18			34	28				
9:15	64	19			47	34				
9:30	78	19			46	23				
9:45	58	15	271	71	41	21	168	106	439	177
10:00	47	20			65	24				
10:15	83	27			47	22				
10:30	43	13			35	14				
10:45	53	13	226	73	49	10	196	70	422	143
11:00	50	8			36	6				
11:15	39	10			70	12				
11:30	82	13			49	7				
11:45	57	10	228	41	64	10	219	35	447	76
Total	1625	2429	1625	2429	1231	2235	1231	2235	2856	4664
Combined Total	4054		4054		3466		3466		7520	
AM Peak	7:15 AM				11:15 AM					
Vol.	342				242					
P.H.F.	0.807				0.864					
PM Peak		4:30 PM				4:30 PM				
Vol.		385				332				
P.H.F.		0.963				0.892				
Percentage	40.1%	59.9%			35.5%	64.5%				

Prepared by NDS/ATD

Volumes for: Wednesday, May 28, 2014 City: Madera County Project #: 14-7366-002
Location: Road 36 south of Avenue12 *6573-05*

Start	Northbound		Hour Totals		Southbound		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	1	11			0	8				
12:15	1	6			1	10				
12:30	0	14			1	8				
12:45	0	17	2	48	0	8	2	34	4	82
1:00	0	12			0	7				
1:15	1	12			0	20				
1:30	1	11			0	16				
1:45	1	14	3	49	0	16	0	59	3	108
2:00	0	13			0	7				
2:15	1	13			2	6				
2:30	0	29			0	18				
2:45	0	17	1	72	1	17	3	48	4	120
3:00	1	21			0	8				
3:15	0	15			1	13				
3:30	0	15			0	7				
3:45	0	24	1	75	1	10	2	38	3	113
4:00	0	17			0	8				
4:15	0	31			0	5				
4:30	1	24			0	12				
4:45	3	28	4	100	3	11	3	36	7	136
5:00	1	24			5	14				
5:15	2	41			6	17				
5:30	2	43			11	12				
5:45	1	35	6	143	6	13	28	56	34	199
6:00	3	22			10	13				
6:15	4	14			17	11				
6:30	6	15			21	13				
6:45	8	17	21	68	19	5	67	42	88	110
7:00	14	18			19	5				
7:15	10	6			24	2				
7:30	25	10			41	4				
7:45	34	12	83	46	41	10	125	21	208	67
8:00	12	8			46	1				
8:15	9	13			22	6				
8:30	6	4			22	4				
8:45	4	12	31	37	15	8	105	19	136	56
9:00	7	6			13	4				
9:15	14	13			13	3				
9:30	13	8			17	3	0			
9:45	6	4	40	31	16	4	59	14	99	45
10:00	6	5			17	5				
10:15	13	6			20	2				
10:30	5	7			12	3				
10:45	8	2	32	20	10	0	59	10	91	30
11:00	9	2			6	2				
11:15	15	2			6	1				
11:30	11	2			7	7				
11:45	10	4	45	10	10	0	29	10	74	20
Total	269	699	269	699	482	387	482	387	751	1086
Combined Total	968		968		869		869		1837	
AM Peak	7:00 AM				7:15 AM					
Vol.	83				152					
P.H.F.	0.610				0.826					
PM Peak		5:00 PM				1:00 PM				
Vol.		143				59				
P.H.F.		0.878				0.738				
Percentage	27.8%	72.2%			55.5%	44.5%				

EXISTING AND EXISTING PLUS PROJECT
6573-05 MADERA RACNHOS INFILL RETAIL

Scenario Report

Scenario:	EX PM
Command:	Default Command
Volume:	EX PM
Geometry:	Default Geometry
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	PM
Paths:	inbound left turns
Routes:	Default Route
Configuration:	Default Configuration

EX PM Thu Jun 19, 2014 08:37:58 Page 2-1

EXISTING AND EXISTING PLUS PROJECT
6573-05 MADERA RACNHOS INFILL RETAIL

Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1	FAST FOOD	8.00	934 FAST FOOD	16.98	15.67	136	125	261	30.7
	Zone 1 Subtotal					136	125	261	30.7
2	GAS & C STOR	12.00	945 GAS W/CONV	6.75	6.76	81	81	162	19.0
	Zone 2 Subtotal					81	81	162	19.0
3	PHARMACY	16.00	881 PHARMACY W	4.55	4.55	73	73	146	17.2
	Zone 3 Subtotal					73	73	146	17.2
4	ANCHOR B	25.30	850 SUPERMARKE	5.68	5.46	144	138	282	33.1
	Zone 4 Subtotal					144	138	282	33.1
TOTAL						434	417	851	100.0

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EXISTING AND EXISTING PLUS PROJECT
6573-05 MADERA RACNHOS INFILL RETAIL

Trip Distribution Report

Percent Of Trips PM

	To Gates								
Zone	1	2	3	4	6	8	9	10	11
1	7.5	3.8	22.5	1.3	15.0	50.0	0.0	0.0	0.0
2	6.6	3.3	19.8	1.1	13.2	0.0	56.0	0.0	0.0
3	7.7	3.8	23.0	1.3	15.3	0.0	0.0	49.0	0.0
4	9.6	4.8	28.8	1.6	19.2	0.0	0.0	0.0	36.0

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EXISTING AND EXISTING PLUS PROJECT
6573-05 MADERA RACNHOS INFILL RETAIL

Turning Movement Report
PM

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Avenue 12 / West Access													
Base	0	0	0	0	0	0	0	380	0	0	328	0	708
Added	0	0	63	0	0	0	0	18	17	62	16	0	176
PassBy	0	0	35	0	0	0	0	-49	49	29	-3	0	61
Total	0	0	98	0	0	0	0	349	66	91	341	0	945
#2 Avenue 12 / east access													
Base	0	0	0	0	0	0	0	380	0	0	328	0	708
Added	0	0	45	0	0	0	0	71	11	0	78	0	205
PassBy	0	0	88	0	0	0	0	-72	58	0	26	0	100
Total	0	0	133	0	0	0	0	379	69	0	432	0	1013
#3 Avenue 12 / Road 36													
Base	28	75	35	96	25	10	31	335	14	15	290	147	1101
Added	21	37	44	0	48	22	48	57	12	69	36	0	394
PassBy	10	-1	25	0	0	0	38	-32	10	22	-22	0	50
Total	59	111	104	96	73	32	117	360	36	106	304	147	1545
#4 Road 36 / Orange Grove Ave													
Base	0	131	2	6	48	0	0	0	0	2	0	7	196
Added	13	7	0	0	8	120	93	5	12	0	5	1	264
PassBy	21	-21	0	0	-17	49	54	0	16	0	0	0	102
Total	34	117	2	6	39	169	147	5	28	2	5	8	562
#5 Road 36 / South Access													
Base	0	133	0	0	50	0	0	0	0	0	0	0	183
Added	1	17	0	0	16	4	3	0	1	0	0	0	42
Total	1	150	0	0	66	4	3	0	1	0	0	0	225
#13													
Base	0	0	0	0	0	0	0	0	0	0	0	0	0
Added	18	67	0	0	70	0	0	0	0	0	0	0	155
Total	18	67	0	0	70	0	0	0	0	0	0	0	155

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EXISTING AND EXISTING PLUS PROJECT
6573-05 MADERA RACNHOS INFILL RETAIL

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Avenue 12 / West Access	A	0.0	0.000	B	10.4	0.137	+10.364 D/V
# 2 Avenue 12 / east access	A	0.0	0.000	B	10.9	0.191	+10.874 D/V
# 3 Avenue 12 / Road 36	B	13.8	0.374	B	18.8	0.507	+ 5.051 D/V
# 4 Road 36 / Orange Grove Ave	A	9.2	0.008	B	13.7	0.279	+ 4.525 D/V
# 5 Road 36 / South Access	A	0.0	0.000	A	9.5	0.004	+ 9.542 D/V
# 13		0.0	0.000	A	3.6	0.000	+ 0.000 D/V

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                     EXISTING AND EXISTING PLUS PROJECT
                     6573-05 MADERA RACNHOS INFILL RETAIL
------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #1 Avenue 12 / West Access
*******************************************************************************
Average Delay (sec/veh):      1.9       Worst Case Level Of Service: B[ 10.4]
*******************************************************************************
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:            Include          Include          Include          Include
Lanes:        0  0  0  0  1    0  0  0  0  0    0  0  1  1  0    1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 28 May 2014 <<
Base Vol:        0    0    0      0    0    0      0  380    0      0  328    0
Growth 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
Initial Bse:     0    0    0      0    0    0      0  380    0      0  328    0
Added Vol:       0    0   63      0    0    0      0   18   17     62   16    0
PasserByVol:     0    0   35      0    0    0      0  -49   49     29   -3    0
Initial Fut:     0    0   98      0    0    0      0  349   66     91  341    0
User 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
PHF Adj:      0.92 0.92 0.92   0.92 0.92 0.92   0.92 0.92 0.92   0.92 0.92 0.92
PHF Volume:      0    0  107      0    0    0      0  379   72     99  371    0
Reduct Vol:      0    0    0      0    0    0      0    0    0      0    0    0
FinalVolume:     0    0  107      0    0    0      0  379   72     99  371    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx   6.9 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx   226  xxxx xxxx xxxxx  xxxx xxxx xxxxx   451 xxxx xxxxx
Potent Cap.: xxxx xxxx   778  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1106 xxxx xxxxx
Move Cap.:   xxxx xxxx   778  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1106 xxxx xxxxx
Volume/Cap:  xxxx xxxx  0.14  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.09 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.5  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.3 xxxx xxxxx
Control Del:xxxxx xxxx  10.4 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.6 xxxx xxxxx
LOS by Move:    *    *     B     *    *    *     *    *    *     A    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *    *     *    *    *     *    *    *
ApproachDel:       10.4           xxxxxx          xxxxxx          xxxxxx
ApproachLOS:         B              *               *               *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************


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                     EXISTING AND EXISTING PLUS PROJECT
                     6573-05 MADERA RACNHOS INFILL RETAIL
------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #2 Avenue 12 / east access
******************************************************************************
Average Delay (sec/veh):      1.4       Worst Case Level Of Service: B[ 10.9]
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:            Include          Include          Include          Include
Lanes:        0  0  0  0  1    0  0  0  0  0    0  0  1  1  0    0  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 28 May 2014 <<
Base Vol:       0    0    0      0    0    0      0  380    0      0  328    0
Growth 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
Initial Bse:    0    0    0      0    0    0      0  380    0      0  328    0
Added Vol:      0    0   45      0    0    0      0   71   11      0   78    0
PasserByVol:    0    0   88      0    0    0      0  -72   58      0   26    0
Initial Fut:    0    0  133      0    0    0      0  379   69      0  432    0
User 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
PHF Adj:     0.92 0.92 0.92   0.92 0.92 0.92   0.92 0.92 0.92   0.92 0.92 0.92
PHF Volume:     0    0  145      0    0    0      0  412   75      0  470    0
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
FinalVolume:    0    0  145      0    0    0      0  412   75      0  470    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx   6.9 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx   243  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx   757  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx   757  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  0.19  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.7  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx  10.9 xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     B     *    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *    *     *    *    *     *    *    *
ApproachDel:       10.9           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         B              *                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************


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--------------------------------------------------------------------------------
                     EXISTING AND EXISTING PLUS PROJECT
                    6573-05 MADERA RACNHOS INFILL RETAIL
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
            2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #3 Avenue 12 / Road 36
********************************************************************************
Cycle (sec):          60              Critical Vol./Cap.(X):         0.374
Loss Time (sec):      12              Average Delay (sec/veh):        13.8
Optimal Cycle:        33              Level Of Service:                  B
********************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Protected        Protected        Protected        Protected
Rights:        Include          Include          Include          Include
Min. Green:   0    0     0    0    0     0    0    0     0    0    0     0
Y+R:        4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:       1  0  1  1  0   1  0  1  0  1   1  0  1  0  1   1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 28 May 2014 <<
Base Vol:     28   75    35   96   25    10   31  335    14   15  290   147
Growth 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
Initial Bse:  28   75    35   96   25    10   31  335    14   15  290   147
User 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
PHF Adj:    0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92
PHF Volume:   30   82    38  104   27    11   34  364    15   16  315   160
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  30   82    38  104   27    11   34  364    15   16  315   160
PCE 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
MLF 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
FinalVolume:  30   82    38  104   27    11   34  364    15   16  315   160
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.93 0.89  0.89 0.93 0.98  0.83 0.93 0.98  0.83 0.93 0.88  0.88
Lanes:      1.00 1.36  0.64 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.33  0.67
Final Sat.: 1769 2296  1072 1769 1862  1583 1769 1862  1583 1769 2230  1131
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.02 0.04  0.04 0.06 0.01  0.01 0.02 0.20  0.01 0.01 0.14  0.14
Crit Moves:      ****       ****                   ****       ****
Green/Cycle: 0.14 0.09 0.09 0.16 0.12  0.12 0.07 0.52  0.52 0.02 0.48  0.48
Volume/Cap: 0.13 0.37  0.37 0.37 0.13  0.06 0.29 0.37  0.02 0.37 0.29  0.29
Delay/Veh:  23.0 26.2  26.2 23.5 24.1  23.7 28.2  8.7   6.9 34.1  9.5   9.5
User DelAdj: 1.00 1.00 1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 23.0 26.2  26.2 23.5 24.1  23.7 28.2  8.7   6.9 34.1  9.5   9.5
LOS by Move:   C    C     C    C    C     C    C    A     A    C    A     A
HCM2kAvgQ:     1    2     2    2    1     0    1    4     0    1    3     3
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                    EXISTING AND EXISTING PLUS PROJECT
                    6573-05 MADERA RACNHOS INFILL RETAIL
---------------------------------------------------------------------------------

                    Level Of Service Computation Report
           2000 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #3 Avenue 12 / Road 36
*********************************************************************************
Cycle (sec):          60               Critical Vol./Cap.(X):          0.507
Loss Time (sec):      12               Average Delay (sec/veh):        18.8
Optimal Cycle:        38               Level Of Service:                  B
*********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
-------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0    0     0    0    0     0    0    0     0    0    0
Y+R:          4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0
Lanes:        1  0  1  1  0    1  0  1  0  1    1  0  1  0  1    1  0  1  1  0
-------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 28 May 2014 <<
Base Vol:       28   75   35    96   25   10    31  335   14    15  290  147
Growth 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
Initial Bse:    28   75   35    96   25   10    31  335   14    15  290  147
Added Vol:      21   37   44     0   48   22    48   57   12    69   36    0
PasserByVol:    10   -1   25     0    0    0    38  -32   10    22  -22    0
Initial Fut:    59  111  104    96   73   32   117  360   36   106  304  147
User 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
PHF Adj:      0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:     64  121  113   104   79   35   127  391   39   115  330  160
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:    64  121  113   104   79   35   127  391   39   115  330  160
PCE 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
MLF 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
FinalVolume:    64  121  113   104   79   35   127  391   39   115  330  160
-------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     1900 1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900
Adjustment:   0.93 0.86 0.86  0.93 0.98 0.83  0.93 0.98 0.83  0.93 0.89 0.89
Lanes:        1.00 1.03 0.97  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.35 0.65
Final Sat.:   1769 1693 1586  1769 1862 1583  1769 1862 1583  1769 2268 1097
-------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.04 0.07 0.07  0.06 0.04 0.02  0.07 0.21 0.02  0.07 0.15 0.15
Crit Moves:       ****          ****               ****          ****
Green/Cycle:  0.12 0.14 0.14  0.12 0.14 0.14  0.18 0.41 0.41  0.13 0.36 0.36
Volume/Cap:   0.31 0.51 0.51  0.51 0.31 0.16  0.40 0.51 0.06  0.51 0.40 0.40
Delay/Veh:    25.0 24.8 24.8  27.0 23.9 23.1  22.6 13.6 10.6  26.2 14.4 14.4
User DelAdj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   25.0 24.8 24.8  27.0 23.9 23.1  22.6 13.6 10.6  26.2 14.4 14.4
LOS by Move:    C    C    C     C    C    C     C    B    B     C    B    B
HCM2kAvgQ:      1    3    3     3    2    1     3    6    0     3    4    4
*********************************************************************************
Note: Queue reported is the number of cars per lane.
*********************************************************************************

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                        EXISTING AND EXISTING PLUS PROJECT
                        6573-05 MADERA RACNHOS INFILL RETAIL
------------------------------------------------------------------------------

                        Level Of Service Computation Report
                  2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #4 Road 36 / Orange Grove Ave
********************************************************************************
Average Delay (sec/veh):      0.7       Worst Case Level Of Service: A[  9.2]
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include            Include          Include
Lanes:       0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0  131    2     6   48    0     0    0    0     2    0    7
Growth 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
Initial Bse:   0  131    2     6   48    0     0    0    0     2    0    7
User 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
PHF Adj:     0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:    0  142    2     7   52    0     0    0    0     2    0    8
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:   0  142    2     7   52    0     0    0    0     2    0    8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5  6.2   6.4  6.5  6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0  3.3   3.5  4.0  3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   145 xxxx xxxxx   213  210   52   209  209  143
Potent Cap.: xxxx xxxx xxxxx  1438 xxxx xxxxx   744  687 1015   780  688  904
Move Cap.:   xxxx xxxx xxxxx  1438 xxxx xxxxx   736  684 1015   777  685  904
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.00 0.00 0.00  0.00 0.00 0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *    *     A    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx    0 xxxxx  xxxx  872 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.2 xxxxx
Shared LOS:     *    *    *     *    *    *     *    *    *     *    A    *
ApproachDel:  xxxxxx           xxxxxx           xxxxxx              9.2
ApproachLOS:     *                *                *                 A
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************


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                     EXISTING AND EXISTING PLUS PROJECT
                     6573-05 MADERA RACNHOS INFILL RETAIL
------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #4 Road 36 / Orange Grove Ave
*******************************************************************************
Average Delay (sec/veh):      5.2       Worst Case Level Of Service: B[ 13.7]
*******************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  131    2     6   48    0     0   0    0     2   0    7
Growth 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
Initial Bse:    0  131    2     6   48    0     0   0    0     2   0    7
Added Vol:     13    7    0     0    8  120    93   5   12     0   5    1
PasserByVol:   21  -21    0     0  -17   49    54   0   16     0   0    0
Initial Fut:   34  117    2     6   39  169   147   5   28     2   5    8
User 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
PHF Adj:     0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:    37  127    2     7   42  184   160   5   30     2   5    9
Reduct Vol:     0    0    0     0    0    0     0   0    0     0   0    0
FinalVolume:   37  127    2     7   42  184   160   5   30     2   5    9
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5  6.2   7.1  6.5  6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0  3.3   3.5  4.0  3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  226 xxxx xxxxx   129 xxxx xxxxx   357  351  134   367  441  128
Potent Cap.: 1342 xxxx xxxxx  1456 xxxx xxxxx   599  574  915   589  510  922
Move Cap.:   1342 xxxx xxxxx  1456 xxxx xxxxx   574  555  915   551  494  922
Volume/Cap:  0.03 xxxx  xxxx  0.00 xxxx  xxxx  0.28 0.01 0.03  0.00 0.01 0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.8 xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *    *     A    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  608 xxxxx  xxxx  669 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.4 xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 13.7 xxxxx xxxxx 10.5 xxxxx
Shared LOS:     *    *    *     *    *    *     *    B    *     *    B    *
ApproachDel:   xxxxxx           xxxxxx              13.7              10.5
ApproachLOS:        *                *                 B                 B
*******************************************************************************
Note: Queue reported is the number of cars per lane.
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EX PM                        Thu Jun 19, 2014 08:37:59                  Page 15-1
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                     EXISTING AND EXISTING PLUS PROJECT
                     6573-05 MADERA RACNHOS INFILL RETAIL
------------------------------------------------------------------------------

                        Level Of Service Computation Report
              2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #5 Road 36 / South Access
******************************************************************************
Average Delay (sec/veh):      0.2       Worst Case Level Of Service: A[  9.5]
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:       0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 28 May 2014 <<
Base Vol:      0  133    0     0   50    0     0    0    0     0    0    0
Growth 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
Initial Bse:   0  133    0     0   50    0     0    0    0     0    0    0
Added Vol:     1   17    0     0   16    4     3    0    1     0    0    0
PasserByVol:   0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   1  150    0     0   66    4     3    0    1     0    0    0
User 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
PHF Adj:     0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92
PHF Volume:    1  163    0     0   72    4     3    0    1     0    0    0
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:   1  163    0     0   72    4     3    0    1     0    0    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5  6.2   7.1  6.5  6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0  3.3   3.5  4.0  3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   76 xxxx xxxxx  xxxx xxxx xxxxx   239  239   74   240  241  163
Potent Cap.: 1523 xxxx xxxxx  xxxx xxxx xxxxx   749  662  988   715  660  882
Move Cap.:   1523 xxxx xxxxx  xxxx xxxx xxxxx   749  662  988   713  660  882
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00 0.00  0.00 0.00 0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  797 xxxxx  xxxx    0 xxxxx
SharedQueue:   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.5 xxxxx xxxxx xxxx xxxxx
Shared LOS:      A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx               9.5          xxxxxx
ApproachLOS:          *                *                 A               *
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Note: Queue reported is the number of cars per lane.
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BIOLOGICAL RESOURCES ANALYSIS

For

Proposed "Liberty Village in the Ranchos" Project Area

40 Acres – Avenue12 and Road 36

Madera County, California

December 1, 2006

Prepared By:
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Consulting Biologist
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Clovis, CA 93612
(559) 297-0144

APPENDIX III

1.0 INTRODUCTION

The landowners are assessing the feasibility of a potential mixed use development and infrastructure project on a forty-acre parcel located on the southwest corner of Madera County Avenue 12 and Madera County Road 36 (see Figure 1). The proponents of "Liberty Village in the Ranchos" are specifically proposing to use the site for commercial development, institutional open space, residential, and agricultural purposes. The entire 40-acre property is referred to in this report as the "Project Area."

It is recognized that any potential development in this region could result in the temporary and/or permanent loss of vegetation and wildlife (biological resources) in the area. The California Department of Fish and Game has routinely stated that development projects in this general region may have potential impacts on several wildlife species and other natural biotic and abiotic resources. To provide the Department with the necessary information to evaluate any development proposals the proponents representative (Mr. Russ Shaw) has requested a "reconnaissance level biological survey" be performed on the site. A reconnaissance level survey is a field survey by a qualified biologist that focuses on habitat suitability and observed presence for sensitive species*. The field study was also performed to provide the project proponent and Madera County officials with an analysis of the biological resources present on the site. This report documents the results of this biological study and provides recommendations and conclusions for evaluation. It is intended to equip the planners with the necessary information to comply with the requirements of the California Environmental Quality Act as it relates to biological resources. It also addresses the likely concerns of the U.S. Fish and Wildlife Service, The Natural Resources Conservation Service, The Army Corps of Engineers, and the California Department of Fish and Game.

2.0 OBJECTIVES

The objectives of this study were:

1. To conduct an investigation of plant and wildlife records and available literature to obtain site and habitat data concerning "sensitive species" that are known to occur or potentially occur in the project vicinity.

2. To perform reconnaissance field surveys in accordance with the accepted protocols to assess species presence and/or habitat suitability in the project area.

3. To observe, document, and describe vegetation types and any "sensitive habitats" within the project area.

4. To perform an analysis of the legal status and sensitivity of the described species, habitats, and resources as they relate to the project area.

5. To provide biological constraints evaluations and recommendations for incorporation into the planning and permitting process.

6. To provide general mitigation guidelines and recommendations for any additional comprehensive technical studies necessary to accomplish the stated goals.

* "Sensitive species" are those listed or under consideration as threatened or endangered by the U.S. Fish and Wildlife Service or the California Department of Fish and Game. Sensitive habitats include those communities, which, if eliminated or degraded, would sustain significant adverse impact under the California Environmental Quality Act (CEQA). Examples of such habitats include wetlands, riparian communities, vernal pools, aquatic habitats, and any other natural areas capable of supporting unique or sensitive species.

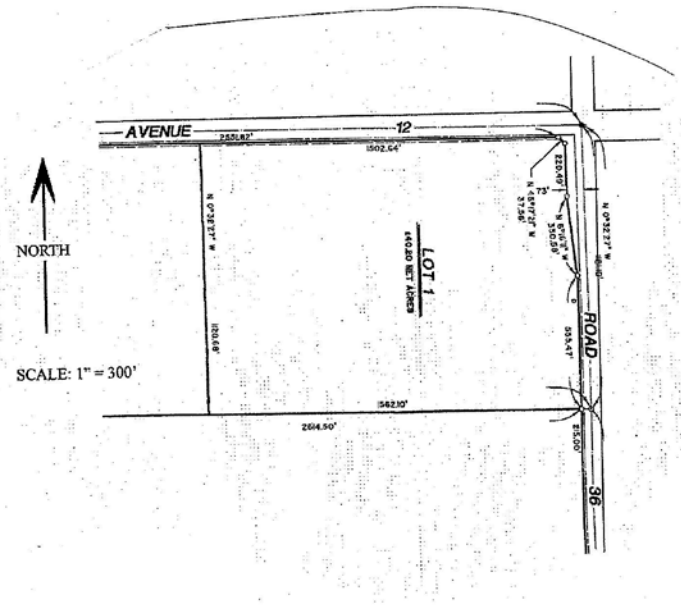

Figure 1. Project Area Location Map (Madera County)
Southwest corner of Avenue 12 and Road 36 (40.20 acres)

3.0 METHODOLOGY

The study was designed to achieve the desired objectives by utilizing two primary research methods, a pre-survey investigation and on-site field surveys and analysis in the project area.

3.1 Pre-survey Investigations

Prior to the field surveys, a pre-survey investigation was completed. The results of this investigation provided data on the sensitive plant and animal species that were known to occur or could potentially occur in the project area. The investigation consisted of two stages:

1. A review of all available literature and publications to compile a list of sensitive plant and animal species and biological and wetland resources known to occur in the general project vicinity.

2. A review of the appropriate location maps and files to obtain any relevant biological and wetlands information from the California Natural Diversity Data Base (CNDDB) in Sacramento and the Natural Resources Conservation Service (NRCS) in Fresno.

These pre-survey investigations resulted in the refinement of a project area "target" sensitive species list for further analysis and research.

3.2 Field Surveys

The diurnal field survey occurred on May 7, 2006. This survey involved walking the entire project area at 50-meter intervals and recording all biotic resource observations. The nocturnal field survey occurred on May 16, 2006. This survey involved night spotlighting conducted on all vehicle access routes in the project area for a period of four hours. The individual involved in the field surveys was John Stebbins (author of this report) who possesses undergraduate and graduate degrees in biological science and has extensive field survey experience in Fresno and Madera County vegetation and wildlife studies. An emphasis was made to identify potential wetlands and any habitats capable of supporting sensitive species. This procedure allowed for a precise, organized accumulation of the data gathered during the research and survey phases of this study.

3.3 Waters of the U. S. and Wetlands

The term "Waters of the U. S." generally includes bodies of water such as rivers, streams, lakes, vernal pools, tidal areas, and adjacent wetlands. Waters of the U. S., which are not vegetated, are usually defined by a point of ordinary high water on a shoreline or stream bank. Wetlands are defined in federal regulations as: "**Those areas that are inundated or saturated by surface or ground waters at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.**" (EPA, 40 CFR 230.3 and COE, 33 CFR 328.3).

Projects affecting waters of the U. S. and/or wetlands may require permitting actions by the U. S. Army Corps of Engineers, (COE), and/or the California Department of Fish and Game. Projects affecting small areas under COE jurisdiction may be authorized under a Nationwide Permit (NWP), issued for specific activities. For each type of NWP there are specific conditions and limits for the area or volume that can be altered or disturbed. Projects affecting habitat of endangered species may require an individual permit regardless of the area affected and consultation with U.S. Fish and Wildlife Service under Section 10 of the Federal Endangered Species Act. Jurisdictional waters are wetlands that are characterized by the process of wetland hydrology (i.e. surface inundation or saturated soils), hydric soils (soils which have developed under anaerobic conditions imposed by soil saturation), and hydrophytic vegetation (an association of plants adapted to saturated soils).

4.0 ENVIRONMENTAL SETTING AND HABITAT DESCRIPTIONS

Vegetation Habitat Types in the general Project Area*

Non-native grassland
Ruderal – Disturbed, Developed
Agricultural

*Names generally conform to Holland, 1986.

Non-native annual grassland communities actively grow during winter and spring and are mostly dormant during summer and fall. They are a common component of the east side rangelands in the general region around the project area although they are being gradually replaced by agriculture or development. The 40-acre project area parcel best fits this habitat type at the present time. The site shows evidence of having been routinely disked and was formerly agricultural (orchards). Non-native annual grasses and forbs, intermixed with a variety of "weedy species",, dominate the grassland/disturbed habitat at this site. The dominant grasses present include soft chess (*Bromus hordeaceus*), rip gut brome (*B. diandrus*), red brome (*B. madritensis rubens),* slender wild oats (*Avena barbata*), foxtail barley (*Hordeum jubatum*), rattail fescue (*Vulpia megalura*) and annual rye (*Lolium multiflorum*). The dominant forbs are filaree (*Erodium cicutarium*), fiddle neck (*Amsinckia intermedia*), tansy mustard (*Sisymbrium altissisum*), pepper weed (*Lepidium nitidum),* spikeweed (*Hemizonia pungens*), and prickly lettuce (*Lactuca serriola*).

The adjacent parcels west and south of the project area supported agriculture crops (orchards) on the survey dates. A drainage ditch is present along the northern boundary of the agricultural parcel to the south. The property north of the project area (across Avenue 12) contains the new Madera High School campus and the property due east (across Road 36) contains residential dwellings.

5.0 RESULTS

One of the study objectives is a botanical assessment of the status of the sensitive plant species that may potentially in the general project area. The species are listed below along with their special status designations.

Table 1. Sensitive Plant Species Potentially Occurring in the Project Area.

Species	Common Name	USFWS Status	CDFG Status	CNPS Status	Habitat in* Study Area	Occurrence* Potential	Observed* in Field
Castilleja campestris succulenta	succulent owl's clover	T	E	1B	No	Low	No
Gratiola heterosepala	Boggs Lake hedge-hyssop	C	E	1B	No	Low	No
Linanthus serrulatus	Madera linanthus	-	-	1B	No	Low	No
Orcuttia inaequalis	San Joaquin orcutt grass	T	E	1B	No	Low	No
Orcuttia pilosa	Hairy orcutt grass	E	E	1B	No	Low	No
Pseudobahia bahiifolia	Hartweg's golden sunburst	E	E	1B	No	Low	No

Notes: (1) Status abbreviations are: California Native Plant Society (**CNPS**) ranks are: **1A** = plant presumed extinct in California, based on 2001 inventory; **1B** = plants rare and endangered in California and elsewhere; **2** = plants rare, threatened or endangered in California but more common elsewhere. California Department of Fish and Game (**CDFG**) ranks are: **E** = endangered; **T** = threatened; **R** = rare. U.S. Fish and Wildlife Service (**USFWS**) ranks are: **E** = endangered; T = Threatened; **PE** = proposed for endangered status; **PT** = proposed for threatened status; **FSC** = Federal Species of Concern.. * Based upon field surveys performed during spring 2006.

Table 2. Sensitive invertebrates, birds and other wildlife potentially occurring in the project area.

Species	Common Name	USFWS Status	CDFG Status	Habitat in Project Area	Occurrence Potential	Observed in Field
			Invertebrates			
Branchinecta lynchii	Vernal pool fairy shrimp	T	-	No	Low	No
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	T*	T	No	Low	No

Table 2 cont.

Lytta moesta	Moesta blister beetle	C2	-	No	Low	No
Lytta molesta	Molestan blister beetle	C2	-	No	Low	No
		Amphibians and Reptiles				
Ambystoma tigrinum californese	California tiger salamander	C	CSC	No	Low	No
Scaphiopus hamondii	Western spade-foot toad	-	CSC	No	Low	No
Clemmys marmorata marmorata	Northwestern pond turtle	C	CSC	No	Low	No
Thamnophis gigas	Giant garter snake	T	T	No	Low	No
		Birds				
Species	Common Name	USFWS Status	CDFG Status	Habitat in Study Area	Occurence Potential	Observed in Field
Accipiter cooperii	Cooper's hawk	-	CSC	No	Low	No
Accipiter striatus	Sharp-shinned hawk	-	CSC	No	Low	No
Agelaius tricolor	Tricolor blackbird	C2	CSC	No	Low	No
Asio flammeus	Short-eared owl	-	CSC	No	Low	No
Asio otus	Long-eared owl	-	CSC	No	Low	No
Athene cunicularia	Burrowing owl	-	CSC	Yes	Moderate	No
Buteo swainsoni	Swainson's hawk	-	T	No	Low	No
Circus cyaneus	Northern harrier	-	CSC	No	Low	No
Falco mexicanus	Prairie falcon	-	CSC	No	Low	No

Table 2 cont.

Grus canadensis tabida	Greater sandhill crane	-	T	No	Low	No
			Mammals			
Vulpes macrotis mutica	San Joaquin kit fox	E	T	No	Low	No

Note: California Department of Fish and Game, (CDFG), ranks are; E = endangered, T = Threatened, CSC = Species of Special Concern. United States Fish and Wildlife Service, (USFWS), ranks are; E = endangered, T = Threatened, C =Candidate List . * The USFWS has recently proposed to delist this subspecies.

Sensitive plants and animals potential: Soils in the project area are a fine textured clay loam with pea size to 2-inch diameter rocks in places. As mentioned previously, it has been repeatedly modified and disked in connection with the historical agricultural operations. California Natural Diversity Data Base records indicate several occurrences for sensitive plant and animal species in this general region of Madera County. However, no habitat for sensitive plant species exists on the described project area. Although the nearby highway right of way and the associated infrastructure (ditches, orchards, etc.) could provide marginal habitat for an occasional San Joaquin Kit Fox, this area is generally outside of the range for the species. No sensitive habitats (wetlands, vernal pools, etc.) are present on the site. The field surveys documented the presence of mostly nonnative ruderal plant species or "weeds". The only mammals observed were beechey ground squirrels, house mice, pocket gophers, jackrabbits, and a house cat. The only reptile observed was a western fence lizard (*Sceloporous occidentalis*). The birds observed included crows, starlings, brewer's blackbirds, house sparrows, horned larks, a killdeer, and mockingbirds. Burrowing owls are known to occur in settings similar to the above-described site in the region but none were observed on the survey dates.

6.0 ANALYSIS

Summary: Soil conditions and a general proximity to other recorded occurrences supporting sensitive plant and animal species indicate the possibility that the project area may have historically supported some sensitive plant and animal species. The long term agricultural usage and current degraded habitat conditions and surrounding land uses generally preclude the occurrence of any sensitive species at the site. The exception to this analysis pertains to the Burrowing Owl. This species can readily move in and occupy even fairly disturbed sites and vacant lands in agricultural and residential areas as long as the site conditions (ground squirrels and burrows) are present and favorable. These birds are regularly seen in the general area of Avenue 12, Madera Ranchos, Highways 41 and 145, etc.

Conclusions/Recommendations: It is not recommended that comprehensive biological surveys or wetland delineation studies be performed at this time in the project area due to the above-described degraded habitat conditions. Mitigation measures to reduce the accidental injury or

entrapment of the various wildlife species that may venture into the area from the general region may need to be undertaken during the construction period of this future project. Information concerning these routine procedures can be obtained from the local office of the California Department of Fish and Game. Furthermore, it is recommended that a 30 day "preconstruction site survey" according to CDFG approved protocols by a qualified biologist for burrowing owls be performed in any of the project areas proposed for future impacts or disturbance. No other recommendations relating to biological resources appear to be necessary at this time.

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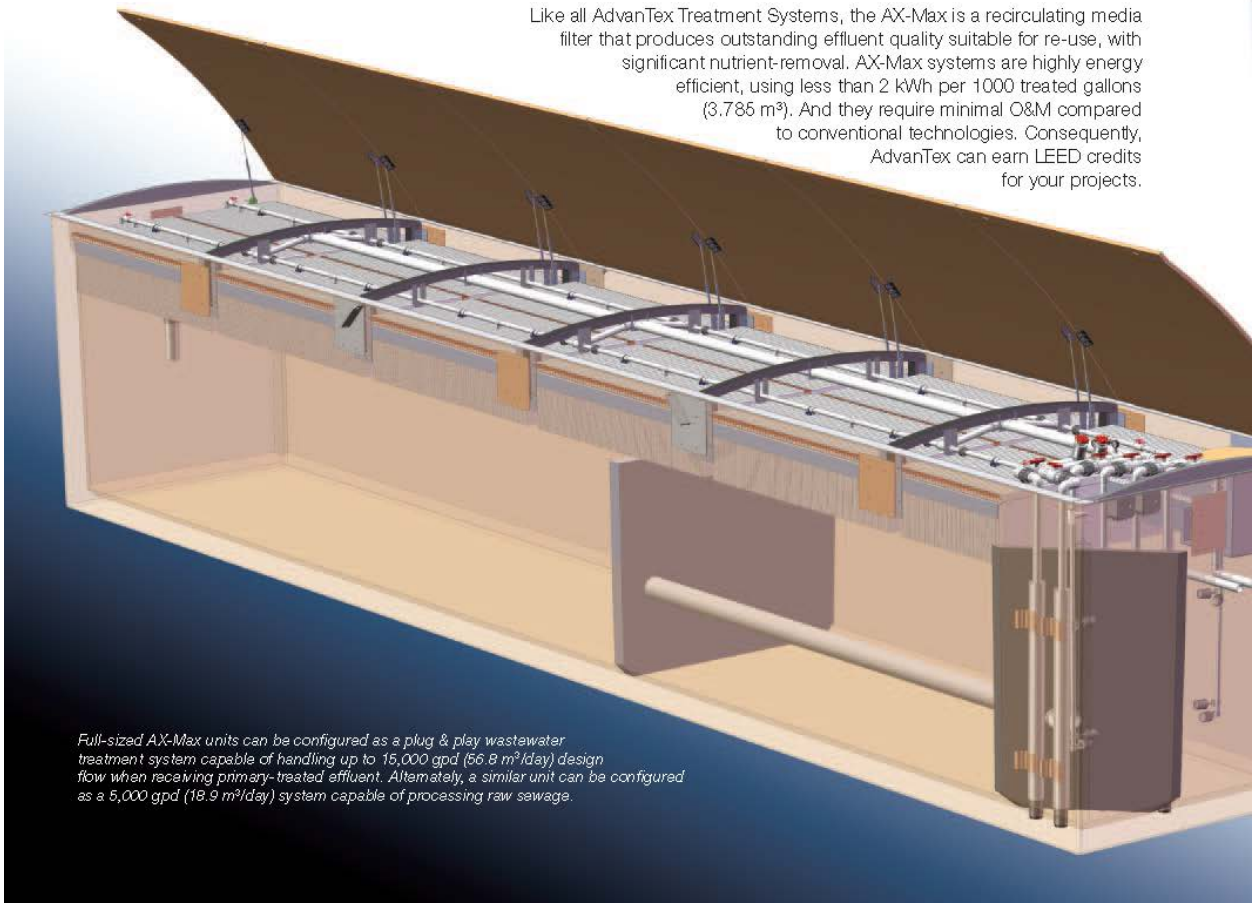
Like all AdvanTex Treatment Systems, the AX-Max is a recirculating media filter that produces outstanding effluent quality suitable for re-use, with significant nutrient-removal. AX-Max systems are highly energy efficient, using less than 2 kWh per 1000 treated gallons (3.785 m³). And they require minimal O&M compared to conventional technologies. Consequently, AdvanTex can earn LEED credits for your projects.



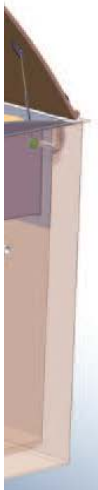
Full-sized AX-Max units can be configured as a plug & play wastewater treatment system capable of handling up to 15,000 gpd (56.8 m³/day) design flow when receiving primary-treated effluent. Alternately, a similar unit can be configured as a 5,000 gpd (18.9 m³/day) system capable of processing raw sewage.

AdvanTex® AX-Max™ Treatment System

Units range from 14'-42' in length. This 21' unit is ideal for lower flows.

Set, Plumb, Wire, and Go

The AX-Max is pre-plumbed and easy to install, so AX-Max projects can meet the tightest deadlines. The entire system — including treatment, recirculation, and discharge — is built inside an insulated fiberglass tank that ranges from 14'-42' (4.3-12.8 m) in length. AX-Max's can be installed above-ground — for maximum versatility in temporary or variable-flow situations — or in-ground. They can also be installed individually or in multi-tank arrays, treating up to 1 MGD (3,800 m³/day).



For Every Climate and Condition

AX-Max systems provide excellent treatment anywhere, and they have been installed all over the world. For example, AX-Max systems have been installed in-ground at Malibu's famous beach parks, the Boy Scout's National Jamboree site in West Virginia, and New Zealand's resort at Glendhu Bay. Two more were recently installed in-ground in Soyo, Africa, to serve a new hospital. Other AX-Max systems have been installed above-ground on top of Alaska's frozen tundra and St. Lucia's volcanic rock. Still more have been installed above-ground in mining camps from Alberta to Texas and, in the Midwest, at a U.S. Department of Defense demo site.

Benefits

- Containerized, fully-plumbed
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  - ~ Re-use quality effluent
  - ~ Significant reductions in ammonia, total nitrogen
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- Above-ground or in-ground installation
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- Simple to operate
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Telemetry Controls

Orenco's telemetry-enabled control panels use a dedicated phone line or ethernet connection, ensuring 24/7 monitoring and real-time remote control.

AdvanTex® AX-Max™ Treatment System

Carefully Engineered by Orenco

Orenco Systems has been researching, designing, manufacturing, and selling leading-edge products for small-scale wastewater treatment systems since 1981. The company has grown to become an industry leader, with about 250 employees and 300 points of distribution in North America, Australasia, Europe, Africa, and Southwest Asia. Our systems have been installed in more than 60 countries around the world.

Orenco maintains an environmental lab and employs dozens of civil, electrical, mechanical, and manufacturing engineers, as well as wastewater treatment system operators. Orenco's technologies are based on sound scientific principles of chemistry, biology, mechanical structure, and hydraulics. As a result, our research appears in numerous publications and our engineers are regularly asked to give workshops and trainings.

Powered by Franklin Electric

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Orenco Systems®, Inc.

Project Summary

Point Dume State Beach and Preserve, Southern California

In spring, 2011, Los Angeles County needed to quickly upgrade restrooms at Malibu's Point Dume State Beach in time for the long — and busy — Memorial Day weekend. The county's engineer specified three AX-Max's, one for each restroom, and the units were installed in a matter of days. Each unit was custom-painted to blend into the surrounding sand or asphalt. After disinfection, the treated effluent is dispersed right into the sand. Point Dume is part of a large-scale upgrade of L.A. County beach parks, virtually all of which include AdvanTex Treatment Systems of various sizes and configurations.

Fully Supported by Orenco

AdvanTex Treatment Systems are part of a comprehensive program that includes ...

- Designer, installer, and operator training
- Design assistance, technical specifications, and plan reviews
- Installation and operation manuals
- Lifetime technical support

Distributed by:

Design Aid

AdvanTex® Design Criteria

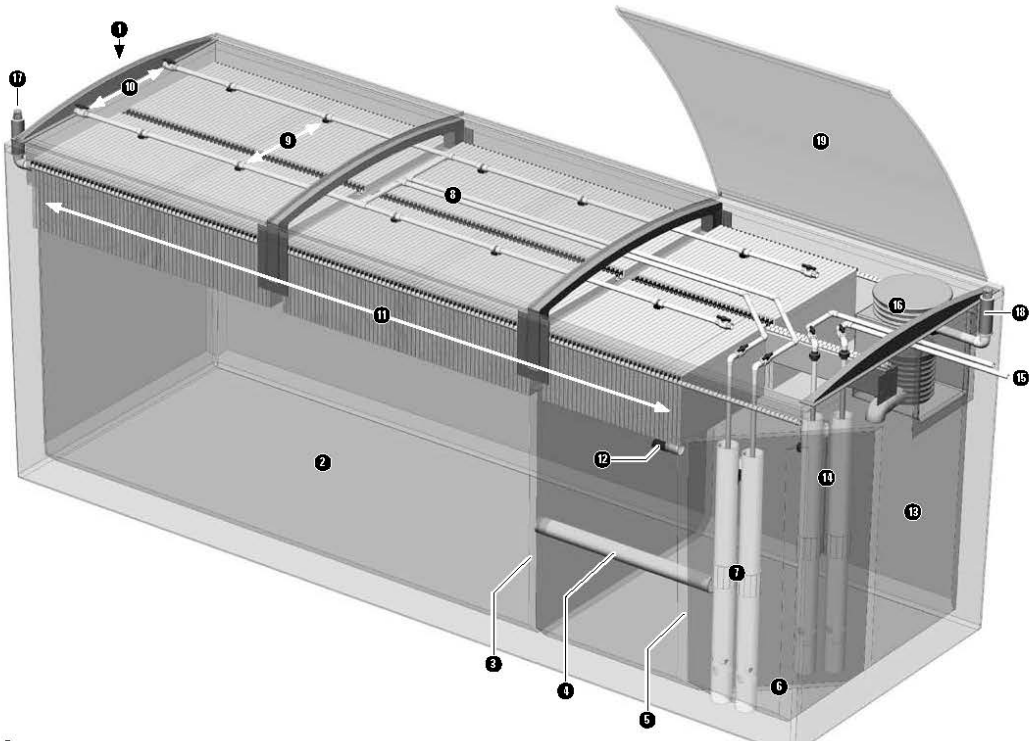
Orenco Systems® Incorporated
800-348-9843

For Residential, Commercial, Municipal, and Mobile Applications: AX-MAX Models

Standard System Description

The AdvanTex AX-MAX® Treatment System is a multiple-pass, packed-bed, aerobic wastewater treatment technology specifically designed and engineered for long-term processing of domestic-strength wastewater to "better than secondary" treatment standards. It features the same outstanding textile filter performance as AdvanTex multi-pod configurations, but in a fully pre-engineered, complete package. Because it has a streamlined system configuration and few components, the AX-MAX requires little operation and maintenance. AX-MAX systems are ideally suited for most municipal applications or residential developments. Figure 1 shows an optional layout of an AX-MAX configured as an advanced secondary treatment facility (primary treatment and dispersal not shown).

Figure 1. AdvanTex AX-MAX125-21 Treatment Unit, cutaway view (other sizes available)



Components:

1. Inlet, not shown
2. Recirc-blend chamber
3. Tank baffle
4. Recirc-transfer line
5. Recirc-pump chamber baffle
6. Recirc-pump chamber
7. Recirc pumping assembly
8. Distribution manifold
9. Spray nozzles
10. Lateral ball valves
11. AdvanTex textile media
12. Recirc-return valve
13. Recirc-filtrate chamber
14. Discharge pumping assembly
15. Outlet, discharge
16. Vent fan assembly
17. Air inlet
18. Air outlet
19. Hinged lid, typical

AdvanTex AX-MAX Design Criteria

Specifications and Typical Operation Summary

- Domestic-strength flows up to 1 MGD (3,700 m^3/day) capacity
- Re-use capable
- Low level nutrient capability
- Power requirements: 15 hp per 0.1 M gpd (11 kW/378 m^3/day)
- Electrical consumption: 1-2 kWh/1000 gpd (1-2 kWh/3.8 m^3/day)
- Average hydraulic loading rate: 25 gpd/ft^2 (1,019 Lpd/m^2)
- Peak hydraulic loading rate: 50 gpd/ft^2 (2,038 Lpd/m^2)
- Average organic loading rate: 0.04 lbs BOD/ft^2 · day (0.20 kg BOD/m^2 · day)
- Average nitrogen loading rate: 0.017 lbs N/ft^2 · day (0.08 kg N/m^2 · day)
- Recirc-blend ratio: 4:1
- Dosing ("ON") times: 60 to 90 seconds
- Rest ("OFF") times: 2 to 120 minutes

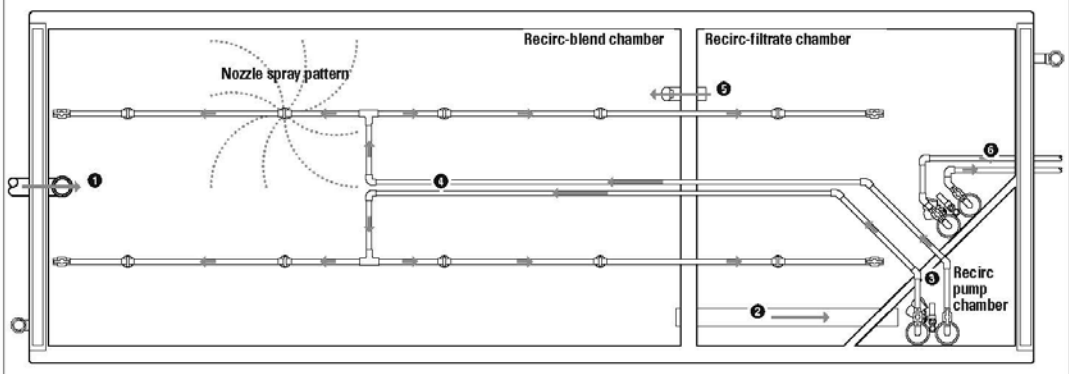
Treatment Process: Standard

AdvanTex AX-MAX systems are typically integrated into multi-stage treatment facilities incorporating sludge and scum segregation, anaerobic digestion, and flow equalization; filtration and aerobic digestion; and disinfection and final discharge for dispersal or reuse.

During the anaerobic treatment stage, organic matter segregates into sludge and scum layers, which undergo digestion by typical anaerobic processes. This stage is capable removing more than 60% of suspended solids and organic strength. In many cases, the AX-MAX is preceded by an effluent sewer, but it can be configured to receive domestic wastewater from other collection systems as well.

During the aerobic treatment stage, Orenco's proven AdvanTex treatment process provides oxidation and digestion for both organic and nutrient reduction. Incoming effluent from the primary treatment chamber enters the recirc-blend chamber where the influent is blended and diluted with filtrate from the AdvanTex system before being dosed onto the AdvanTex filter by the recirc pumps. The recirculation pumps transport the effluent to a distribution manifold above the AdvanTex filter. Effluent percolates down through the textile media, where organic and inorganic matter is treated by naturally occurring heterotrophic & autotrophic microorganisms that populate the filter. The microbial population of the filter will vary in density and type, based on the strength of waste applied to the filter. Typically, no outside chemicals are necessary for effluent and solids reduction, though systems requiring ammonia reduction may need alkalinity adjustments. The flow of filtered effluent

Figure 2. Typical Flow Pattern, AdvanTex AX-MAX Treatment Unit (AX-MAX125-21 shown)



Flow path:

1. Filtered effluent from collection system enters recirc-blend chamber.
2. Effluent from the recirc-blend chamber flows through the recirc-transfer line into the recirc-pump chamber.
3. Recirc pumps energize spray nozzles in the manifold.
4. Effluent percolates through media (not shown) and is split between the recirc-blend and recirc-filtrate chambers.
5. Recirc-return valve allows one-way flow from recirc-filtrate chamber during low-use periods.
6. Recirc-filtrate chamber provides tertiary treatment (where required) and storage before dispersal.

is mechanically divided between the recirc-blend chamber and the recirc-filtrate chamber via a tank baffle; the liquid levels within the recirc-blend chamber and the recirc-filtrate chamber are controlled by the recirc-return valve. During extended periods of low forward flow, 100% of the treated effluent is returned to the recirc-blend chamber. A final pass section of the AdvanTex treatment system provides the final polishing of the effluent prior to entering the recirc-filtrate chamber.

During the final stage, several treatment, disinfection, and discharge options are available. Post-aeration, post-nitrate reduction, tertiary filtration, disinfection, and/or final discharge storage are all possible uses of the final dosing chamber. The dispersal method can be designed for batch or continuous flow, with gravity or pump discharge options available. AX-MAX units can be buried at grade, set above-grade and bermed, or set above grade and left unbermed. An example of the typical flow pattern for a standard AX-MAX application is shown in Figure 2.

System Requirements: Recommended Primary Treatment

Primary treatment for the AX-MAX must be capable of meeting the requirements listed in Table 1. The primary stage of the AX-MAX should incorporate a Biotube® effluent filter, which prevents solids greater than 1/8-inch (3-mm) from passing through to the second stage. Although pre-processing of effluent is not usually required, some applications may benefit from pre-treatment, screening, and trash compacting using packaged sewage receiving stations.

Table 1. Typical Commercial AdvanTex Influent Wastewater Strength*

Characteristic	Average (mg/L) †	Weekly Peak (mg/L)	Rarely Exceed (mg/L)
BOD_5	150	250	500
TSS	40	75	150
TKN	65	75	150
G&O	20	25	30
pH	7	6.5 to 7.5	6 to 9
Alkalinity	250-100 (desired) ‡	—	—

** Wastewater strength characteristics (primary treated) entering the recirc-blend chamber of an AdvanTex AX-MAX Treatment System are considered "typical strength" when they fall within the expected ranges shown above.*

† Commercial systems will occasionally vary in strength based upon changes in flow characteristics or ownership. As the average influent strength approaches 80% of the weekly peak levels, consideration must be given to providing supplemental pre-treatment, additional treatment units, or process oversight.

‡ Wastewater alkalinity should rarely drop below these levels if nitrogen reduction is necessary.

Retention times of several days are built into the primary treatment system to provide the best possible settling and digestion, with sufficient solids retention time to ensure that long-term biosolids digestion and reduction are maximized, with minimal energy cost. Reductions in $cBOD_5$ and TSS are typically between 50-90% through the first stage of treatment.

Alternative primary treatment devices may be appropriate for flows over 20,000 gpd (75,708 Lpd) or for higher-strength applications. For higher-strength applications, a pre-treatment aeration device can be added to aid in BOD removal prior to secondary treatment. Contact Orenco to discuss alternative options for primary treatment.

System Requirements: Typical Wastewater Strength

The strength of wastewater influent to the AX-MAX is expected to remain within typical limits as shown in Table 1. For higher waste strength applications, consult Orenco or an authorized AdvanTex Dealer. If the collection system is something other than an effluent sewer, then a primary treatment system will need to be incorporated into the treatment facility design. The AX-MAX can be designed to enhance other processes as well, such as stressed package plants, membranes, advanced nutrient removal, or wetlands.

System Requirements: Recirculation-Blend Tankage

Effluent from the primary treatment chamber discharges to the recirc-blend chamber, where it blends with the filtrate recirculating back to the recirc-blend chamber. The filtrate dilutes the primary concentrations by the rate at which the recirculation-blend ratio (R_D) is set. The recirc-blend chamber is typically sized to equal the actual average flow (Q_a). A larger chamber may be recommended based on the expected organic or peak design hydraulic loads, enhanced nitrogen reduction, or to accommodate special surge capacities or operator response capabilities.

AdvanTex AX-MAX Design Criteria

System Design Loading Rates: Standard

Multi-pass systems, such as the AX-MAX, are capable of sustaining greater loading capacities than single-pass systems because hydraulic, biological, and chemical surges are blended and diluted with a portion of the aerobically treated filtrate. The continual recirculation and intermittent dosing to the media ensures a moist environment and stable diet for the biota. The critical factors in controlling the environment are the recirculation ratio and time-controlled dosing.

Orenco's suggested design loading rates are based on typical per capita flow rates and average influent strength characteristics as listed in Table 1. The AX-MAX Treatment System's packed bed media is configured in the same manner as our ANSI/NSF Standard 40 Class I treatment units. Figure 3 shows ANSI/NSF testing results for average performance at the 95% confidence level.

The base nominal AdvanTex hydraulic loading rate (HLR) is 25 gpd/ft^2 (1,019 Lpd/m^2) with a base organic loading rate (OLR) of 0.04 lbs BOD/ft^2 · day (0.20 kg BOD/m^2 · day). At these loading rates, "actual" design criteria targets a 5/5 effluent quality in the discharge effluent. Effluent quality may be projected at a 95% confidence level relative to the HLR. Peak HLR's of 50 gpd/ft^2 (2,037 Lpd/m^2) or peak OLR's of 0.08 lbs BOD/ft^2 · day (0.40 kg BOD/m^2 · day) can be handled for short periods of time with little effect on performance. Higher loading rates may be applicable relative to higher discharge limits or sufficient operating documentation, but normally should be limited to 50 gpd/ft^2 (2,037 Lpd/m^2) or lower at the typical average characteristics presented in Table 1. A thorough evaluation of all of the typical wastewater characteristics will guide design limits. High oil and grease concentrations may require some pretreatment to ensure maintenance frequencies are not excessive. Hydraulic capacities for standard AX-MAX models are provided in Table 2.

Table 2. Standard Hydraulic Capacities*: For Domestic Strength Wastewater

Model	Average Hydraulic Capacity, gpd (Lpd)	Peak Hydraulic Capacity gpd (Lpd)
AX-MAX075-14	1,875 (7,100)	3,750 (14,200)
AX-MAX100-14	2,500 (9,460)	5,000 (18,930)
AX-MAX125-21	3,125 (11,830)	6,250 (23,660)
AX-MAX150-21	3,750 (14,200)	7,500 (28,390)
AX-MAX175-28	4,375 (16,560)	8,750 (33,120)
AX-MAX200-28	5,000 (18,930)	10,000 (37,850)
AX-MAX225-35	5,625 (21,290)	11,250 (42,590)
AX-MAX250-35	6,250 (23,660)	12,500 (47,320)
AX-MAX275-42	6,875 (25,840)	13,750 (52,050)
AX-MAX300-42	7,500 (28,390)	15,000 (56,780)

**Capacities are based on domestic-strength waste. For commercial-strength applications, such as restaurants or commercial facilities, see Appendix A.*

System Design Loading Rates: Nitrogen Reduction

Nitrogen is a nutrient, and is essential to plant and microbial development and growth. In most wastewater, however, there is more nitrogen than can be assimilated into cell tissue. The removal of excess nitrogen is accomplished in two conversion steps, nitrification and denitrification. In the first step (nitrification), ammonia (NH_3-N) is oxidized biologically to nitrate (Nitrite NO_2-N and then NO_3-N). In the second step (denitrification), nitrate (NO_3-N) is reduced to nitrogen gas (Typically N_2), which is released harmlessly to the atmosphere. Total nitrogen (TN) is the sum of organic and ammonia nitrogen, nitrate nitrogen, and nitrite nitrogen:

$$TN = ON + (NH_3\text{-}N) + (NO_2\text{-}N) + (NO_3\text{-}N)$$

or

$$TN = TKN\text{-}N + (NO_2\text{-}N) + (NO_3\text{-}N)$$

Nitrogen removal (or "nitrification/denitrification") is a biochemical process in which ammonia is oxidized to nitrate (nitrification) ($2NH_3$ converts to $2NO_3 + 2H_2O$) and then nitrate is reduced through bacterial action (denitrification) ($10NO_3$ converts to $5N_2+3H_2O+10OH$) to nitrogen gas.

Total nitrogen reduction in the standard configuration will typically exceed 60 percent (with no special or supplemental process features). Using an alternative configuration, total nitrogen reduction can exceed 80 percent, depending on wastewater strength and other characteristics such as BOD_5, grease and oils, pH, tankage (HRT), temperature, and alkalinity concentrations.

The first phase of nitrification (conversion of ammonia to nitrite) liberates hydrogen ions into the solution, which lowers the pH levels, causing the influent alkalinity to be consumed. Consequently, nitrification can be inhibited if the natural buffering capacity (alkalinity) is too low. On a theoretical basis, 7.14 mg/L of alkalinity as calcium carbonate ($CaCO_3$) is needed to nitrify 1 mg/L of NH_4^+.

For nitrogen-sensitive areas requiring greater than 99% ammonia reduction or 65% total nitrogen reduction, the recirc-blend chamber may be sized greater than the actual average flow. Pre-aeration tanks, pre-anoxic tanks, post-anoxic reactors, chemical feed devices, post-aeration devices, and/or post-anoxic treatment devices may also be necessary depending on specific limits. The typical hydraulic loading rate may need adjustment if the expected influent organic load is higher than domestic strength or the incoming ammonia levels are above 75 mg/L. For more information on nitrogen reduction, contact Orenco.

Recirculation-Blend Ratios and Timer Settings

The Recirculation Ratio (R_b) is defined as the ratio of the daily flow returned (Q_r) to the recirc-chamber to blend with the daily inflow (influent or forward) wastewater flow (Q_i) as shown in the following expression:

$$R_b = Q_r / Q_i$$

$$Q_r = R_b \times Q_i$$

where:

R_b is the recirculation (recirc-blend) ratio.

Q_r is the daily flow returned to the recirc-blend chamber, in gpd or Lpd.

Q_i is the daily inflow (or forward flow), in gpd or Lpd

Typical operating recirculation-blend ratios will vary between 2:1 to 6:1, and the system's "OFF" time varies as a function of the recirc-blend ratio. AdvanTex AX-MAX controls are initially set to a 4:1 recirc-blend ratio, and initial timer settings are established based on the expected average daily flow, influent organic, total nitrogen, pH, and alkalinity levels. If or when flows vary significantly, the control panel features automatically adjust the timer settings based on predetermined parameters.

The function of the R_b is as critical to process management for multiple-pass attached-growth packed bed filter systems as return sludge, waste sludge, and air management are to suspended-growth processes. Proper management of the R_b assures aeration and wetting needs, but most importantly it establishes equilibrium with respect to the desired endogenous respiration rate by maintaining food-to-microorganism (F/M) ratios relative to influent hydraulic and biological loads. The recirculation ratio is well documented in textbooks and design manuals.

It's important to understand that there are both high and low R_b limits to watch for. Higher ratios may be preferred to prevent odor problems, but generally should not exceed 6 or 7; ratios of 2 or 3 – with normal strength influent – are typically sufficient for controlling odors and providing treatment.

A high R_b can have many adverse effects on the biology, chemistry, and performance of a system. It can deplete the base alkalinity concentration sufficiently to cause the pH to fall below acceptable levels. The ecosystem then becomes especially suited for filamentous microbes, which tend to cluster and overpopulate on the pump screens, accelerating the system's cleaning needs. In addition, a high R_b doesn't allow sufficient time for filtrate dissolved oxygen (DO) levels to deplete within the recirc-blend chamber. Dissolved oxygen depletion is necessary for effective denitrification. So a high R_b can inhibit denitrification and cause greater nitrate concentrations to pass through the system. Not only can a high R_b increase maintenance demands and degrade effluent quality, it also consumes more energy than necessary. A high R_b can cause process degradation, regardless of the growth process (suspended or attached) when not properly controlled.

An excessively low R_b can have adverse effects as well. A low R_b may not provide sufficient aeration for organic or nutrient demand, causing insufficient treatment. In addition, low R_b can lead to anaerobic conditions that lead to odor control issues.

AdvanTex AX-MAX Design Criteria

Dosing Frequency

Dosing frequency (*DF*) is typically reported as the number of doses or dosing events per day (*dpd*), but more specifically represents the time span between doses (typically measured in minutes) or, in control terminology, cycle time (*CT*). There are two components to the dosing frequency: "ON" dosing time and the "OFF" resting time, as shown in the following expression:

$$CT = DF = T_d + T_r$$

and also:

$$dpd = Q_f / T_d Q_d$$

$$dpd = (R_b + 1)\ Q_i / T_d Q_d$$

$$R_b = (1440\ T_d Q_d - 1) / Q_i\ (T_r + T_d)$$

where:

CT is the dose cycle time in minutes

DF is the dose frequency time in min/dose (or 1440 min per day / doses per day)

dpd is the number of doses per day

T_d is the dose time in minutes ("ON")

T_r is the rest time in minutes ("OFF")

Q_f is the total flow through the recirculation tank ($Q_i + Q_r$), in gpd or Lpd

Q_d is the dosing rate to the filter, in gpm (5-6 gpm, or 60 Lps, per nozzle)

The dosing frequency is related to the R_b as well as to particular features of the media, such as its texture, void ratio, water-holding capacity etc. Considerable academic work has been done to establish relative dosing frequencies for various media. It's well established that small frequent doses improve filter performance. Increasing the dosing frequency (number of occurrences over a given time period) reduces the volume of wastewater applied per dose and increases coliform removal.

The dosing time is the "ON" time span. The dosing time is related to the application dose rate, in gpm/ft^2 or Lpd/m^2, and the water holding capacity (WHC) of the filter media. Critical factors include keeping the applied dose to a fraction of the water holding capacity of the media and within the typical Rb limits based on influent flows, food values, and other constituents. Standard "ON" times are 1 to 1.5 minutes.

The resting time is the "OFF" time span. The resting time is primarily dependent on the recirculation ratio, "ON" time, and the influent flows. Being the dependent variable, the resting time is typically determined as shown in the following expression:

$$T_r = DF - T_d$$

or

$$T_r = [\,1440\ T_d Q_d / (R_b + 1)\ Q_i\,] - T_d$$

The critical issue with the resting period is that it not be excessively long. One dose per 90 to 120 minutes is typically sufficient for maintaining wetting of the biomass during low flow periods. By adjusting the R_b, the dilution and blend concentrations within the recirc-blend chamber can be balanced, as shown by the following expression.

$$Q_i S_i + Q_r S_e = Q_{r+i}\ S_b$$

$$Q_i S_i + Q_i R_b S_e = (R_b + 1)\ Q_i S_b$$

or

$$S_i + R_b S_e = (R_b + 1)\ S_b$$

where:

Q_{r+i} is the daily filter hydraulic load, in gpd or Lpd

or

$$Q_{r+i} = Q_f = (R_b + 1)\ Q_i$$

where:

Q_r is the daily flow returned to the recirc-blend chamber, in gpd or Lpd

S_i is the inflow substrate concentration, in mg/L

S_e is the filtrate substrate concentration, in mg/L

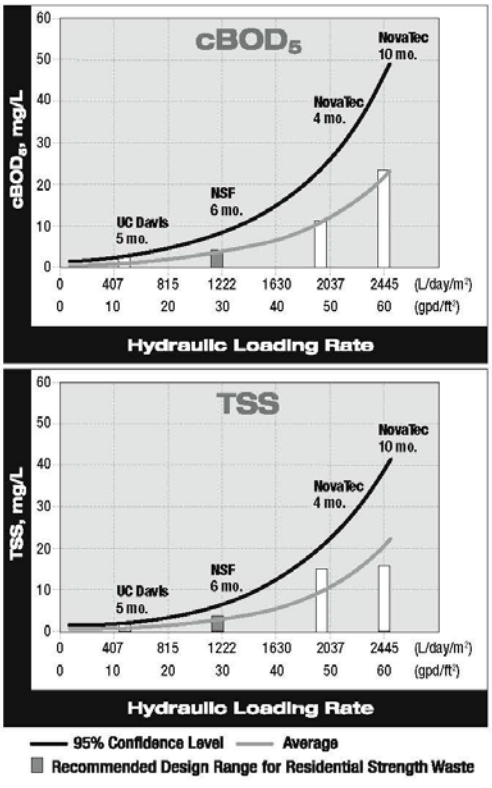
S_b is the blended substrate concentration, in mg/L

By varying R_b within the limits of the application's wastewater characteristics, optimization of the HRT and substrate concentrations within the recirc-blend chamber can be accomplished. Biological respiration rates tend to adjust according to the available food and oxygen. Therefore, to ensure the best performance and sustain the most efficient and effective working environment, the substrate equations (above and below) are used to establish programmed timer settings to maintain an R_b within an acceptable range. The recirc-blend chamber's blended substrate concentration may be determined directly by the following expression:

$$S_b = (S_i + R_b S_e) / (R_b + 1)$$

The dose frequency and recirculation ratio are directly related to and dependent on each other, but only one at a time can be the independent variable. Typical design practice calls for maintaining a recirc-ratio within a bandwidth making it (the recirc-ratio) the controlling or independent variable, thus leaving the dosing frequency as the dependent variable. Within the expression for the dosing frequency are the dosing period and resting period. The dosing period (T_d) is governed by the characteristics in the make-up of the media and must be kept within a narrowly limited range. The resting period (T_r) has the greatest flexibility and is, therefore, the most desirable choice for the dependent variable.

Figure 3.
Effluent Quality vs. Hydraulic Loading Rates*
(ANSI/NSF Standard 40 and Other Third Party Testing Results)



** Influent concentrations of 162 mg/L BOD_5 and 291 mg/L TSS, with peak influent concentrations of 550 mg/L BOD_5 and 1600 mg/L TSS.*

System Performance and Typical Effluent Quality

AdvanTex Treatment Systems are capable of processing typical domestic strength wastewater (see Table 1) to "better than secondary treatment standards." With additional components they can meet more advanced treatment levels with little additional operation and maintenance. Standard systems achieve $\leq$ 10 mg/L $cBOD_5$ and $\leq$ 10 mg/L TSS. In addition, total nitrogen reduction will typically exceed 60% with 98% $\pm$ nitrification, provided there are adequate concentrations of alkalinity and liquid temperatures levels are greater than 45° F (7.2° C). When influent alkalinity is limited or greater nitrogen reduction is required, an alkalinity feed unit can be incorporated.

Performance is a function of the expected typical loads with periodic weekly peaks. Effluent quality is dependent on a number of factors, including influent characteristics and loading rates. Third party ANSI/NSF 40 testing results are shown in Figure 3. The results demonstrate that low-to-moderate loading rates can produce $cBOD_5$ and TSS of $<$ 5 mg/L, and TN of $<$ 20 mg/L. Higher loading rates produce $cBOD_5$ and TSS in the range of 15-25 mg/L.

Reuse

After advanced treatment, effluent is usually clear and odorless, but it still contains pathogens at levels that can cause illness if ingested. At this point, it can be reused in applications where people will be unlikely to come into contact with it. For example, it can be used for subsurface drip irrigation of landscape vegetation. Here, the nutrients remaining in the effluent are put to use by plants and other soil organisms. Using treated effluent for irrigation saves potable water for other purposes.

However, many reuse applications, such as toilet flushing and industrial process water, require a higher level of purity. For these applications, the effluent will typically undergo tertiary treatment. This can include the use of fine mesh filter processes, such as polishing sand filters; multi-media filtration; micro-, ultra- or nano-filtration through membranes; reverse osmosis; or cloth/disc filters, in addition to chemical or ultraviolet disinfection.

AdvanTex AX-MAX Design Criteria

AdvanTex AX-MAX Control System

The method in which the effluent is loaded onto the AdvanTex filter is critical to the successful performance of the AX-MAX Treatment System. Over the past three decades, timer-controlled applications have proven to play an essential role in optimizing the performance of both fixed and suspended growth biological systems. A timer-controlled pump in the recirc-blend chamber periodically doses effluent to a distribution system on top of the AdvanTex filter media. Each time the filter is dosed, effluent slowly percolates through the filter media and is treated by naturally-occurring microorganisms that populate the filter. During periods of high flow, a timer override float will temporarily adjust the timer settings to process the additional flow. The controller can also be programmed to change to an energy economy mode during extended periods of low inflow.

A telemetry-based panel — which can be connected to a land line, cellular service, internet, or satellite service — controls all equipment. Remote telemetry control panels are an integral part of all commercial AdvanTex Treatment System equipment packages. The remote telemetry feature provides real-time operator monitoring and control over system components, as well as data collection of key operational parameters and events. If additional equipment for pretreatment, tertiary treatment, or disinfection are required, the controls for each component can easily be incorporated into the telemetry control panel. This also allows the manufacturer to contact the panel directly to assist the operator in system evaluation and troubleshooting or to manually override operations. Remote telemetry control panels also provide additional alarm functions to automatically page the operator in the event that trend data indicate potential problem conditions (e.g. high flows). Orenco control panels can also integrate into existing SCADA systems.

Surge Volume

AX-MAX tankage design is consistent with that of other packed bed filters. Flow equalization should be designed into the primary tankage with controlled (metered) feed to the recirc-blend chamber. If surging needs to be done in the recirc-blend chamber, then sizing and timer controls will be programmed to optimize performance and surge capacity. Churches, schools, destination resorts, dining establishments, and assembly halls are typical applications where weekly surge control practices provide optimum filter sizing.

Pumping Equipment

The integrated treatment package includes one or more Orenco pump packages. Typically, duplex pumps are used to energize the distribution manifold and are specified for redundancy in each of the textile treatment channels. This can be accomplished with a single pump per channel in larger flow applications. Pump models will vary based on number of units, flow path, and system configuration.

Venting Equipment

AX-MAX Treatment Systems typically come with an incorporated active vent system. With the active vent system, air changes occur at least once every 2 hours. The active vent system comes standard with an activated charcoal filter for increased odor reduction. One ventilation assembly is required per four AX-MAX units.

Sludge Handling Equipment

AdvanTex systems can be equipped with a sludge removal pump that can be activated manually if sludge needs to be purged from the primary chamber. Primary chamber sizing is roughly one-three days HRT based on actual flow, influent characteristics, and pre-treatment devices; sludge purging may be required. Sludge is typically about 1-5% solids and may require dewatering and lime treatment prior to land application. Solids removal devices may be placed prior to the primary chamber to reduce overall chamber sizes. Solids removal devices will, however, require regular maintenance and/or disposal of solids cake on a regular frequency.

Supplemental Process Equipment

Additional processes can be included in the design of an AX-MAX, such as sewage headworks, primary treatment, septage handling, solids handling, pH/alkalinity adjustment, carbon feed, pre- or post-aeration, disinfection, advanced nitrogen removal, phosphorus removal, turbidity removal, disinfection, and dispersal.

Climate Considerations and System Enclosures

AX-MAX systems are designed to withstand climates ranging from temperatures of -60° F (-51°C) to 125° F (52° C). Units are constructed with 4-inch-thick foam cells providing an estimated insulation value of R-26 (US) or R-5 (SI). AX-MAX systems are also available with an optional build-on control module, to provide a climate-controlled environment for easy operation and maintenance.

Alternatively, the AX-MAX can be enclosed in a building for maximum privacy, efficiency, and climate control. AX-MAX systems are compatible with a variety of enclosure types. Typical construction materials for the enclosure include a combination of concrete, fiberglass, steel and wood.

Energy Consumption

Orenco's AX-MAX systems and their components are designed in a manner that allows for highly cost-effective operation for the life of the system. Unlike most other aerobic treatment systems, AdvanTex has low energy consumption due to the intermittent use of low horsepower, high-head turbine pumps and a small ventilation fan. With lower power costs and lifecycle costs than many of the available alternatives, AX-MAX is an ideal option for "green" projects. For information on obtaining LEED credits, please visit our website at www.orenco.com.

Sample power consumption for 50,000 gpd (peak design flow) AX-MAX system with an average flow of 25,000 gpd:

Assumptions:

Four sets of ¾-hp duplex pumps, each operating at 15% of available hours annually

Pump "ON" time of 1 min, Pump "OFF" time of 6 min. 1/(6 + 1) = 15% (230 V, 10.1 A, 1-Phase)

One 1.4-A (115 V) ventilation fan operating at 100% of available hours annually

Energy cost of 0.10 $/kWh (USD)

Energy cost, pumps:

[4 × (230 V × 10.1 A) × 15%] / 1000 = 1.380 kWh/h

1.380 kWh/h × 8760 hr/year × 0.10 $/kWh = $1209 (USD), annually

Energy cost, ventilation fan:

[1 x (115 V x 1.4 A) × 100%]/1000 = 0.161 kWh/h

0.161 kWh/h × 8760 hr/year × 0.10 $/kWh = $141 (USD) annually

Energy cost, control panel:

[1 x (115 V x .3 A) x 100%]/1000 = 0.0345 kWh/h

0.0345 kWh/h × 8760 hr/year × 0.10 $/kWh = $30 (USD) annually

Total costs:

Total kWh/h = 1.58 kWh/h

Total kWh/d = 37.81 kWh/d

Total kWh/year = 13,801.4 kWh/year

Total estimated annual energy cost = $1209 + $141 + $30 = $1380 (USD), annually

In some cases, efficiencies may allow for the reduction of recirculation ratios, resulting in even lower energy consumption, as well as process configuration that would reduce overall electrical equipment and power consumption. This includes the operation of surge pumps, recirculation pumps, ventilation system components, pump controls, and discharge pumps.

For custom applications, AdvanTex Treatment Systems can be designed to operate on photovoltaic (PV) systems. Power sources incorporating diesel, gasoline, or battery generators can also be custom-designed into an AX-MAX system configuration. Call Orenco for more details.

Sustainability

Decentralized package treatment plants and their manufacturers are not all alike. Orenco has always been committed to the long term performance and low operating cost of its treatment systems; our engineers know that design integrity and product support matter. Orenco AX-MAX Treatment Systems meet the requirements of sustainability by protecting the "triple bottom line" of social, environmental, and financial benefits. For these reasons, AdvanTex is consistently chosen by developers and municipalities looking for wastewater technology that supports their sustainability goals.

AdvanTex AX-MAX Design Criteria

Operation and Maintenance

The AX-MAX has a streamlined system configuration designed to achieve high effluent quality and low power consumption, with minimal maintenance requirements and low life-cycle costs. O&M activities include effluent sampling for performance data collection, as well as scheduled cleaning of effluent filters, laterals, and spray nozzles. In units equipped with dry-chemical feed units, regular loading of the feed hopper is necessary. For units equipped with UV disinfection, the UV bulbs require yearly replacement. Recirculation chambers typically have minimal sludge accumulations and rarely require pumping.

Operationally, the module's flexible and easily serviceable features make AX-MAX units an ideal, efficient, and effective solution for all wastewater treatment applications with typical domestic waste characteristics. The AX-MAX dependably produces high-quality effluent with no need for full-time staffing. And its controls and telemetry features give service providers the opportunity to provide remote operational oversight as necessary.

To assist in reliability and ease of maintenance, AX-MAX systems are built with rugged, dependable parts and components, designed to work together for long service lives. The replacement cycle for liquid level switches is typically five years. The replacement cycle for Orenco high-head effluent pumps and various small components in the control panel is typically 20 years. Orenco's high-head effluent pumps can be rebuilt in the field with simple tools and the pump motors are easily replaced.

In addition, Orenco has a dedicated, experienced Asset Management division to support wastewater assets in the field.

Education

Orenco provides AdvanTex Design programs for designers, engineers, and regulators. Orenco also provides regular installation and O&M trainings for contractors, operators, and users. Check with Orenco's training department for information on upcoming courses. Training for end users can help ensure influent characteristics, chemical use, and operating practices are properly managed and maintained through an understanding of how microbial toxic thresholds can retard or inhibit performance in wastewater processes.

References and Performance Data

Since 1981, Orenco has been involved in thousands of commercial and community wastewater systems, providing education, design assistance, equipment, installation oversight, and operational support. References of system owners, engineers, and operators are available from Orenco. In addition, project tours are often available through the local regulatory jurisdiction or an Orenco equipment distributor. Call Orenco at 800-348-9843 or +1-541-459-4449 for more information about references or tours.

Appendix A: Primary Tank Sizing Chart

Facility	Minimum		Preferred	
	Grease Tankage[1] HRT (days)	Primary Tankage[2] HRT (days)	Grease Tankage[1] HRT (days)	Primary Tankage[2] HRT (days)
Office/Manufacturing/Light Industrial				
a) restrooms only	n/a	3	n/a	4
Restaurant/Deli				
a) restrooms and kitchen	3	4	5	5
Convenience Store/Gas Station				
a) restrooms only	n/a	3	n/a	4
b) restrooms and kitchen/deli	2	3[3]	4	4[3]
Hotel/Motel/Multiple Dwelling Units				
a) restrooms and kitchens	n/a	3	n/a	4
b) restrooms and restaurant/kitchen	3	3[3]	5	4[3]
Church				
a) restrooms only	n/a	2.5 + Surge[4]	n/a	4 + Surge[4]
b) restrooms and kitchen	2	2.5 + Surge[3,4]	4	4 + Surge[3,4]
School				
a) restrooms only	n/a	3 + Surge[4]	n/a	4 + Surge[4]
b) restrooms and kitchen	3	3 + Surge[3,4]	5	4 + Surge[3,4]
Dog Kennel/Veterinary Clinic				
a) restrooms only	n/a	3	n/a	4
b) restrooms and floor drains	n/a	3 + Surge[3,4,5]	n/a	4 + Surge[3,4,5]
RV Park				
a) RV spaces	n/a	3	n/a	4
b) dump station	n/a	8	n/a	10
Casino				
a) gaming floor	n/a	3	n/a	4
b) hotel/motel	n/a	3	n/a	4
c) restaurant/deli	3	4	5	5
Resort/Camp				
a) bunk houses	n/a	3	n/a	4
b) main houses	n/a	3	n/a	4
c) kitchen	2	3	4	4

1. Grease tankage HRT is based on a separate **kitchen design maximum daily flow**, which is integrated into the main flow prior to the primary septic tanks.
2. Primary tankage HRT is based on the **sum of the design maximum daily flows from all sources**.
3. For facilities with restrooms and kitchen, primary tankage volume is determined by multiplying the sum of the design maximum daily flows of the restrooms and kitchen combined by the factor in the primary tankage cell.
4. To determine surge volume for flow equalization purposes, please call **Orenco Systems** at (800) 348-9843 or +1-541-459-4449 for assistance.
5. To reduce septage pumping in these and other specialized applications, we recommend using multiple tanks: The first should be small (0.5 to 0.75 HRT); subsequent tanks should provide the remaining HRT requirements.

Note: Tankages are based on long-term performance satisfaction (with respect to septage removal) and nominal (minimum) to high-quality (preferred) effluent. If effluent strength is higher than the expected level or if a higher level of treatment is required, greater tankage will be necessary.

To enhance total nitrogen reduction, primary tankage should be increased for AdvanTex Mode 3 systems. Contact Orenco for specifics.