

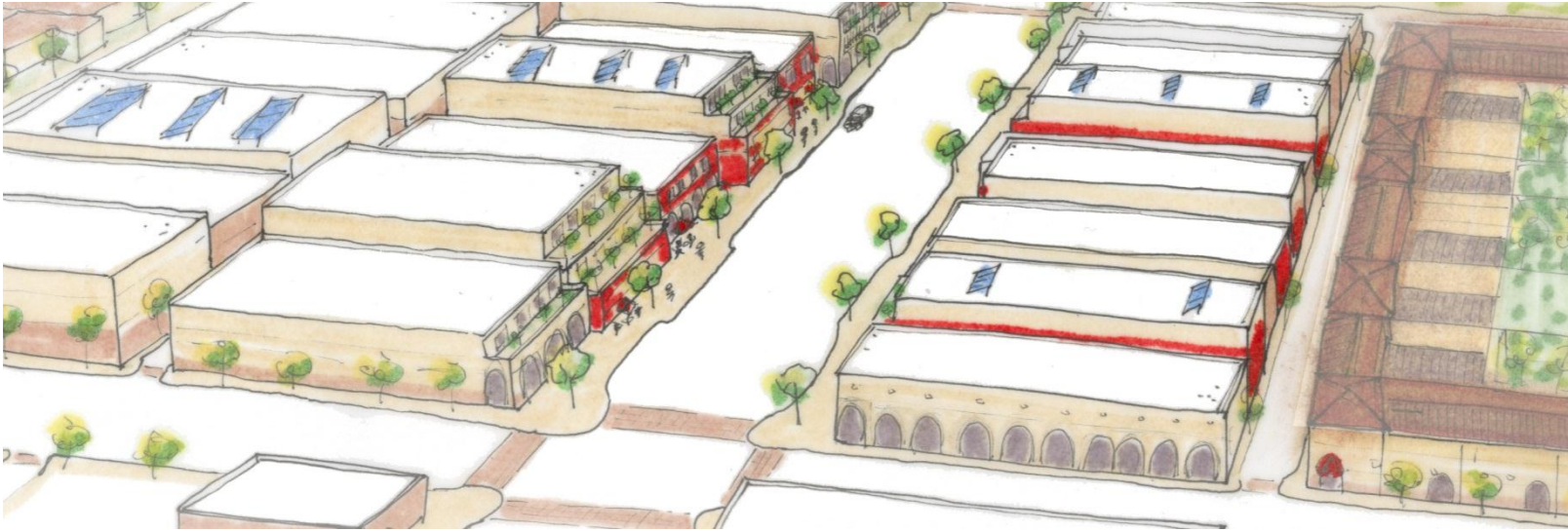
June 1, 2011

## City of San Joaquin 2040 Community Plan, Volume I: Background Report

City of San Joaquin, California, *City of San Joaquin, California*

Graduate Community and Regional Planning Studio, California Polytechnic State University

- San Luis Obispo, *Graduate Community and Regional Planning Studio, California Polytechnic State University - San Luis Obispo*



## CITY OF SAN JOAQUIN 2040 COMMUNITY PLAN

VOLUME I:

# BACKGROUND REPORT

JUNE 2011



CAL POLY





## Acknowledgements

### City of San Joaquin, California

#### **City Council**

Amarpreet Dhaliwal, Mayor  
Julia Hernandez, Mayor Pro Tem  
Abel Lua  
Mary Helen Reynaga  
Betty R. Vallejo

#### **City Staff**

Cruz W. Ramos, City Manager  
Diana Brooks, City Clerk  
Lupe Estrada, City Treasurer  
Jeff Viau, Public Works Director  
Stan Bulla, Code Enforcement Officer  
Alex Porteshawver, Energy Program Manager

#### **Consultants**

Gary Horn, P.E., Yamabe & Horn Engineering, Inc.

### Graduate Community and Regional Planning Studio

California Polytechnic State University at San Luis Obispo  
College of Architecture and Environmental Design  
City and Regional Planning Department

#### **Faculty Advisor**

Cornelius Nuworsoo, Ph.D., AICP

#### **Studio Team Members**

Jeffrey Ballantine  
Trina Blanchette  
Diego Castaneda  
Peter Flier  
Larissa Heeren

Cynde Kasperovich  
Michael Mottman  
Darci Palmer  
Aaron Ray  
Christopher Read

Bijan Riley  
Scott Robidoux  
Justin Saydell  
Natalie Stiffler  
Timothea Tway

## Preface

The City of San Joaquin General Plan Update Background Report was prepared by second-year graduate students and a professor in the City and Regional Planning Department at California Polytechnic State University at San Luis Obispo. Under an agreement between the City and the Department, this report is the first deliverable in a two-phase Graduate Community and Regional Planning Studio project to prepare a General Plan Update for the City. This project partially fulfills the requirements necessary to obtain a Master of City and Regional Planning degree from the University. This document represents 12 weeks of research regarding existing conditions and future possibilities for the City, as well as community feedback and opinions gathered from participants in community events conducted during the research period.

The members of the Graduate Planning Studio Team wish to express their gratitude to all who made it possible to conduct this project and prepare this report. Sincere appreciation is extended to City staff, officials, and consultants for their assistance in gathering information needed to conduct this research, as well as for facilitating access to community events to engage local residents in the process. The Team would also like to thank the citizens of San Joaquin for their enthusiastic participation in community meetings. Without their participation, this project would not have been possible.

## Table of Contents

Preface .....	ii
List of Figures .....	9
List of Tables .....	12
<b>EXECUTIVE SUMMARY .....</b>	<b>13</b>
Economic .....	13
Land Use .....	14
Circulation .....	14
Housing .....	14
Public Facilities and Services .....	15
Conservation .....	15
Biological Resources .....	15
Water Conservation .....	16
Energy Conservation .....	16
Green Building .....	17
Air Quality .....	17
Greenhouse Gas Inventory .....	17
Open Space .....	17
Safety .....	18
Noise .....	18
Community Design .....	18
<b>1. INTRODUCTION .....</b>	<b>21</b>
1.1. Setting .....	21
1.2. Demographics .....	21
1.3. History .....	21
1.4. City Planning Area and Sphere of Influence .....	21
1.5. Long Range Planning and the San Joaquin General Plan .....	22
<b>2. PLANNING PROCESS .....</b>	<b>23</b>

---

2.1. Introduction.....	23
2.2. Background Research and Fieldwork .....	24
2.3. Land Use Inventory.....	24
2.4. Community Outreach.....	26
2.4.1. Supplemental Trip 1: October 7, 2010 .....	26
2.4.2. Community Meeting 1: October 9, 2010 .....	26
2.4.3. Supplemental Trip 2, November 2, 2010 .....	28
2.4.4. Community Meeting 2: November 18, 2010 .....	32
2.5. Stakeholder Interviews .....	32
 <b>3. ECONOMIC .....</b>	 <b>35</b>
3.1. Introduction.....	35
3.2. Existing Conditions .....	35
3.2.1. Demographics .....	35
3.2.2. Population size, gender and age .....	35
3.2.3. Nativity and native language .....	36
3.2.4. Educational attainment.....	40
3.3. Economics.....	40
3.3.1. Income and poverty.....	40
3.3.2. Employment .....	42
3.3.3. Municipal budget and revenue.....	42
3.4. Emerging Directions .....	44
3.4.1. Community Feedback .....	44
3.4.2. Analysis.....	45
3.5. References .....	45
 <b>4. LAND USE.....</b>	 <b>47</b>
4.1. Introduction.....	47
4.1.1. State Standards .....	47
4.1.2. Regional Context.....	47
4.1.3. Development Trends.....	48
4.2. Existing Conditions .....	48
4.2.1. Residential .....	50
4.2.2. Commercial .....	52
4.2.3. Industrial.....	53
4.2.4. Open Space .....	54
4.2.5. Vacant Land .....	55
4.2.6. Public Facilities .....	56
4.2.7. Agriculture .....	57
4.2.8. Other Lands in the Sphere of Influence .....	58
4.3. Emerging Directions .....	59

---

4.3.1. Community Feedback .....	59
4.3.2. Conclusions .....	59
4.4. References .....	59
<b>5. CIRCULATION.....</b>	<b>61</b>
5.1. Introduction.....	61
5.2. Existing Conditions .....	61
5.2.1. Street Layout .....	61
5.2.2. Transportation Routes.....	67
5.2.3. Terminals.....	70
5.3. Emerging Directions .....	71
5.3.1. Public Transportation .....	71
5.3.2. Complete Streets .....	71
5.3.3. Other Improvements .....	72
5.4. References .....	72
<b>6. HOUSING .....</b>	<b>73</b>
6.1. Introduction.....	73
6.2. Existing Conditions .....	74
6.2.1. Housing Affordability .....	74
6.2.2. Housing Stock .....	77
6.2.3. Special Needs .....	82
6.3. Emerging Directions .....	87
6.4. References .....	88
<b>7. PUBLIC FACILITIES AND SERVICES.....</b>	<b>89</b>
7.1. Introduction.....	89
7.2. Existing Conditions .....	89
7.2.1. Water.....	90
7.2.2. Wastewater .....	94
7.2.3. Stormwater .....	96
7.2.4. Solid Waste .....	97
7.2.5. Police Services.....	98
7.2.6. Fire Protection .....	99
7.2.7. Public Schools.....	99
7.2.8. Public Libraries.....	100
7.3. Emerging Directions .....	101



---

7.3.1. Infrastructure Investments.....	101
7.3.2. Facility Investments.....	101
7.3.3. Program Enhancements .....	102
7.4. References .....	102
<b>8. CONSERVATION .....</b>	<b>105</b>
8.1. Introduction.....	105
8.2. Traditional Components.....	105
8.2.1. Location.....	105
8.2.2. Topography .....	106
8.2.3. Climate .....	106
8.2.4. Soil .....	107
8.2.5. Minerals.....	108
8.3. Biological Resources .....	109
8.3.1. Regulatory Framework.....	109
8.3.2. Existing Conditions.....	110
8.3.3. Emerging Directions.....	113
8.4. Water Conservation .....	113
8.4.2. Regulatory Framework.....	115
8.4.3. Existing Conditions.....	120
8.4.4. Community Feedback .....	128
8.4.5. Emerging Directions.....	130
8.5. Energy Conservation .....	134
8.5.1. Existing Conditions.....	134
8.5.2. Emerging Directions.....	139
8.6. Green Building.....	140
8.6.1. Existing Conditions.....	141
8.6.2. Emerging Directions.....	144
8.7. Air Quality.....	145
8.7.1. Regulatory Framework.....	145
8.7.2. Attainment Status Designations.....	149
8.7.3. Existing Conditions.....	151
8.7.4. Emerging Directions.....	155
8.8. Greenhouse Gas Inventory.....	156
8.8.1. Regulatory Framework.....	156
8.8.2. Existing Conditions.....	157
8.8.3. Emerging Directions.....	159
8.9. References .....	159
<b>9. OPEN SPACE.....</b>	<b>163</b>

---

---

9.1. Introduction.....	163
9.2. Existing Conditions .....	163
9.2.1. Agricultural Open Space .....	163
9.2.2. Recreation .....	171
9.3. Emerging Directions .....	175
9.4. References .....	176
<b>10. SAFETY .....</b>	<b>179</b>
10.1. Introduction.....	179
10.2. Existing Conditions .....	179
10.2.1. Seismic and Geologic Hazards .....	180
10.2.2. Flood .....	188
10.2.3. Fire .....	193
10.2.4. Human Made Hazards .....	195
10.3. Emerging Directions .....	198
10.3.1. Seismic and Geologic Hazards .....	199
10.3.2. Flood .....	199
10.3.3. Fire .....	199
10.3.4. Human Made Hazards .....	199
10.3.5. Hazard Mitigation .....	199
10.4. References .....	199
<b>11. NOISE .....</b>	<b>201</b>
11.1. Introduction.....	201
11.2. Existing Conditions .....	203
11.2.1. Noise Sources .....	203
11.2.2. Noise-Sensitive Land Use.....	205
11.2.3. State Standards .....	206
11.3. Emerging Directions .....	207
11.4. References .....	207
<b>12. COMMUNITY DESIGN .....</b>	<b>209</b>
12.1. Introduction.....	209
12.2. Guidelines and Standards.....	209
12.2.1. Historic Preservation .....	209
12.2.2. Cultural Resources.....	210
12.3. Existing Conditions .....	210

---

12.3.1. Existing Urban Design Characteristics.....	211
12.4. Emerging Directions and Urban Design Principles.....	216
12.4.1. Community Feedback .....	216
12.5. References .....	218

## List of Figures

Figure 1-1. San Joaquin City Limits and Sphere of Influence. ....	22
Figure 2-1. Community Planning Process. ....	23
Figure 2-2. City Land Use Inventory.....	25
Figure 2-3. Land Use Inventory for Sphere of Influence. ....	25
Figure 2-4. Architectural Visual Preference Survey. ....	29
Figure 2-5. Street Visual Preference Survey .....	30
Figure 3-1. Population by Sex and Age. ....	36
Figure 3-2. Foreign Born Population .....	37
Figure 3-3. Foreign Born Population Which Entered Between 1990 and 2000. ....	37
Figure 3-4. Region of Birth for Foreign Born Population in San Joaquin, 2000. ....	38
Figure 3-5. Percent of population (five years and older) who speak English less than 'very well'. .....	39
Figure 3-6. Percent of population 25 years and over who completed less than 9th grade in school. ....	39
Figure 3-7. Median Household Income. ....	40
Figure 3-8. Percent of individuals living below the poverty level. ....	41
Figure 3-9. Percent of families living below the poverty level.....	41
Figure 3-10. Industries by Employment. ....	42
Figure 3-11. Taxable Retail Sales per Person. ....	43
Figure 4-1. Existing Land Uses. ....	49
Figure 4-2. Residential Land. ....	51
Figure 4-3. Commercial Land.....	52
Figure 4-4. Industrial Land .....	53
Figure 4-5. Open Space.....	54
Figure 4-6. Vacant Parcels.....	55
Figure 4-7. Public Facilities. ....	56
Figure 4-8. Agriculture.....	57
Figure 4-9. Sphere of Influence Land. ....	58
Figure 5-1. Street Layout .....	62
Figure 5-2. Typical Roadway Cross-Sections.....	64
Figure 5-3. Average Daily Traffic Volumes (1990).....	67
Figure 5-4. Truck Routes. ....	68
Figure 5-5. Bicycle Routes. ....	69
Figure 6-1. Housing Units by Tenure.....	74
Figure 6-2. Overpayment Among Households by Tenure.....	75
Figure 6-3. Percent of Households with Severe Overcrowding.....	76
Figure 6-4. Housing Stock by Year Constructed.....	77
Figure 6-5. Housing Units by Size .....	77
Figure 6-6. Residential Units by Type .....	78
Figure 6-7. Vacancy Rate .....	78
Figure 6-8. Examples of San Joaquin Housing Units .....	80

Figure 6-9. Percent of Dwelling Units with Incomplete Plumbing. ....	81
Figure 6-10. Persons with one or more disabilities. ....	83
Figure 6-11. Households by Size. ....	84
Figure 6-12. Comparison between household sizes and housing unit sizes. ....	85
Figure 6-13. Single Parent Families with Children ....	85
Figure 6-14. Percent of Population Below Poverty Line.....	86
Figure 7-1. Locations of all public facilities within or operated by the City.....	90
Figure 7-2. Forecasted Water Demand vs. System Capacity .....	93
Figure 8-1. Location Map. ....	106
Figure 8-2. Average Temperatures. ....	107
Figure 8-3. Precipitation. ....	107
Figure 8-4. Average Humidity.....	107
Figure 8-5. Soils map. ....	108
Figure 8-6. Upper Kings River Groundwater Basin.....	120
Figure 8-7. Change in Depth to Groundwater.....	123
Figure 8-8. Groundwater elevation example.....	124
Figure 8-9. Average and Total Water Demand. ....	126
Figure 8-10. Average annual solar radiation at the national level in kilowatt-hours per square meter per day. ....	136
Figure 8-11 California Annual Average Wind Speed at 80m. ....	137
Figure 8-12 Number of structures built before year of Title 24 Update .....	139
Figure 8-13. Buildings with proper solar orientation.....	143
Figure 8-14. Valley Air Basin.....	151
Figure 9-1. High Density Parcels within Northeast San Joaquin. ....	165
Figure 9-2. Tentative tracts for southwest San Joaquin.....	166
Figure 9-3. Large acreage parcels for county land directly west of San Joaquin. ....	167
Figure 9-4. Existing zoning under General Plan. ....	168
Figure 9-5. Map of soil quality for Fresno County. ....	170
Figure 9-6. Map of parcels under Williamson Act contracts. ....	171
Figure 9-7. Parcels within 1/4 mile of a park.....	174
Figure 10-1. Regional Earthquake Faults. ....	182
Figure 10-2. Seismic Risk Zone Boundaries. ....	184
Figure 10-3. Landslide Hazards and Areas of Subsidence. ....	186
Figure 10-4. Expansive Soils. Source: Fresno County General Plan.....	187
Figure 10-5. Flood Insurance Rate Map for San Joaquin. ....	190
Figure 10-6. Dam Failure Flood Inundation Areas. ....	191
Figure 10-7. Potential Local Flood Zones.....	192
Figure 10-8. Fire Hazard Severity Zones.....	194
Figure 10-9. San Joaquin Hazard Areas. ....	198
Figure 11-1. Intensity and the Decibel Scale. ....	203
Figure 11-2. Key Noise Sources and Levels. ....	204
Figure 11-3. Noise-Sensitive Uses. ....	205
Figure 11-4. Acceptable Noise Exposure Levels by Land Use. ....	206
Figure 12-1. Existing Conditions.....	211

Figure 12-2. Downtown.....	212
Figure 12-3. Downtown Streetscape .....	213
Figure 12-4. Downtown Gateway. ....	213
Figure 12-5. Agricultural uses. ....	214
Figure 12-6. Example of a gateway from Temecula, California .....	215
Figure 12-7. Existing Alley in San Joaquin .....	217

## List of Tables

Table 2-1. Land Use Designations. ....	25
Table 3-1. Major Sources of Revenue for the City of San Joaquin General Fund. ....	43
Table 3-2. Total Funding and Total Expenditures, City of San Joaquin General Fund. ....	43
Table 4-1. History of Housing Construction, San Joaquin. ....	48
Table 4-2. Land Use Distribution. ....	50
Table 4-3. Residential Density Distribution. ....	50
Table 5-1. Levels of Service. ....	65
Table 5-2. LOS Criteria for All-Way Stop-Controlled (AWSC) Intersections. ....	66
Table 5-3. LOS Criteria for Two-Way Stop-Controlled (TWSC) Intersections. ....	66
Table 6-1. Regional Housing Needs Allocation Progress .....	76
Table 6-2. Housing Conditions in San Joaquin. ....	80
Table 7-1. City Groundwater Pump Facilities .....	90
Table 7-2. Wastewater Generation Forecasts, Five-Year Intervals. ....	95
Table 7-3. Crime Rate Statistics, 2009 .....	99
Table 8-1. Rare Species of San Joaquin .....	113
Table 8-2. Water Well Information. ....	124
Table 8-3. Surface and Groundwater Usage. ....	127
Table 8-4. State and Federal Ambient Air Quality Standards .....	146
Table 8-5. Health Effects of Criteria Air Pollutants .....	148
Table 8-6. San Joaquin Valley Attainment Status. ....	150
Table 8-7. Ambient Air Quality at the Fresno-Drummond Street Monitoring Station .....	154
Table 8-8. Greenhouse Gas Global Warming Potential. ....	156
Table 8-9. Emissions Multiplier by Utility. ....	158
Table 9-1. NRPA Standards for Parks. ....	172
Table 9-2. Small Communities Parks Standards .....	173
Table 9-3. Data Summary from Community Dinner Workshop. ....	176
Table 10-1. Hazardous Materials/Hazardous Waste Facilities in San Joaquin. ....	197
Table 11-1. Noise Descriptors. ....	201

# EXECUTIVE SUMMARY

---

This background report provides an overview of existing conditions (as of December, 2010) in the City of San Joaquin, California, in relation to the update of the General Plan. The information presented in this background report reveals the opportunities and constraints present in San Joaquin and will help inform the goals, policies, and programs included in the General Plan. The City of San Joaquin is located in the central San Joaquin Valley in Fresno County approximately 30 miles southwest of the City of Fresno.

A study team of Cal Poly graduate students in the Department of City and Regional Planning gathered information for each general plan element. The team consulted existing plans and documents, community leaders and public officials and City residents during the creation of this document.

This background report includes the following ten elements:

- Economic Development
- Land Use
- Circulation
- Public Facilities and Services
- Housing
- Conservation
- Open Space
- Noise
- Safety
- Community Design

The following sections of this executive summary briefly outline existing conditions, key findings and future directions for San Joaquin for each element.

## Economic

The Economic Element is intended to maintain and enhance the economic character of the community while providing for a stable annual budget. The City is challenged in its ability to cover the costs of public services as a result of lower than average per capita sales tax income, low wages among residents and poor proximity to major trade routes. Also, the local economy was detrimentally affected by a federal program to retire arid farmland in the surrounding area which has greatly reduced employment opportunities.

Major concerns expressed by residents at meetings were employment opportunities and retail availability in San Joaquin. Many people showed interest in education related to new job skills.



Strategies to be considered in order to enhance the economy include the attraction of large employers to the area, the development of local self-employment options and the attraction of job skills training programs to the City. Types of industries to be considered for recruitment are renewable energy generation and agriculture related industries. Consideration should also be given to the informal economy and how that might be developed into a more formal economy.

## Land Use

The Land Use Element describes the findings from the 2010 Land Use Survey which identifies the types and intensity of land use on each parcel in the City. This inventory revealed that general neighborhood commercial land is concentrated on Colorado Boulevard and Main Street, totaling 25.02 acres. 46.09 acres are designated as industrial land, focused on the southeastern portion of the City with a mix of light and heavy industrial uses. Residential land totaled 158.52 acres, distributed throughout the City with lower density housing in the southern and central parts of the City, medium densities in the north portion, and higher density in the northwest of the City. The inventory also revealed 230.95 acres of agricultural land in numerous parcels on the edges of the City. Roads in the City account for 106.00 acres of land, public facilities account for 78.13 acres, and railroad uses account for 19.09 acres. There are 6.71 acres of open space within the City, and a total of 39.69 acres of otherwise vacant land.

Input from community members indicates a recurring desire for a small and compact City, more parks and more stores. Emerging directions for land use include the possibility of using vacant parcels to accommodate additional parks, stores, and housing. Additionally, more land could be allocated for industrial purposes to help bring more jobs to the City. By developing appropriate goals, the City can ensure that land uses are compatible, appropriate, and contribute to the vitality of the community.

## Circulation

The Circulation chapter describes the existing conditions and emerging issues related to many aspects of transportation, including roads, highways, public transit, railways, parking, and bicycle and pedestrian infrastructure. San Joaquin lies halfway between Interstate 5 and State Route 99. It shares one of its main streets with traffic traveling through the City to other destinations. Colorado Avenue is a major north - south corridor that also acts as a truck route; Manning Avenue is a main east - west route that connects two main freeways. These routes are operating at above average levels of service. San Joaquin also has a major rail line that parallels Colorado Avenue and splits the town. This affects the traffic, safety, and pedestrian connectivity. The City's streets and sidewalks are in fair condition and in need of maintenance and it lacks bicycle infrastructure. Thus directions for future include improvements to streets, bicycle lanes, sidewalks, connectivity between the two sides of town and expansion of public transportation service.

## Housing

The purpose of the Housing Element is to ensure that local governments adopt land-use plans and regulatory schemes that provide adequate housing opportunities and development for

residents of all incomes. In 2000, over one third of households in the City were overpaying for housing, and over one third were living under the poverty threshold. With the recent loss of employment opportunities, overpayment and poverty trends have likely worsened.

There are a total of 1,067 residential units in the City, over half of which are single family detached. The housing stock is in good condition overall, with only 78 units in need of minor repairs according to external assessment. Anecdotal evidence suggests, however, that subsidized rental units are in need of repair for basic livability. In addition, the needs assessment and public outreach indicate that more housing stock is needed, especially for large families in lower income brackets. Future directions include building low-income housing units with five or more bedrooms, developing high-quality housing to attract high-income residents, and improving maintenance of rental units.

## Public Facilities and Services

The Public Facilities and Services Element guides the evolution of citywide infrastructure and programs that provide the foundation for development and growth. This element considers infrastructure and systems for water distribution, stormwater management, wastewater treatment, and solid waste disposal. In addition, the element examines services including police and fire protection, local schools, and the public library. Although the City has prepared master plans for nearly all of its infrastructure systems, both the water and sewer systems are inadequate to meet potential needs.

The City's only school serves a student population of roughly double its design capacity, and has failed to meet performance standards for five consecutive years. The City is fortunate to have a low crime rate in contrast with the rest of Fresno County, but lacks its own police protection force, instead relying on relatively limited access to police services under contract with the Fresno County Sheriff Department. The City also lacks its own fire station, and all fire calls within San Joaquin must be served by the nearby fire station in Tranquility, increasing response times in the event of an emergency.

## Conservation

The Conservation element is given special attention in this background report and the San Joaquin General Plan. The City has expressed a desire to focus specifically on the conservation element, in order to become a model sustainable city in the San Joaquin Valley. In this background report conservation has been divided into several sections including water conservation, biological diversity, air quality, greenhouse gas inventory, green building and energy conservation.

## Biological Resources

San Joaquin supports agriculture and urban development. Approximately 38 percent of the land use in the City is dedicated to agriculture; therefore, plant and animal life is minimal. In the few remaining areas not converted to urban or agriculture use, unique biological features exist. The areas not yet converted consist largely of non-native plant species and grassland habitats. The

community has expressed the importance of additional trees in the City. The addition of trees in San Joaquin may potentially support a more abundant plant and animal habitat, and could also add to the aesthetics of the City.

## Water Conservation

The importance of water conservation in California is becoming increasingly realized, particularly in the Central Valley. Much of the economy in the Valley is attributed to water availability for agriculture. The City, nestled in the heart of prime agricultural land, understands the importance of reducing water consumption to protect valuable water supplies. Current water demand is about 181 gallons per person per day equaling 257 million gallons per year for the entire City. The average daily water demand for Fresno County is 258.8 gallons per person and the State of California's average daily water use is approximately 192 gallons per person.

This section of the Conservation Element sets the tone for developing a General Plan that emphasizes water conservation. Included in this portion is a description of the State water policy framework including required water planning, building codes, city landscaping ordinances, and metering; existing conditions including water supply; water demand; regional hydrogeology and emerging directions. The emerging directions portion covers the feasibility of implementing water saving measures in San Joaquin. The City hopes to protect its water resources by developing and implementing a plan that reduces the City's water consumption. The size and overall economic situation makes it difficult for the City to make significant investments in water infrastructure and services without outside funding.

According to State statutory law, the City must reduce water consumption to 144.8 gallons per person per day. Compliance with State laws and regulations that help to meet California's State Water Plan of a 20 percent water reduction by 2020 allows the City to qualify for State and federal funding to help pay for water infrastructure improvements and projects that reduce overall water usage. Some of these project themes include: educational programs for children and adults, incentive based programs such as "cash for grass" and water saving fixture installation, water metering installation with a tiered fee based system and ordinances restricting landscape watering. By adopting a general plan that lays a policy and implementation framework, the City can prioritize water conservation projects that make them a model city for water conservation.

## Energy Conservation

The Energy Conservation section of the Conservation Element aims to substantially decrease the amount of energy consumed by the City. The City is currently entirely dependent on non-renewable energy sources. Further, a majority of buildings in the City were built before minimum mandatory building efficiency standards were in place. This section suggests actions the City can take to decrease dependence on non-renewable energy sources by supporting on-site power generation, municipal renewable energy sources, and building efficiency through enforcement of non-mandatory elements of Title 24 (California's Green Building Code).

## Green Building

Buildings and the process of building comprise a majority of energy use and GHG emissions in most cities. The Green Building element seeks to reduce the amount of resources that the building stock of the city consumes. The section uses parts of LEED-ND, a national tool used to evaluate the sustainability of neighborhoods, to assess the current green building conditions in the City. While the City currently fails to meet national standards for green building, the potential exists for the City to have highly efficient buildings and construction processes by encouraging recycled and sustainably harvested construction materials on-site power generation, and energy and water efficient buildings. In the second community meeting, City residents confirmed that they would be willing to invest in energy efficiencies if it meant saving money and energy in the long term.

## Air Quality

The City is located in the San Joaquin Valley Air Basin, which is regulated by the San Joaquin Valley Air District. Air quality in the San Joaquin region has generally been good according to nearby monitoring station data. Based on a review of pertinent literature, air quality issues relevant to the City include vehicle emissions, construction activity emissions, fugitive dust and odors. Future directions related to air quality include the creation of policies and programs to keep air pollutant emissions low, and protect the health and safety of the residents of San Joaquin.

## Greenhouse Gas Inventory

The Greenhouse Gas (GHG) Inventory section reports a comprehensive list of all GHG emission sources in the City as well as the net total amount of carbon dioxide emitted in one calendar year. The GHG Inventory accounts for municipal and private emission sources. The background report accomplishes the first task of identifying the sources of GHG emissions in the City, including the City's vehicle fleet, energy from building operations, and street lights. Private sources include emissions from vehicles, buildings, and industrial operations. Once the sources have been compiled, the emissions can be quantified and projected forward to 2035 and backward to 1990.

## Open Space

The Open Space Element contains a plan for the management and maintenance of open space resources for the City. The open space resources in San Joaquin are agricultural land and recreational spaces. Agriculture is the largest industry in San Joaquin, and the current land use policy reflects this by working to conserve agricultural lands as the city grows. Recreational open space in the City fails to meet national standards as there is not enough space for the existing population, and it is not adequately distributed throughout the City. The major areas of concern are to provide more recreational space and to provide a greater variety of uses.

While not currently a pressing issue because of sound land use policy, prime agricultural land is a diminishing and irreplaceable resource that will only grow more valuable, so its conservation will always remain a priority. Feedback from the community indicates a strong need and desire

for greater number and types of outdoor recreational spaces to improve the health of residents and increase the quality of life.

## Safety

The Safety Element addresses the protection of humans and property from natural and man-made hazards. Hazards addressed include seismic and geologic hazards, wildfire, flood, and hazardous materials storage and transport. Seismically, San Joaquin is relatively safe. The nearest active fault is approximately 40 miles away from San Joaquin and there are no unreinforced masonry buildings in the City. San Joaquin is also not significantly threatened by liquefaction, landslide, or wildfire. The City is located in an area of deep subsidence, which means there is a risk of the ground settling or sinking, especially if precautions are not taken when removing groundwater from aquifers. Notably, the City was recently classified by FEMA as being located in the 100-year flood plain. There are several hazardous materials sites that are monitored by the EPA in the city, and two major thoroughfares and the railroad provide corridors along which hazardous materials can be transported.

The City does not have a hazard mitigation plan, nor are they a part of any multi-jurisdictional plan. Future directions for the City include the creation of a hazard mitigation plan, or partnership with other agencies for a multi-jurisdictional hazard mitigation plan and the creation of a community emergency plan. The development and implementation of safety related community education programs can also be explored. As the City continues to develop and grow, there is also the opportunity to address community safety through environmental design.

## Noise

The Noise Element provides a discussion on the regulatory framework upon which the noise element is based. It also identifies locations of major noise sources and noise sensitive land uses. The greatest noise sources are traffic on Manning and Colorado Avenues with most sensitive uses such as schools and most residences located outside the limit of unacceptable noise levels. The greatest noise-related issues for San Joaquin in the future will be continuing to ensure land use compatibility among adjacent properties. This can be achieved through noise control measures and noise control programs to limit the community's exposure to harmful levels of noise.

## Community Design

The Community Design Element describes the aesthetic characteristics of the City's built environment and focuses on San Joaquin's identity. The City has a distinct character and a vision to maintain its unique sense of place and small town qualities as it moves into the future. Sense of place within the City is created by cultural, historical significance and architectural elements, such as setbacks, architectural details and storefronts. Key areas that define San Joaquin's sense of place include the downtown, commercial area, residential neighborhoods and the agriculture industry.

To strengthen the City's character, community design guidelines can be created to address new construction, the downtown core, pedestrian connections, park space and "gateways" to the community. Emphasis on creating public spaces, implementing sustainable design principles and preserving landmarks, open space and historic buildings can further enhance San Joaquin's sense of place and identity. Residents have indicated aspects of the City's character that they wish to change, including improving the efficiency of land uses, attracting a diverse population to the City, and sustaining an attractive small town atmosphere.



# 1. INTRODUCTION

---

## 1.1. Setting

The City of San Joaquin is located in the central San Joaquin Valley of California between the Sierra Nevada and Coast Range mountain ranges in Fresno County. It is located approximately 30 miles southwest from the City of Fresno. The City, which is about one square mile, lies at an elevation of 170 feet on flat terrain and is surrounded mainly by agricultural uses. Throughout the City's history, agriculture has played an important role. Major transportation corridors link the City with major cities in California including Interstate 5, Highway 99 and Manning Avenue. San Joaquin is also located on a rail line.

## 1.2. Demographics

San Joaquin had approximately 4,070 residents in 2009 and is the smallest incorporated city in Fresno County. In the 2000 census, more than 90 percent of those living in the City identified themselves as Hispanic or Latino of any race. Approximately 41 percent of San Joaquin's population is under the age of 18. Additionally, about 34 percent of the population was living under the poverty line at the time of the census.

## 1.3. History

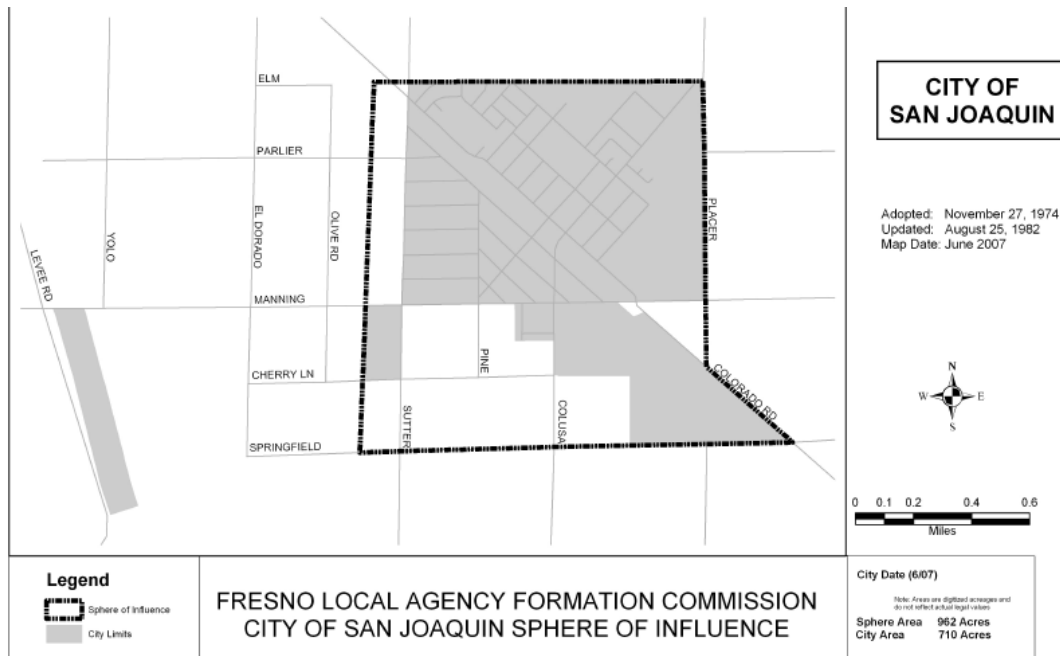
San Joaquin was founded in the early 1900s and incorporated in 1920 as a general law city. The City developed with a traditional grid layout, oriented around the railway and served as a center for services in an agricultural area. Throughout its history, the city has been a small community with a strong agricultural presence.

## 1.4. City Planning Area and Sphere of Influence

As suggested by the Governor's Office of Planning and Research (OPR), "When establishing its planning area, each city should consider using its sphere of influence as a starting point" (2003, p .10). The sphere of influence contains the City limits as well as any unincorporated territory of the County in which development or projects can influence the interests of the City. While the City itself is about one square mile in size, the City of San Joaquin Sphere of Influence is about 1.57 square miles in size, illustrated in Figure 1-1.



Figure 1-1. San Joaquin City Limits and Sphere of Influence.



## 1.5. Long Range Planning and the San Joaquin General Plan

California's cities and counties must adopt a General Plan to guide future development. The General Plan, which outlines goals and policies for future directions of a jurisdiction, is the tool used for long-range planning. State law mandates the inclusion of seven elements in a general plan including Land Use, Circulation, Housing, Conservation, Open Space, Safety, and Noise. Three additional optional elements have been included in this general plan update: Economic Development, Public Facilities and Services, and Community Design.

The first General Plan for San Joaquin was adopted in 1973, with subsequent amendments and Housing Elements. The current San Joaquin General Plan was updated in 1995. This San Joaquin General Plan update is being completed by a study team of graduate students in the City and Regional Planning Department at Cal Poly, San Luis Obispo. The plan update is based on OPR guidelines for preparing a general plan.

## 2. PLANNING PROCESS

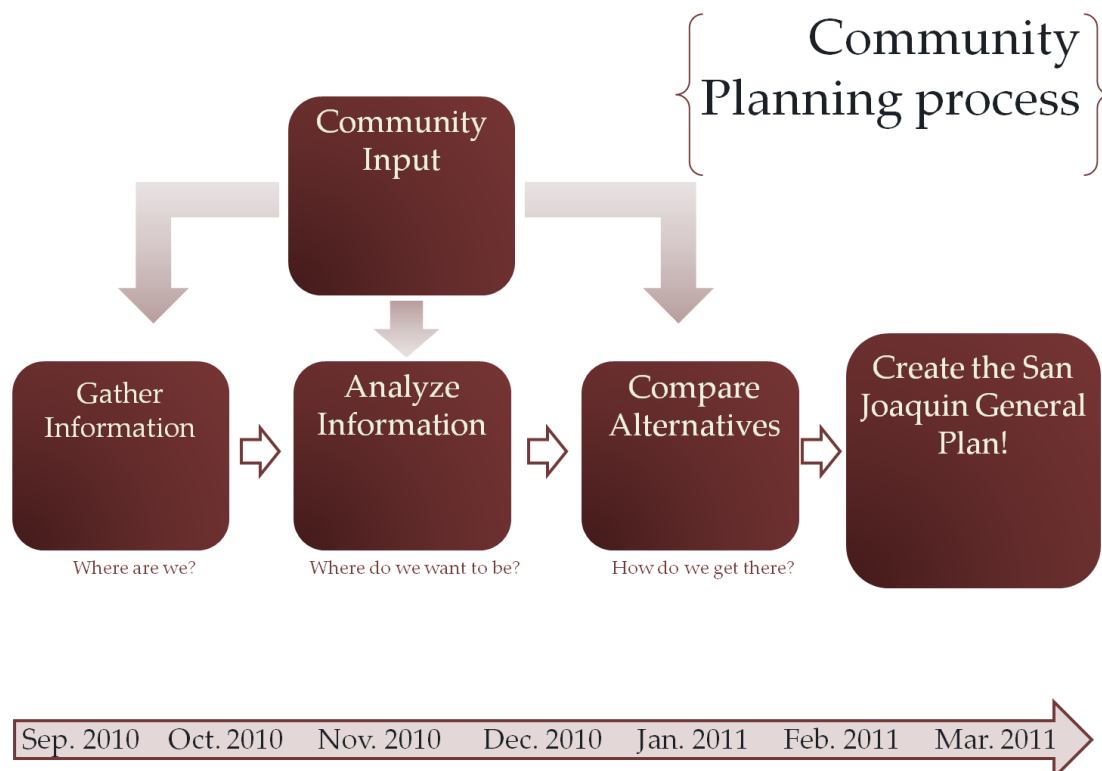
### 2.1. Introduction

This section describes the Community Planning Process undertaken by the study team for the background report of the City of San Joaquin General Plan Update. The planning process involves three distinct and important steps (See Figure 2-1):

1. Gathering information by conducting a land use inventory, researching background information about the City, conducting personal interviews with stakeholders, distributing and collecting surveys and holding community meetings;
2. Analyzing information from primary and secondary research to develop future directions for the City; and
3. Comparing alternative scenarios for the future of the City.

Community feedback is an integral part of the Community Planning Process and contributes to each step throughout. Community feedback was obtained through personal interviews with stakeholders, surveys of residents and community meetings which are described in the community feedback section.

*Figure 2-1. Community Planning Process.*



## 2.2. Background Research and Fieldwork

Each general plan element is influenced by policies set at the local, regional and State level. These policies guide the community's decision-making process about when, where and how to grow, as well as determining what infrastructure is needed to serve growth. This section describes the formal research sources, organizations and fieldwork undertaken by members of the planning team. The California Governor's Office of Planning and Research (OPR) identifies what needs to be addressed by the general plan for each of the seven required elements. Additional elements have been added to the City of San Joaquin Background Report. Agencies with interests or responsibilities related to development and use of land in Fresno County were consulted to identify current land uses.

The following agencies were consulted to establish policies and best practices:

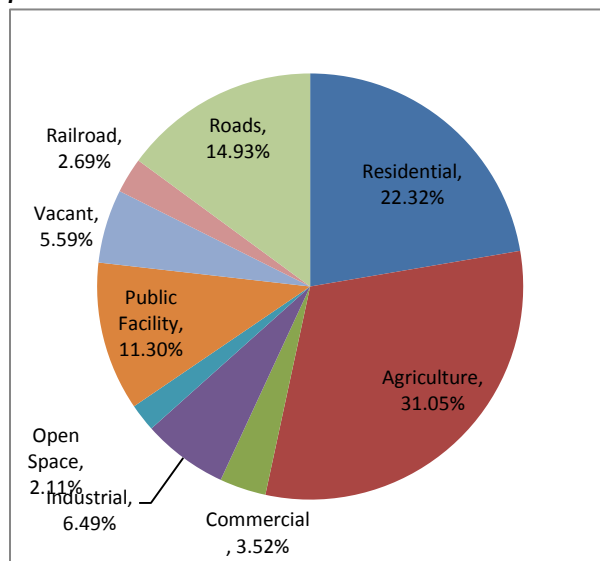
- California Department of Finance
- California Department of Transportation
- California Department of Water Resources
- California Office of Planning and Research, General Plan Guidelines
- California Resources Agency
- City of San Joaquin
- County of Fresno
- County of Fresno Department of Public Works and Planning
- Golden Plains Unified School District
- Fresno Council of Governments
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Department of Housing and Urban Development
- U.S. Access Board Guidelines

These agencies either report activities at the local level (e.g., department of finance records current population and employment information) or guide local decision-making (e.g., the Local Agency Formation Commission determines if and when bordering areas can be annexed by the City). The agencies are referenced throughout the background report.

## 2.3. Land Use Inventory

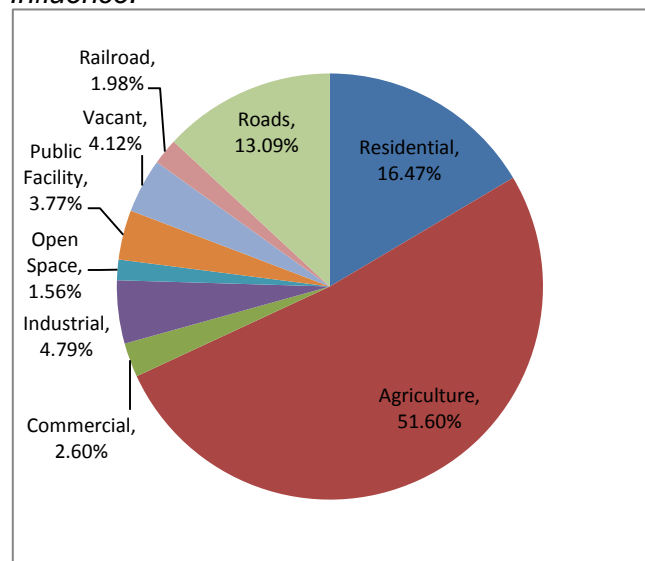
The planning team conducted a land use inventory in early October 2010 primarily to determine land uses and conditions of buildings within city limits. The inventory included a visual assessment of each parcel in several different categories. A classification and coding system was adapted from Fairfax County, Virginia to categorize the land uses. The condition of roads, presence of public sidewalks and trails were also noted. Figure 2-2, Figure 2-3 and Table 2-1 show the land uses in the City and its Sphere of Influence. The land use inventory is discussed further in the Land Use chapter of this background report.

Figure 2-2. City Land Use Inventory.



Source: 2010 Land Use Survey

Figure 2-3. Land Use Inventory for Sphere of Influence.



Source: 2010 Land Use Survey

Table 2-1. Land Use Designations.

Land Use Designation	City		Sphere of Influence	
	Acres	Percent	Acres	Percent
Residential	158.52	22%	158.52	16%
Agriculture	230.95	32%	506.95	53%
Commercial	25.02	3%	25.02	3%
Industrial	46.09	6%	46.09	5%
Open Space	6.71	1%	6.71	1%
Public Facility	78.13	11%	78.13	4%
Vacant	39.69	6%	39.69	4%
Railroad	19.09	3%	19.09	2%
Roads	106.00	15%	126.00	13%
<b>Total Acreage</b>	<b>710.20</b>	<b>100%</b>	<b>962.20</b>	<b>100%</b>

Source: 2010 Land Use Survey

## 2.4. Community Outreach

Community outreach is fundamental to the development of the background report. Two community meetings were conducted by the study team. Additionally, two supplemental trips were made to the City. A number of surveys were collected throughout the process; the details of which follow in the general and economic survey sections and following chapters. The vast majority of adult community members were non-native English speakers, so a Spanish translator was used at Community Meeting 1. The second community meeting was conducted in Spanish. A more detailed discussion of demographic characteristics takes place in the Economic chapter. The format of each of these meetings and trips is discussed in the following subsections.

### 2.4.1. Supplemental Trip 1: October 7, 2010

In the first of the two supplemental trips, team members went to the San Joaquin Veteran's Hall.

#### **Purpose**

The purpose of this trip was to introduce the studio to the City, and to encourage members of the City to participate in the upcoming meeting.

#### **Format**

A weekly Thursday night dinner is provided free of charge by local aid organizations (such as the United Way and Salvation Army). Discussions with city staff brought to light that this weekly event saw participation in numbers approaching five hundred. Though no absolute count was made, estimates place the crowd at well over two hundred, with a majority being children.

A table was provided by the City on which team members placed clipboards with a general supplemental survey for individuals to fill out in Spanish or English as preferred. Candy was also provided to encourage children to bring their parents to the table. Team members who spoke Spanish aided community members in completing surveys. Twenty survey responses were collected that night. Additional surveys were given to the mayor pro tem and head of the local *Promotoras* (the participatory arm of a regional community non-profit organization). Detailed discussions of the results of this survey follow in subsequent chapters.

### 2.4.2. Community Meeting 1: October 9, 2010

Community Meeting 1 was held at the San Joaquin Veteran's Hall.

#### **Purpose**

The purpose of this meeting was to introduce the study team to the community, explain the General Plan Process, record valuable input about the perceived state of the community and confirm initial feedback received from surveys. The combined feedback follows in the feedback section. Community members were asked to answer three questions:

- What do you like about your community?
- What does your community lack?

- What would make your community better?

### **Format**

The format of the first community meeting was a PowerPoint presentation which included a brief explanation of who constituted the study team, the intention to update the general plan, how this would be accomplished and an explanation of the final product to be produced (the update to the general plan). The meeting began with ten adult members of the community, but this number doubled as the meeting progressed. The language distribution witnessed at the first supplemental meeting held constant and most community members only spoke Spanish.

Two community member tables were established, along with one community leader table at which sat the Mayor, City Manager and Public Works Director, among others. A facilitator asked all groups three questions (translated in Spanish by the Mayor pro tem) and gave groups 15 minutes or more to respond to each question. Feedback and discussion commenced as the participants gave an abundance of input. Answers were written on notepads for each of the three questions. One team leader for each group then presented the answers to the rest of the groups.

### **Feedback**

This section discusses the common answers received in both surveys and community meetings. The team accumulated beneficial input that would help in determining the future vision for the City. Detailed descriptions of these answers follow in chapters under the community feedback sections and the input from community leaders follows in the stakeholder interviews section as well as later chapters. There was a range of different feedback but common answers throughout the surveys and Community Meeting 1 included:

#### Likes about the community

- Everyone knows each other
- The farmer's market and other community activities
- Everything is within walking distance
- There is a very low crime rate

#### Things the community lacks

- A well-trained workforce to attract businesses
- A public transportation system
- Fast-food restaurants and shopping opportunities
- A youth center
- A 24-hour medical clinic
- Adequate school space
- A grocery store

#### Things to make the community better

- More parks, trees, flowers and landscaping
- More employment opportunities and job training

- More public facilities (bathrooms, benches, etc.)
- More stores and entertainment opportunities
- Teen activities
- Keep up with general maintenance and upkeep of streets and sidewalks

### 2.4.3. Supplemental Trip 2, November 2, 2010

The second supplemental trip coincided with a public festival in the City: *Día de los Muertos*.

#### **Purpose**

The purpose of this trip was to obtain additional information regarding economic forces, understand community design preference and to advertise the next community meeting.

#### **Format**

The main downtown street was closed off to vehicular traffic for the street festival. In Mexican culture, the *Día de los Muertos* is a popular holiday which honors the deceased members of the community. Offerings are made to the deceased in the form of candy, liquor and toys (for deceased children). The City began its own celebration in 2009 with three altars to the dead and a handful of street vendors offering assorted cultural foods and beverages. The altars are part of a design competition entered into by local community members. In 2010, the festival boasted nine altars, numerous street food vendors, cultural dances and disk music for participants to dance to on an improvised dance floor. Though no head count was made, it is estimated that community member participation reached several hundred for the event.

Team members, with assistance of the Mayor pro tem set up a booth with different materials to help facilitate discussion. The booth, consisting of a table and some easels displaying posters stood at one end of the festivities near the heart of the celebration, the cultural dance stage. This location placed studio members in direct interaction with attendees. Two Spanish posters with 24 pictures in all were used to conduct a visual preference survey (see Figure 2-4 and Figure 2-5). This visual tool asked participants to select the style they most preferred from three designs of houses, neighborhoods, sidewalks and other amenities. Further discussion of the results of this visual preference survey appears in Chapter 12: Community Design.



Figure 2-4. Architectural Visual Preference Survey.

## CITY OF SAN JOAQUIN GENERAL PLAN UPDATE

### PREFERENCIAS VISUALES PARA SAN JOAQUIN

#### QUE ESTILO ARCHITECTURAL PREFIERE?



#### QUE TIPO DE CALLES PREFIERE



#### QUE ESTILO DE CASA PREFIERE?



#### QUE ESTILO DE VIVIENDA PREFIERE?



*Note: English translation for the questions above are: "which architectural style do you prefer?", "which type of street do you prefer?", "which style house do you prefer?" and "which type of housing do you prefer?"*



Figure 2-5. Street Visual Preference Survey

## CITY OF SAN JOAQUIN GENERAL PLAN UPDATE

### PREFERENCIAS VISUALES PARA SAN JOAQUIN

#### QUE ESTILO DE PASO DE PEATONES PREFIERE?



#### QUE TIPO DE ACERA PREFIERE?



#### QUE ESTILO DE BANQUETA PREFIERE?



#### QUE ESTILO DE FAROL PREFIERE?



*Note: English translation for questions above are: "which style of crosswalk do you prefer?", "which type of sidewalk do you prefer?", "which bench style do you prefer?", and "which style of lighting do you prefer?"*

Also, studio members administered a survey which asked the following general economic, housing and shopping and entertainment questions:

- Are you satisfied with the job opportunities in San Joaquin?
- Are you interested in obtaining new job skills?
- Are you satisfied with the shopping opportunities in San Joaquin?
- Where do you purchase a majority of your household goods?

Additional, un-administered surveys were left with the *Promotoras* to conduct throughout the City in our absence and administer as many as possible. These surveys were to be returned to the studio members at a later date.

### **Feedback**

This section discusses the answers provided and preferences for the economic survey and visual preference survey, respectively.

#### Economic Survey

41 surveys were collected from the *Día de los Muertos* festival. The proportion of answers to some of the more one-sided responses are as follows:

- 62.5 percent of respondents were not satisfied with the job opportunities in San Joaquin.
- 78.4 percent of respondents were interested in obtaining new job skills.
- 82.9 percent of respondents were not satisfied with the shopping opportunities in the City.
- 91.4 percent of respondents obtained a majority of their household goods in the City of Fresno.

A more detailed examination of survey questions follows in later chapters.

#### Visual Preference Survey

Over 80 individuals participated in the visual preference survey which was administered both during Supplemental Trip 2 and Community Meeting 2. The majority of participants were from the *Día de los Muertos* festival so while the participants were given equal opportunity to cite their preference, the results from the second community meeting served merely to confirm conclusions which were already developing about preferences. Some of the more striking results are as follows:

- 62 percent of respondents preferred the Spanish colonial style of architecture over the Craftsman and ranch style homes.
- 62 percent of respondents preferred low density neighborhoods over to medium and high density neighborhoods.
- 81 percent of respondents preferred the sidewalk with more treatments, amenities and arcades over a sidewalk with simple tree-scaping or a blank sidewalk without adornment

A more detailed discussion of this survey follows in later chapters.

#### **2.4.4. Community Meeting 2: November 18, 2010**

Community Meeting 2 was held at the San Joaquin Veterans Hall.

##### **Purpose**

The purpose of Community Meeting 2 was to share with the community the background research conducted by the team and to gain some input as to what opportunities (called future directions) the plan should focus on.

##### **Format**

The decision was made to hold Community Meeting 2 at a time and place where attendance would be higher than the first meeting. The meeting was held at the free Thursday night dinner. The meeting coincided with the Thanksgiving dinner offerings so attendance was much greater than expected. A vast majority of those in attendance were young children and all participants who were not city officials were Spanish speakers.

As the dinner began to settle down, the City Manager introduced the team and let community members know that a presentation would occur to discuss the future of their community. Children were asked to draw how they wanted the City to look. Crayons and pencils were provided to young children so their parents and other adults could give full attention to the activities and presentation of the team.

The format of the second community meeting was a gallery of stations, displaying visual preference surveys and maps. Participants were asked to perform assessments similar to the previous visual preference survey. Stations which were not purely visual preference surveys (stations which used maps) asked participants to identify specific locations within the City. Community members were instructed to place a sticker on locations in the City which were especially noisy, where they felt unsafe or were particularly malodorous, among other questions.

There was also a PowerPoint presentation which included a brief explanation of what step in the General Plan update process had been reached; analysis of information. Over 30 attentive adult community members were counted at the beginning of the presentation. The presentation was around 35 minutes in duration and discussed many of the general conclusions about each element of the general plan. These conclusions form much of the basis for this document and will be discussed in detail in later chapters. Later chapters discuss the community feedback.

#### **2.5. Stakeholder Interviews**

To help identify goals and objectives for the City, interviews were conducted with major stakeholders of the City. Community Meeting 1 presented an opportunity to gain valuable input from community leaders. Interviews of the City's stakeholders were conducted in San Joaquin, on November 18, 2010. Interviewees were asked the following questions, among others:

- Do you rent or own your space?
- What is the main advantage of this location?
- What is the main disadvantage?

Later chapters discuss the community feedback.

### **Feedback**

Community leaders and stakeholders came to many of the same conclusions in interviews and Community Meeting 1. The common trends found in their inputs were as follows:

- Keep the small town community feel of the City
- Keep the crime rate low
- Increase the opportunities for businesses to thrive
- Develop more park land
- Create more jobs
- Create youth programs



## 3. ECONOMIC

---

### 3.1. Introduction

The purpose of the Economic Element is to develop policies and programs to maintain and enhance the economic character of the community while providing for a stable annual budget. This is achieved through the development of policies and strategies related to retaining existing businesses, attracting new businesses and industries, creating jobs and expanding the tax base (Office of Planning and Research, 2003). The existing General Plan has a few policies that relate to economic goals. The incorporation of an Economic Element will allow the City to pursue economic goals in a more strategic manner. This chapter discusses existing conditions and emerging directions. Existing conditions consist of demographic and economic data. These data are assessed in combination with community input to form emerging policy directions.

### 3.2. Existing Conditions

#### 3.2.1. Demographics

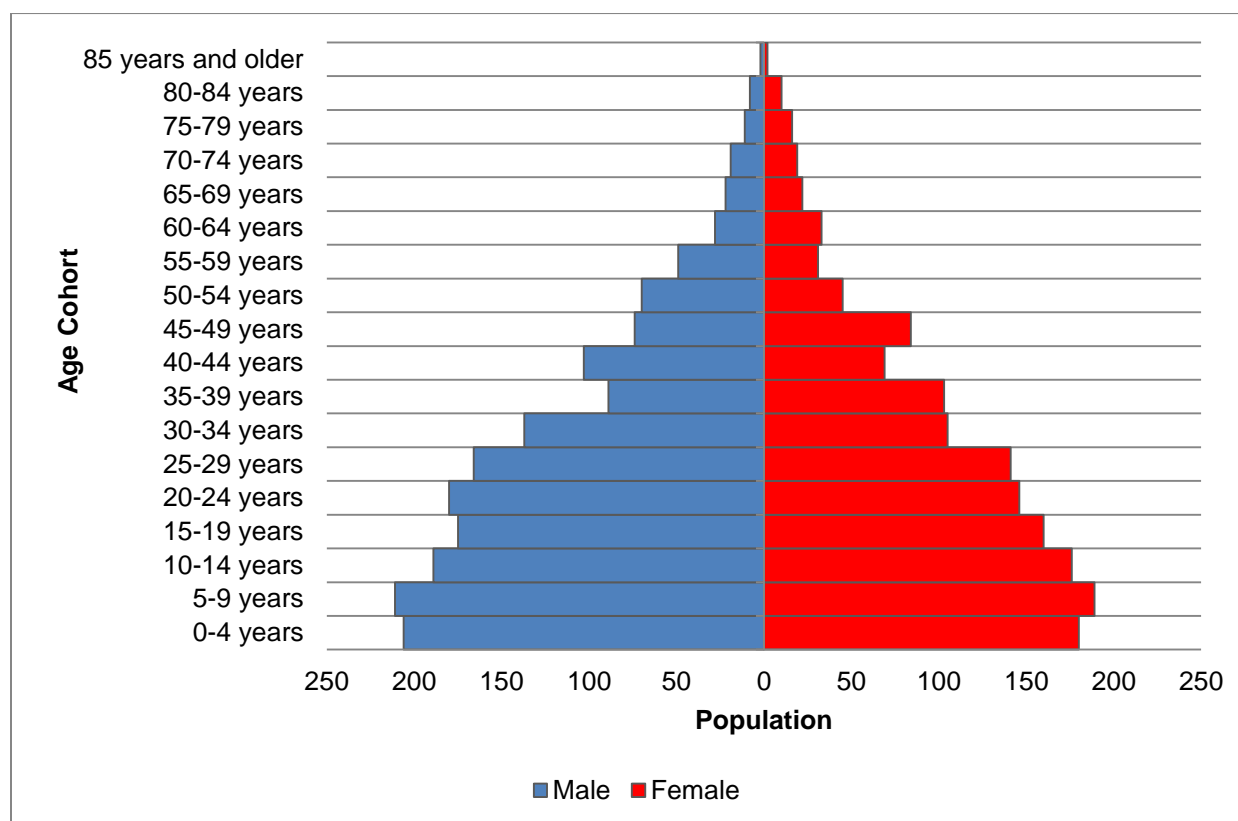
Population demographics provide important information about economic needs as well as information about the City's workforce. Demographics discussed in this section are:

- Population size, gender and age
- Nativity and language
- Educational attainment

#### 3.2.2. Population size, gender and age

The 2009 population estimate for the City was 4,071 (CA Department of Finance, 2009). The population reported in the 2000 Census, was 3,270, which represents a 25 percent increase in population between 2000 and 2009.

The age distribution of San Joaquin is shown in Figure 3-1. This figure breaks down the total population into age and gender categories. The figure shows that the City has unusually high proportion of very young people. This distribution of age categories is similar to those found in pre-industrial nations. Industrial and post-industrial countries tend to have fewer children and a higher proportion of older adults.

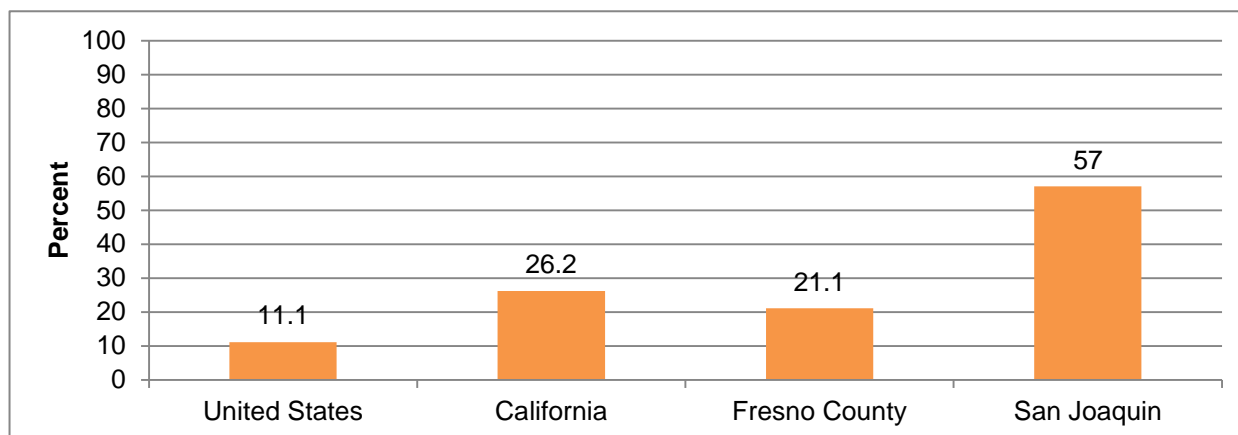
*Figure 3-1. Population by Sex and Age.*

Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 1, Table P12; generated by Larissa Heeren; using American Fact Finder (28 September 2010).

### 3.2.3. Nativity and native language

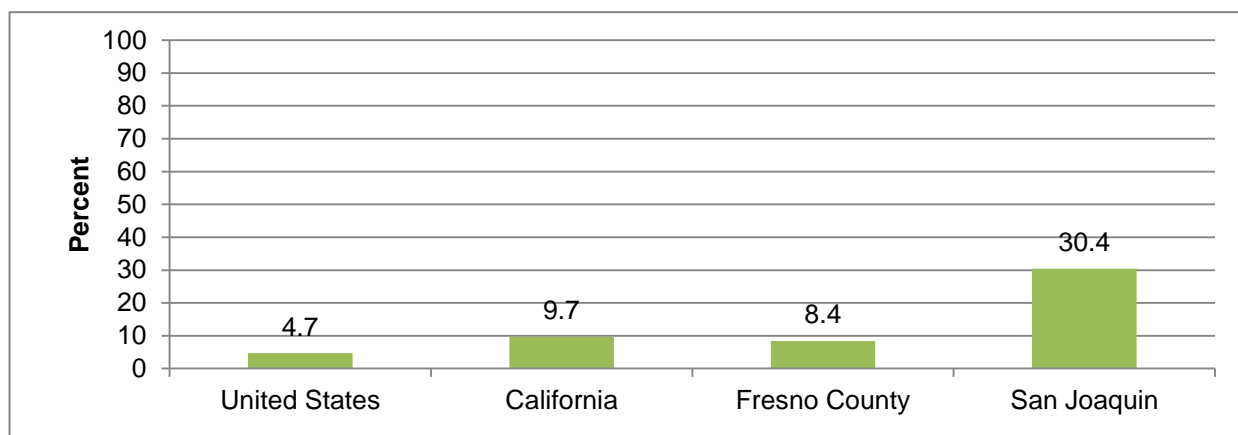
According to the 2000 Census, 57 percent of City residents were foreign born. This is more than double the percentage of foreign born residents in California overall as can be seen in Figure 3-2. The City also has a high number of fairly recent immigrants when compared to the State. Figure 3-3 compares the percentage of foreign born residents who entered the US between 1990 and 2000. The City had three times more recent immigrants than the State in 2000. Figure 3-4 shows that most of the foreign born population immigrated from Latin America. This was evidenced also by the prevalence of Spanish in the community meetings.

*Figure 3-2. Foreign Born Population*



Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 1, Table DP-2; generated by Larissa Heeren; using American Fact Finder (28 September 2010).

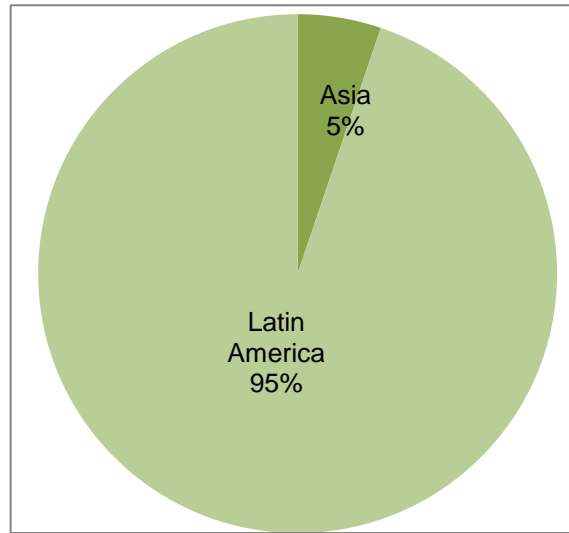
*Figure 3-3. Foreign Born Population Which Entered Between 1990 and 2000.*



Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 3, Table DP-2; generated by Larissa Heeren; using American Fact Finder (28 September 2010).

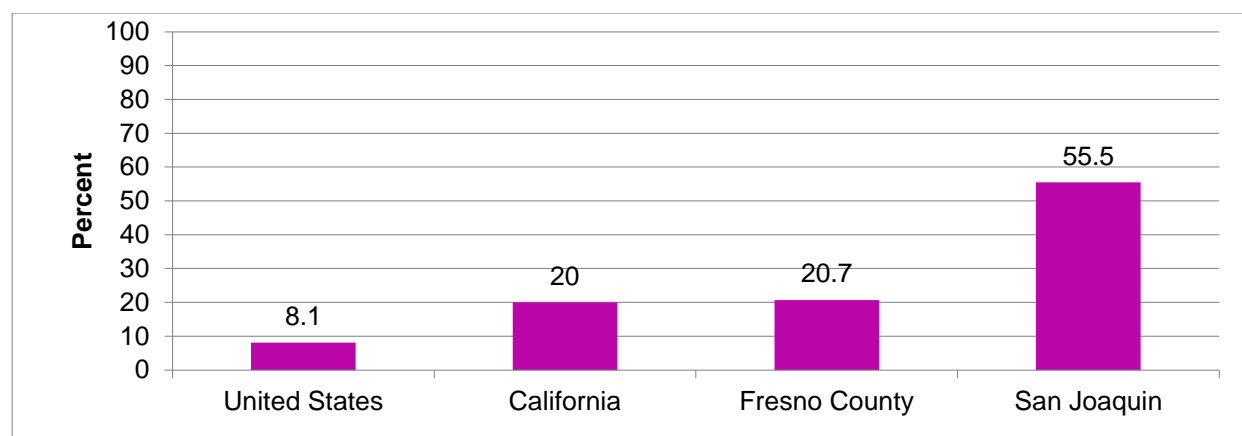


*Figure 3-4. Region of Birth for Foreign Born Population in San Joaquin, 2000.*



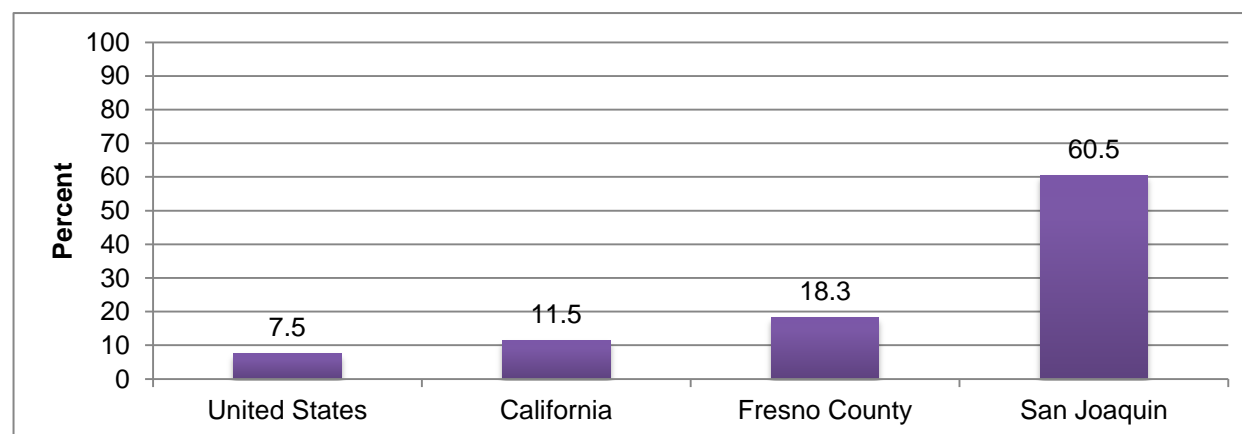
*Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 3, Table DP-2; generated by Larissa Heeren; using American Fact Finder (1 December 2010).*

*Figure 3-5. Percent of population (five years and older) who speak English less than 'very well'.*



Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 3, Table DP-2; generated by Larissa Heeren; using American Fact Finder (28 September 2010).

*Figure 3-6. Percent of population 25 years and over who completed less than 9th grade in school.*



Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 3, DP-2; generated by Larissa Heeren; using American Fact Finder (28 September 2010).

The high proportion of immigrants and especially fairly recent immigrants, translates into lower than average English fluency among the residents. Figure 3-5 shows the percent of population who identified themselves as speaking English less than 'very well.' In the City this is true for more than half the population.

### 3.2.4. Educational attainment

The City's adult population, 25 years of age and older, has low levels of education attainment when compared to the State, the County and the Nation. Figure 3-6 shows the percent of population who has achieved less than 9<sup>th</sup> grade education.

## 3.3. Economics

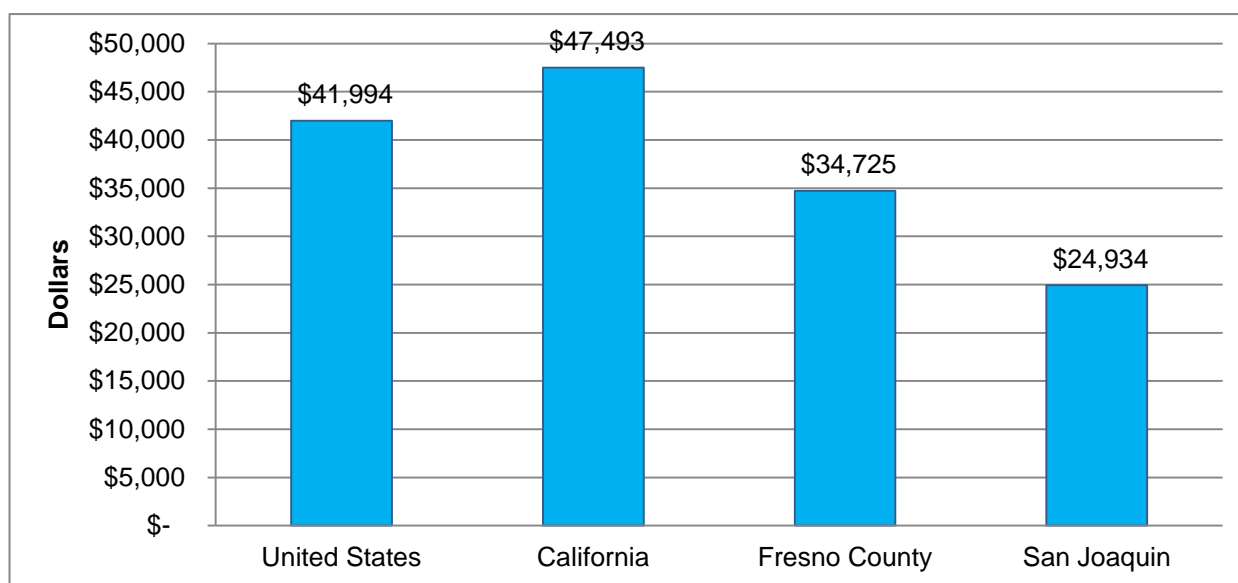
Economic data provide an understanding of the current economic conditions and in combination with demographic data, allow for an analysis of strengths, weaknesses, opportunities and constraints. In some cases the City is compared to other localities in order to contextualize data. Economic data included in this section are:

- Income and poverty
- Employment
- Municipal budget and revenue

### 3.3.1. Income and poverty

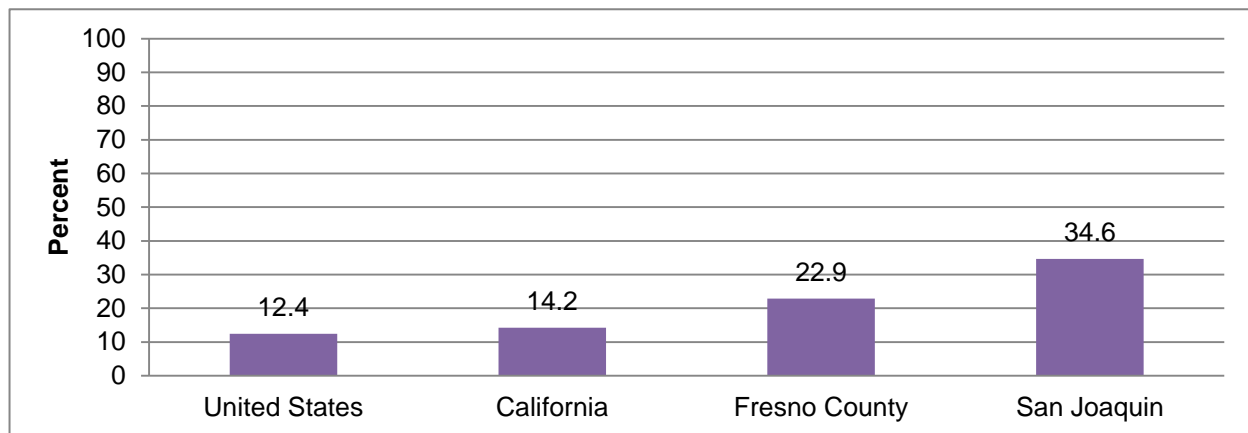
Median household income in the City is approximately \$10,000 lower than the Fresno County median which is, in turn, about \$13,000 less than the State median of about \$47,000. Figure 3-7 shows that median annual household income was just under \$25,000 in 2000. Not surprisingly, poverty trends for the City, County and State reflect the median income trends. Figures 3-8 and 3-9 show that the City has a higher percentage of individuals and families, respectively, living in poverty than the County. They also show that the County, in turn, has higher rates than the State.

Figure 3-7. Median Household Income.



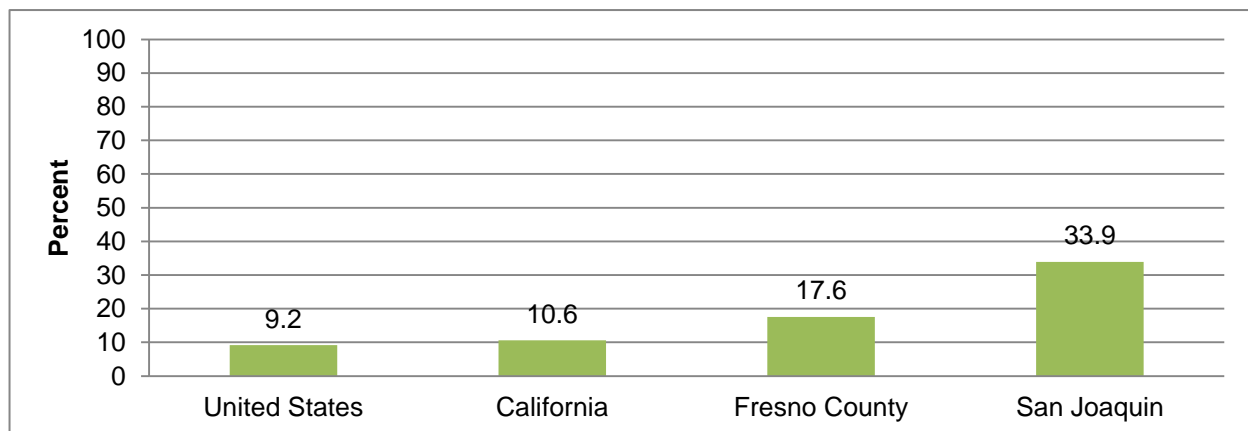
Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 3, DP-2; generated by Larissa Heeren; using American Fact Finder (28 September 2010).

*Figure 3-8. Percent of individuals living below the poverty level.*



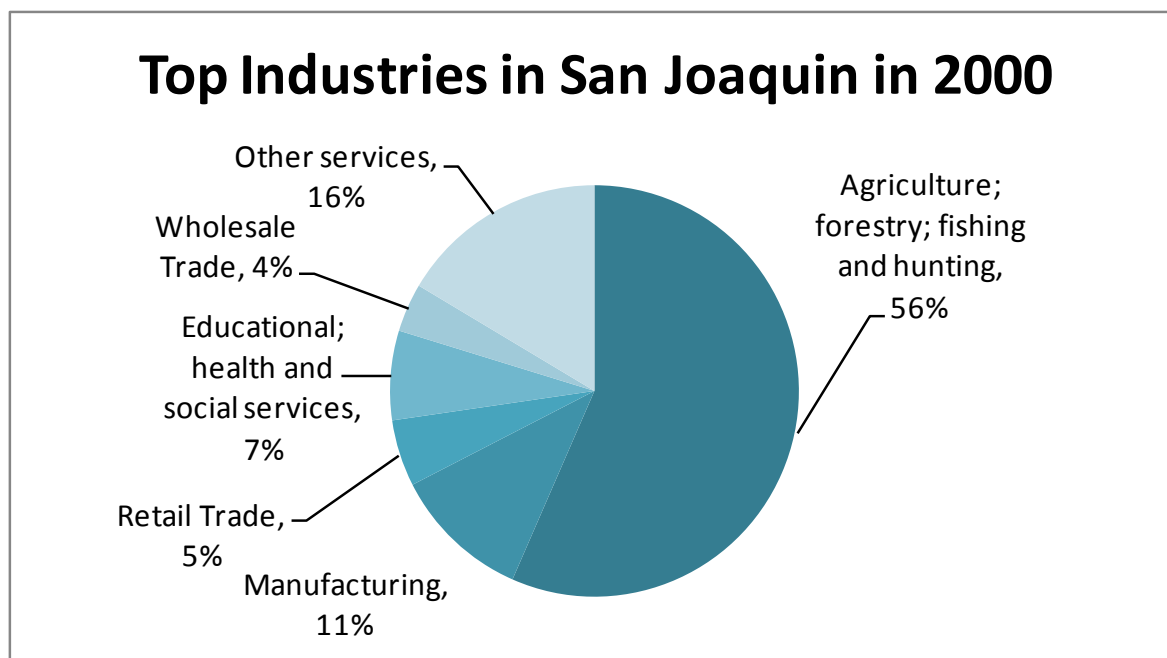
Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 3, DP-3; generated by Larissa Heeren; using American Fact Finder (28 September 2010).

*Figure 3-9. Percent of families living below the poverty level.*



Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 3, DP-3; generated by Larissa Heeren; using American Fact Finder (28 September 2010).

Figure 3-10. Industries by Employment.



Source: US Census Bureau; 2000 Census of Population and Housing, Summary File 3, Tables P-49 and P-50; generated by Larissa Heeren; using American Fact Finder (23 October 2010).

### 3.3.2. Employment

Employment in the City is heavily concentrated in the Agricultural sector. Figure 3-10 shows a breakdown of employment by sector for the City.

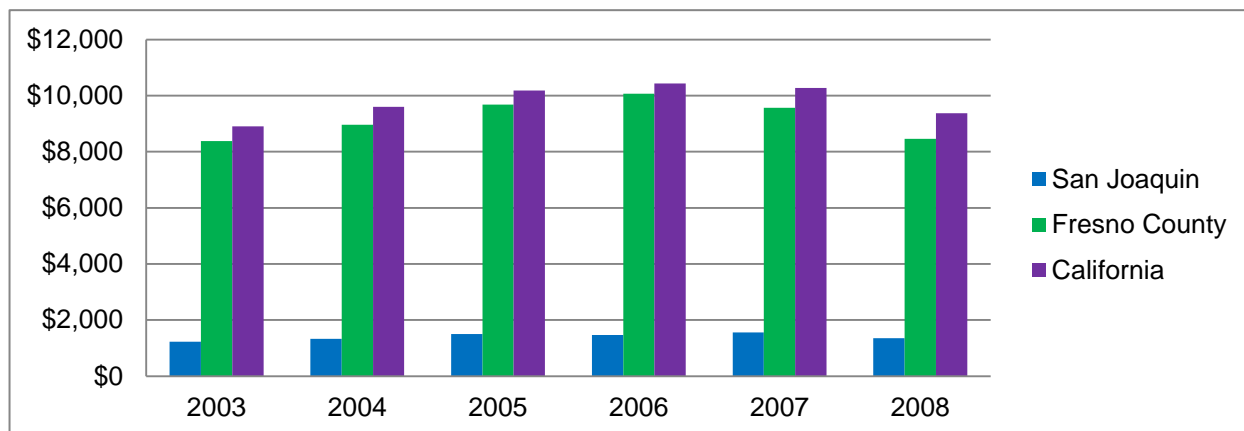
### 3.3.3. Municipal budget and revenue

The City has far less taxable retail sales per capita than both the County and the State. Figure 3-11 illustrates the retail gap. Not only does this implicate a need for retail outlets in the City, it compromises the City's ability to pay for public services. Despite the comparatively low amount of sales tax revenue, sales tax is the second largest source of revenue for the City. The single largest source of income for the City is repayment of local sales tax confiscated by the State to guarantee bonds during the prior fiscal year (referred to as "triple flip"). Other sources of significant amounts of income are property tax, rent, franchise fees, business licenses, building permits and motor vehicle-in-lieu tax. Tables 3-1 and 3-2 show a breakdown of revenue sources and expenditures in the 2008-2009 fiscal year.

During the 2008-2009 fiscal year the City had an anticipated shortfall of about \$45,000 but only ended the year with a \$15,000 deficit. Even so, as a proportion of the City's total revenue, which was approximately \$827,700 in 2008-2009, that is a significant amount of money. For fiscal year 2009-2010, the City expects a shortfall of approximately \$93,000. Looking at City spending,

there seem to be few opportunities for cutbacks. Expanding revenue to cover public services into the future will be important.

*Figure 3-11. Taxable Retail Sales per Person.*



Source: CA Board of Equalization, 2009. *Taxable Sales in California 2003-2008, Taxable Sales by City*. Retrieved by Larissa Heeren (17 October 2010). CA Board of Equalization, 2009. *Taxable Sales in California 2003-2008, Statewide Taxable Sales*. Retrieved by Larissa Heeren (17 October 2010).

*Table 3-1. Major Sources of Revenue for the City of San Joaquin General Fund.*

San Joaquin General Fund							
Major Sources of Funding:	2005-2006	2006-2007	2007-2008	2008-09	2009-2010	2009-2010	2010-2011
	ACTUAL	ACTUAL	ACTUAL	ACTUAL	PROJECTED	BUDGET	BUDGET
Current Secured Property Tax	70,151	48,193	88,251	20,451	40,000	90,000	<b>40,000</b>
Triple Flip		45,662	333,305	333,342	408,268	335,000	<b>410,000</b>
Sales Tax	126,381	158,251	182,268	314,688	200,000	270,000	<b>220,000</b>
Franchise Fees	19,108	22,169	23,840	27,226	25,000	27,000	<b>27,000</b>
Business License	11,844	9,508	14,054	14,101	16,000	16,000	<b>18,000</b>
Building Permits	100,573	82,430	10,502	9,046	7,000	20,000	<b>10,000</b>
Rent	19,258	16,122	10,700	26,383	26,000	28,000	<b>26,000</b>
Motor Vehicle-in-Lieu Tax	262,525	293,309		12,355	6,000	10,000	<b>7,000</b>

Source: City of San Joaquin Finance Department

*Table 3-2. Total Funding and Total Expenditures, City of San Joaquin General Fund.*

San Joaquin General Fund							
	2005-2006	2006-2007	2007-2008	2008-09	2009-2010	2009-2010	2010-2011
	ACTUAL	ACTUAL	ACTUAL	ACTUAL	PROJECTED	BUDGET	BUDGET
Total General Funding	836,483	760,528	703,574	1,029,343	755,868	827,700	<b>783,600</b>
Total Expenditures	470,428	580,853	882,303	747,294	801,494	842,909	<b>877,577</b>
<b>Total Surplus (Deficit)</b>	366,054	179,676	(178,729)	282,049	(45,626)	(15,209)	<b>(93,977)</b>

Source: City of San Joaquin Finance Department

## 3.4. Emerging Directions

Over the course of several community outreach events, feedback was gathered from community members. They were asked about their opinions and perceptions regarding current conditions in San Joaquin and their aspirations and hopes for the future of the City. This section includes a summary of that feedback as well a summary of the data presented in this chapter. Lastly, emergent themes are discussed. These themes are the basis of policy development for the final Economic Element.

### 3.4.1. Community Feedback

Initial community feedback was gathered during the first community meeting. During this meeting, participants were asked what they like and dislike about their community and how it could be improved. Common responses relating to economic development were that people would like more employment opportunities, more retail and restaurant outlets, more educational opportunities and higher paying jobs.

This feedback was used to develop a survey for the general population and an interview instrument for City business owners. Both research instruments were designed to garner more detailed information about the City's economic needs.

The sample collected was a convenience sample; therefore was not representative of the City population. The sample was 73 percent female and 78 percent non working. It is not surprising that there would be a higher proportion of non-working individuals since the surveys were collected at community events on weekdays. Only 53 percent of respondents were looking for work which indicates that some of the non-workers chose not to work. Census data shows that a lower percentage of women in the City work compared to the County and the State overall.

While the sample is not representative of the population, some valuable information can be gained from the survey. For example, a majority of respondents (63 percent) were unhappy with employment opportunities. Common responses to the question 'What kinds of jobs do you want in San Joaquin?' were 'work in the fields' and 'packaging.' Presuming that packing refers to food packing, these responses indicate that there are insufficient employment opportunities even in the City's biggest industries. One respondent said that there used to be much more work in the fields around the City but that in recent years, much of the land has been retired. Other jobs that respondents were interested in for the City were maintenance, equipment operating, retail, construction, landscape, warehousing, customer service, apartment management and year-round work.

Feedback at the first community meeting indicated that City residents place high importance on education and results from this survey seem to confirm that. 78 percent of people said they would be interested in learning new jobs skills. Some response to 'what kind of training' were corrections, power plant operator, beauty shop, construction, landscape, packaging, business,

computers and welding. Reasons for wanting the skills were to earn more money, more interesting work, learn something new, for my family and for better jobs.

Related to retail outlets and dining, 77 percent of respondents said that they were not satisfied with dining opportunities in the City and 83 percent of respondents said they were not satisfied with shopping options. Dining options suggested for the City were fast food, inexpensive food, more variety and healthy food. Respondents rated the necessity of clothing, grocery and pharmacy slightly higher than bank and hardware but all types of retail were rated by most of being of high importance. Other types of retail suggested were a movie theater and a gas station. Perhaps the most telling was that of the 36 respondents for the question 'Where do you get the majority of your household goods?' Only one of them answered 'In San Joaquin.' The vast majority of responses were that people shop for their household goods in Fresno.

### 3.4.2. Analysis

The City has a large and relatively uneducated working age population. This working age population is going to increase over time and will need a higher level of education in the future. While much of the United States will be struggling to support an aging population with a smaller workforce, the City could avoid such problems with a well educated and skilled labor force. There are however, other significant challenges.

Currently the City is served by Tranquility Union High School and there are no opportunities for higher education in town. The community has significant education needs and wants. While building or attracting a community college or trade school to the City seems unlikely, the City could invite the local West Hills College to add a satellite campus somewhere nearby or arrange for transportation to existing campuses.

While there was some interest in jobs training, much of the feedback received from residents was simply that the City needs more opportunities for employment. Based on this, it will be important to include some industry recruitment and self-development strategies. Support for local people who are interested in opening their own retail establishment should be explored as well as the attraction of a renewable energy generation company.

## 3.5. References

Office of Planning and Research. 2003. General Plan Guidelines. Retrieved on October 7, 2010, from [http://www.opr.ca.gov/planning/publications/General\\_Plan\\_Guidelines\\_2003.pdf](http://www.opr.ca.gov/planning/publications/General_Plan_Guidelines_2003.pdf)





## 4. LAND USE

---

### 4.1. Introduction

The Land Use Element determines the allowable use of existing and future parcels of land and ensures that adjacent land uses are compatible with one another. For instance, industrial uses and residential uses are rarely compatible with one another due to noxious substances and/or noises that are associated with industrial uses. It also helps to guide the allowable size and location of buildings for future development.

#### 4.1.1. State Standards

The California Governor's Office of Planning and Research (OPR) requires a land use element to include a land use map and a description of the distribution and location of the different land uses and the allowable density and extent of the buildings located within these uses (Office of Planning and Research [OPR], 2003). Distribution refers to the number of acres of each land use in the City and the percent of each land use compared to the total acreage of the City. Allowable densities for each use are determined by the maximum number of housing units per acre or the maximum floor area ratio (FAR) for commercial and industrial buildings. A FAR value is obtained by dividing the square footage of a building by the square footage of the parcel. The extent of a building refers to the allowable width, length and height of each building depending on the designated land use and the size of the parcel. Required minimum lot sizes, minimum setbacks from the property line and maximum allowed building height, for instance, determine the allowable size of a building.

In addition, a land use element must identify the location of future solid waste sites and be consistent with the circulation element (OPR, 2003, p. 51). Consistency with the circulation element requires accessibility of the projected population to designated land uses.

#### 4.1.2. Regional Context

San Joaquin is a member of the Fresno Council of Governments (Fresno COG). Fresno COG works to provide guidance (particularly regarding transportation) to the numerous municipalities within Fresno County to foster decisions that take into account regional considerations. Fresno COG also serves as a Metropolitan Planning Organization (MPO) and as such, is in charge of creating greenhouse gas reductions and corresponding policies with the oversight of the California Air Resources Board (CARB). By 2014 or 2015, Fresno COG plans on completing a Sustainable Communities Strategy (SCS) which will provide guidance for local municipalities in creating land use and circulation plans that reduce green house gas emissions for each municipality.

Although it will not be a requirement for San Joaquin to follow the SCS, it will make the City more competitive to receive various funding from Fresno COG if land use and circulation plans and policies are in line with the SCS. Fresno COG has already identified compact development,

infill development, mixed land uses, jobs/housing balance, increased density, bicycle/pedestrian infrastructure and parking strategies as components that will be included in the SCS.

### 4.1.3. Development Trends

Table 4-1 depicts the history of housing construction in the City. From 1950 to 1990, construction consistently averaged about ten housing units per year. Between 1990 and 2008, this average more than doubled.

*Table 4-1. History of Housing Construction, San Joaquin.*

Year Built	Number of Housing Units
Total (as of 2008):	895
Built 2001 to 2008	152
Built 1999 to 2000	38
Built 1995 to 1998	116
Built 1990 to 1994	114
Built 1980 to 1989	105
Built 1970 to 1979	99
Built 1960 to 1969	107
Built 1950 to 1959	84
Built 1940 to 1949	67
Built 1939 or earlier	13

*Source: Table H34. Census 2000 SF 3. San Joaquin Housing Element 2008-2014*

## 4.2. Existing Conditions

This section describes the existing land uses in the City that were identified in the 2010 Land Use Survey. Figure 4-1 represents the existing land uses in the City. This data was obtained by physically observing each parcel and recording the land use of each parcel. This map indicates that residential land is spread throughout the City, and that commercial land is concentrated along Colorado Boulevard and Main Street. Industrial land is concentrated on the southeastern portion of the City. Additionally, there are numerous vacant parcels spread throughout the City.

The broad categories of land uses are residential, commercial, industrial, public facilities, open space, agriculture and vacant. Subcategories of commercial uses include neighborhood commercial and general commercial. Subcategories of industrial uses include heavy and light industrial. Table 4-2 demonstrates that the two dominant uses in the City are residential and agriculture. Together, these two uses make up more than half of the total land use in the City.

*Figure 4-1. Existing Land Uses.*

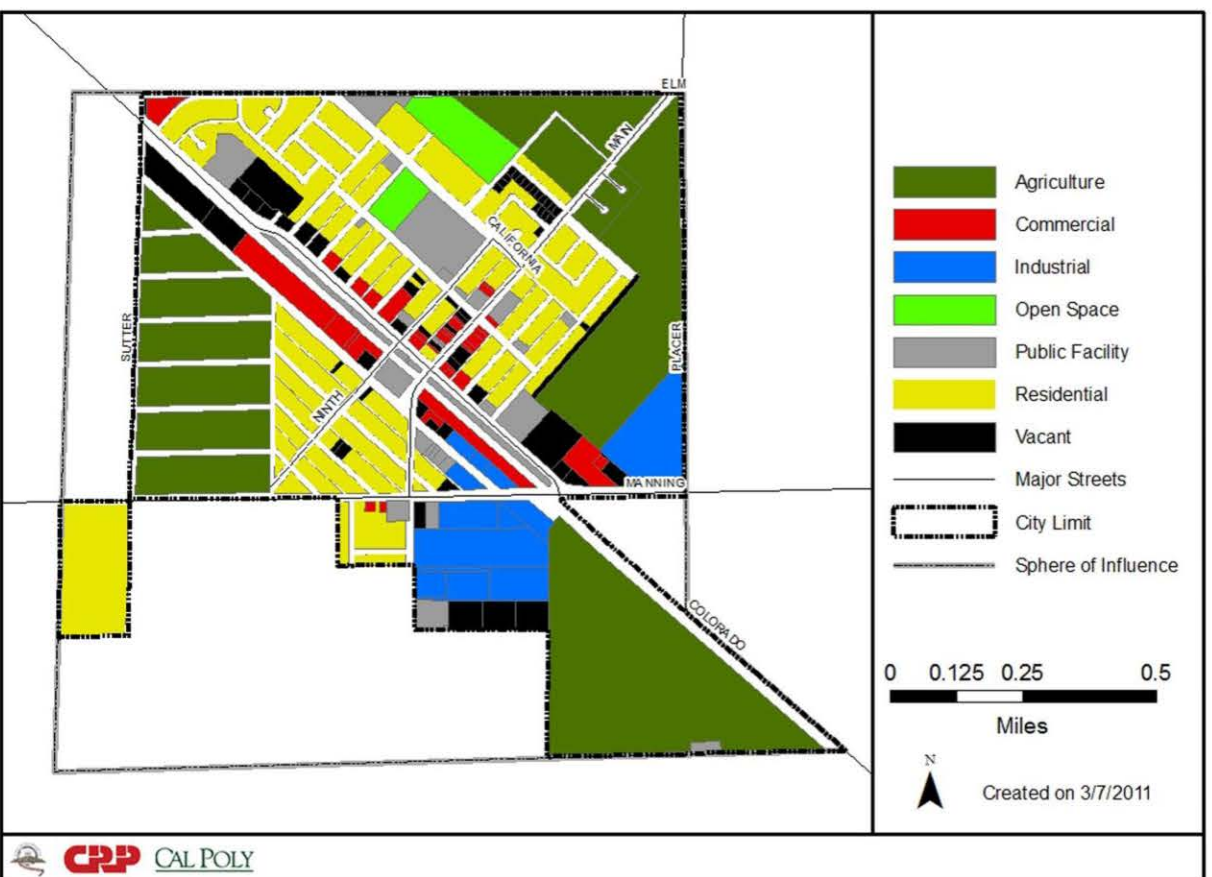


Table 4-2. Land Use Distribution.

Land Use Designation	City		Sphere of Influence	
	Acres	Percent	Acres	Percent
Residential	158.52	22.32%	158.52	16.47%
Agriculture	220.54	31.05%	496.54	51.60%
Commercial	25.02	3.52%	25.02	2.60%
Industrial	46.09	6.49%	46.09	4.79%
Open Space	14.98	2.11%	14.98	1.56%
Public Facility	80.27	11.30%	36.27	3.77%
Vacant	39.69	5.59%	39.69	4.12%
Railroad	19.09	2.69%	19.09	1.98%
Roads	106.00	14.93%	126.00	13.09%
<b>Total Acreage</b>	<b>710.20</b>	<b>100.00%</b>	<b>962.20</b>	<b>100.00%</b>

Source: Cal Poly Land Use Inventory, October 2010.

### 4.2.1. Residential

There are 158.5 acres of residential land spread throughout the City. Within residential uses are the subcategories of high density, medium density and low density residential. Distribution across each category is shown in Table 4-3.

Table 4-3. Residential Density Distribution.

Land Use Designation	Number of Acres	Percent of Housing Acreage	Percent of SOI Acreage	Units Per Acre	Number of Units
Low Density Residential	50.9	8.43%	5.87%	3.97	202
Medium Density residential	99.2	16.42%	11.43%	6.85	680
High Density Residential	6.3	1.04%	0.72%	27.48	172
Mobile Home Park	2.1	0.35%	0.24%	5.24	11
<b>Total Acreage</b>	<b>158.5</b>	<b>26.24%</b>	<b>18.26%</b>	<b>6.72</b>	<b>1065</b>

Source: Cal Poly Land Use Inventory, October 2010.

### Low Density Residential

Low density residential allows for the construction of single-family houses. A maximum of five housing units per acre are allowed in low density residential areas.

### Medium Density Residential

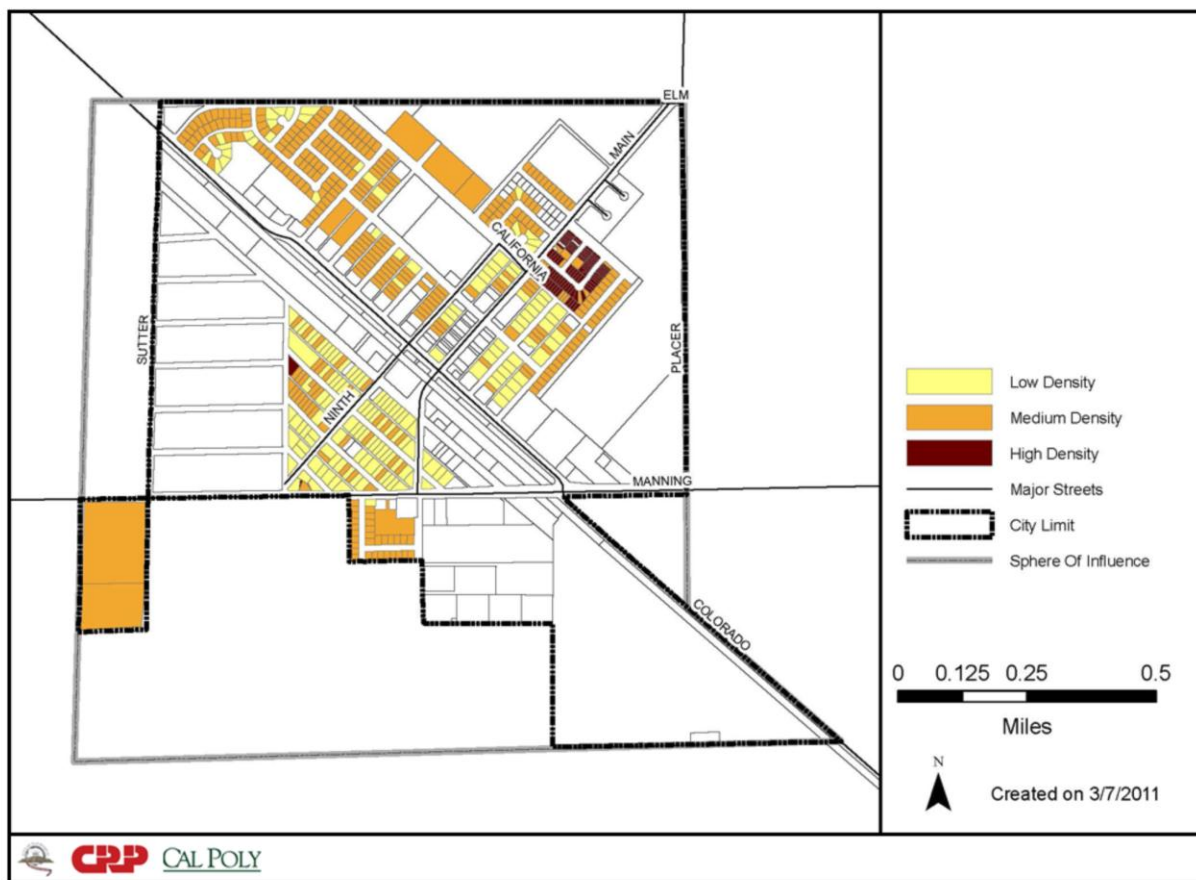
Allowable housing types in this land use are duplexes, triplexes, fourplexes, condominiums, townhouses, and mobile homes in mobile home parks (San Joaquin General Plan, 1995). The maximum allowable density in this land use is 15 units per acre. As Figure 4-2 indicates, a majority of the housing acreage in the City is classified as medium density residential according

to the existing General Plan. However, if the standard of a maximum of seven units per acre for low density residential is applied from Time-Saver Standards for Building Types, then most of the housing acreage in the City is classified as low density (Chiara & Crosbie, 2001).

### High Density Residential

Allowable densities in high density residential areas are 16 to 50 units per acre. In the City, these areas consist of single family houses on parcels of less than 3,000 sq ft.

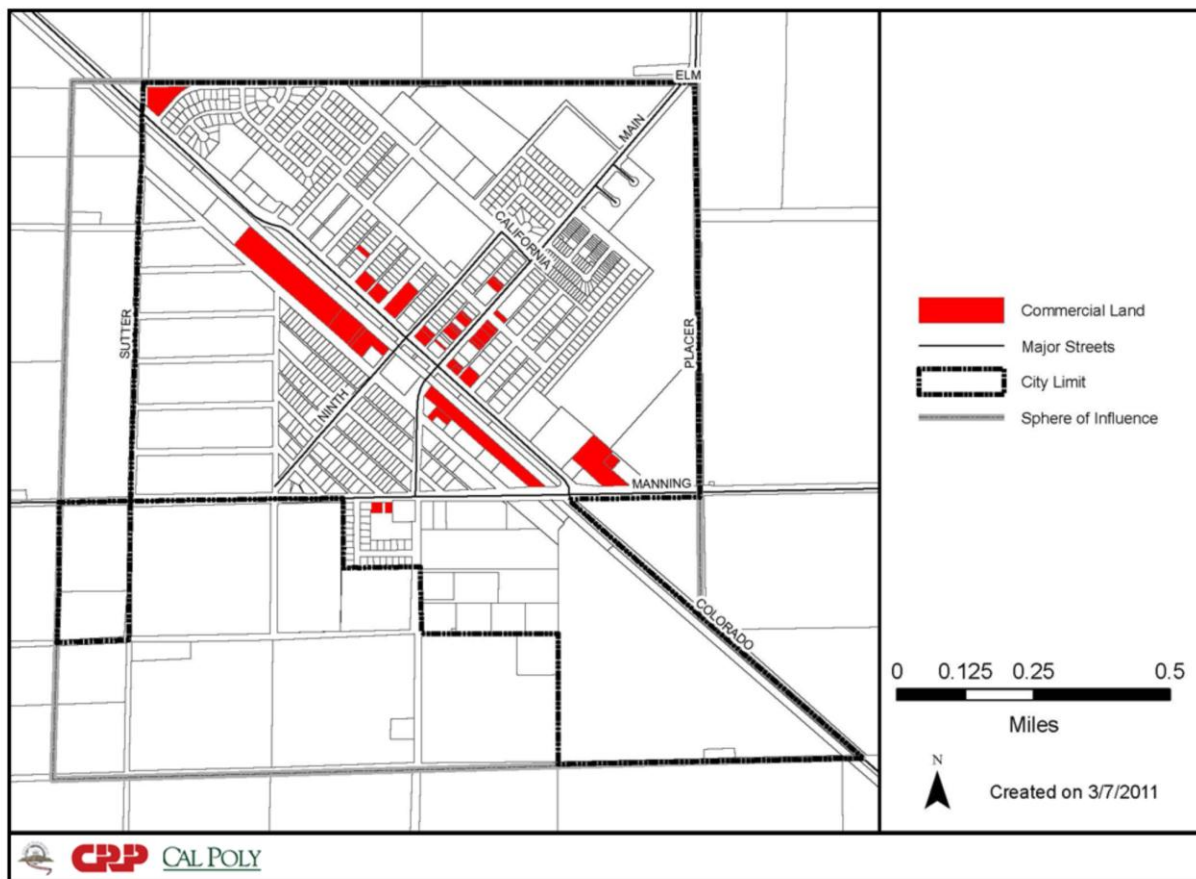
Figure 4-2. Residential Land.



### 4.2.2. Commercial

25 acres of land are used for commercial purposes in the City. There are two types of commercial uses: neighborhood commercial and general commercial. The neighborhood commercial areas are generally located on Main Street and consist of restaurants, a market and other small shops. The general commercial areas are located along Colorado Boulevard and are suited to serve higher volumes of traffic than the neighborhood commercial areas. These general commercial areas consist of gas stations, a hardware store, an auto-repair shop, a restaurant and a food market. As Figure 4-3 indicates, most of the commercial land is concentrated along Colorado Boulevard and Main Street.

Figure 4-3. Commercial Land.

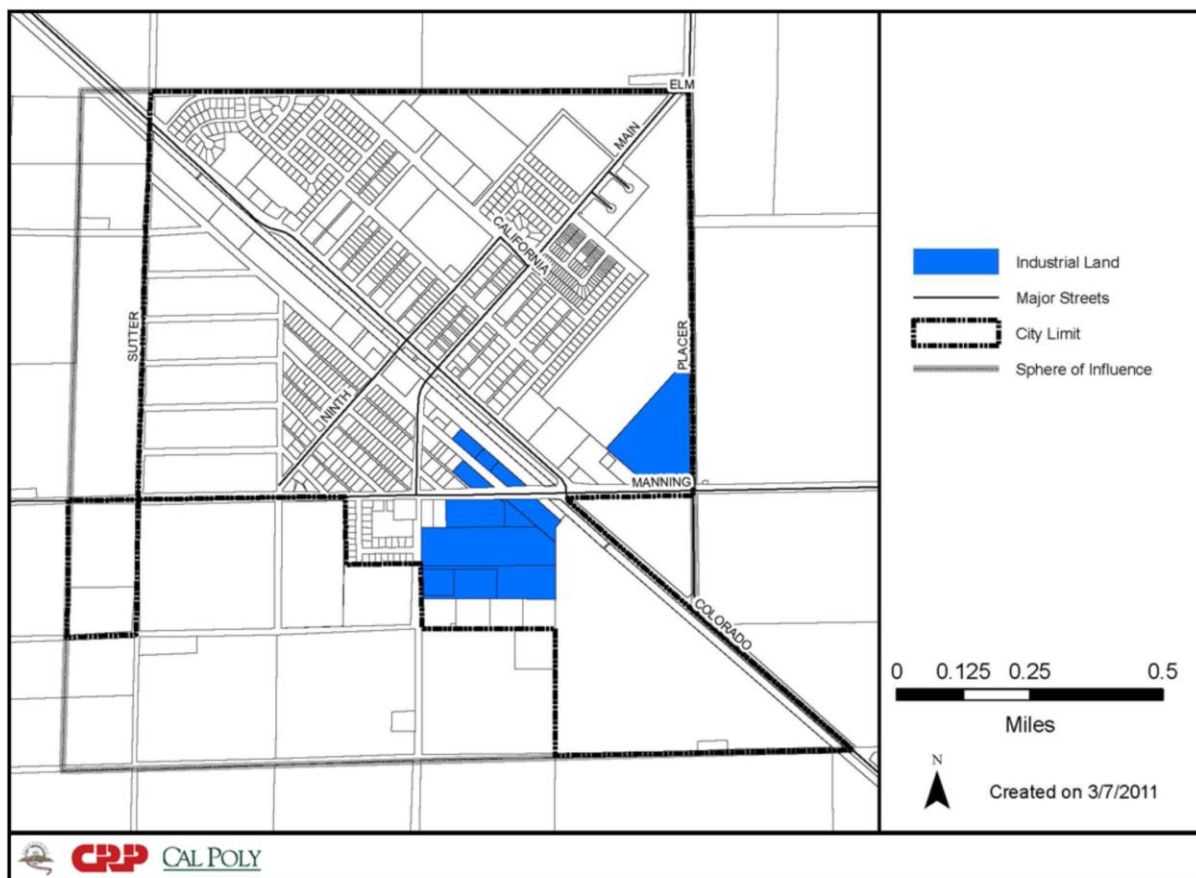




### 4.2.3. Industrial

There are currently 46 acres in the City that are used for industrial purposes. The industrial uses consist of light and heavy manufacturing. As shown in Figure 4-4, land used for industrial purposes is located in the southeastern portion of the City. Wind in the City generally blows in a southeastern direction. As a result, wind helps to carry the odors and noise generated from these industrial uses away from the City.

*Figure 4-4. Industrial Land*

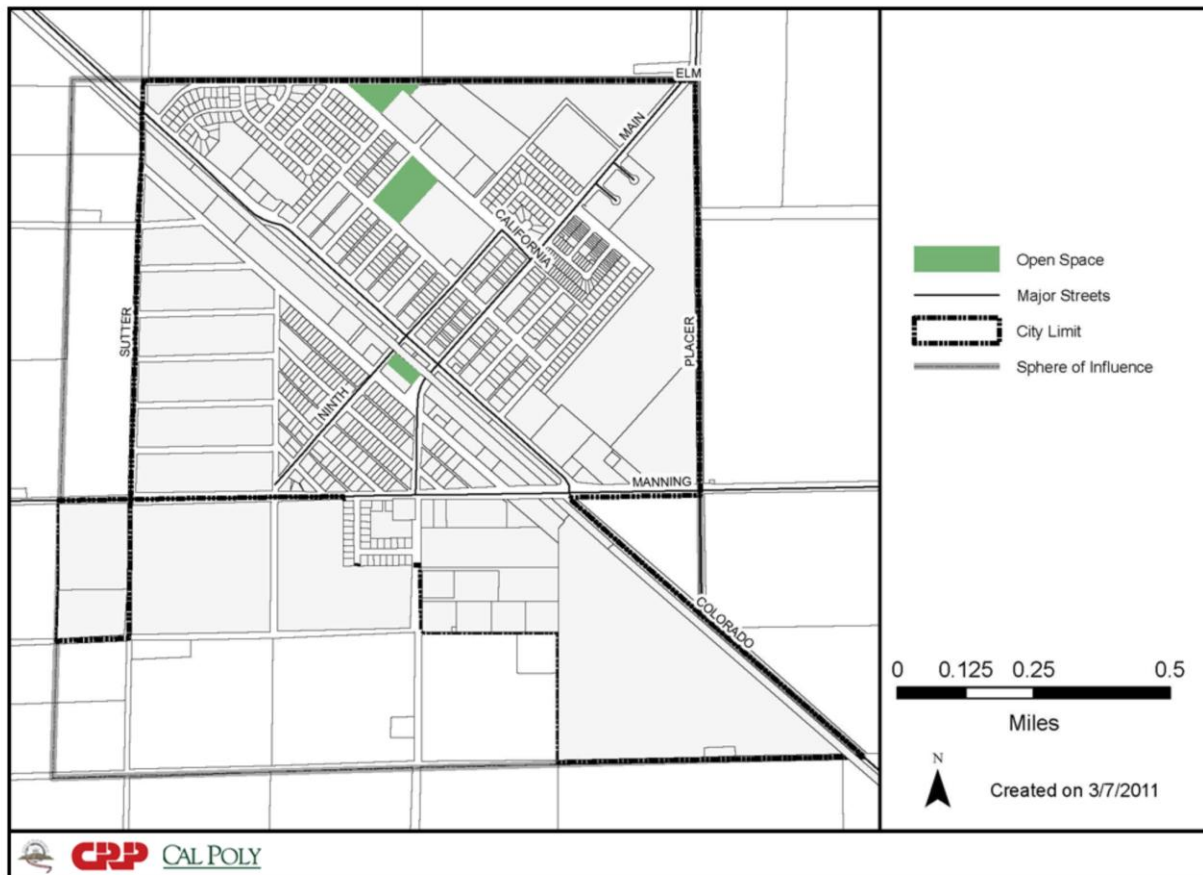




#### 4.2.4. Open Space

There are 14.98 acres of open space in the City. Open space includes parks and sports fields. Notice in Figure 4-5 that there are two parks in the City.

Figure 4-5. Open Space

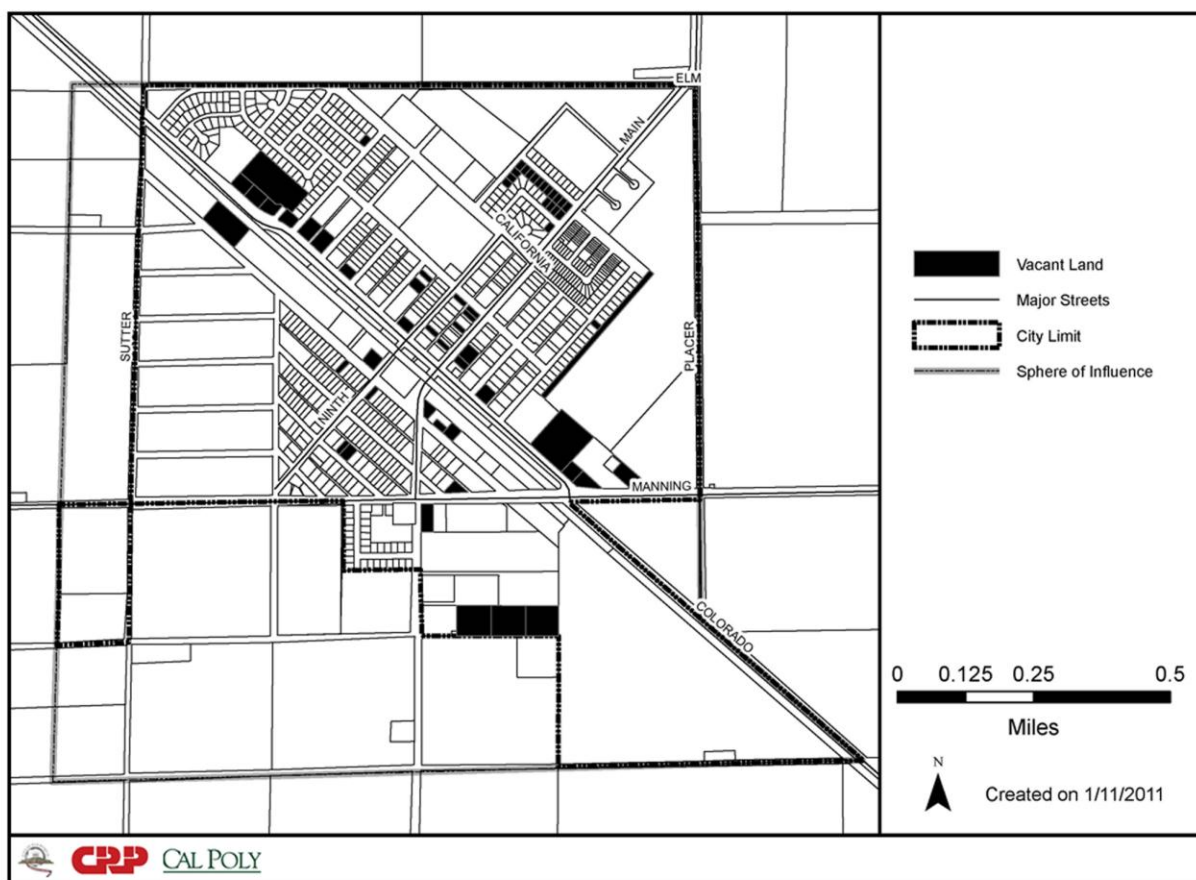


#### 4.2.5. Vacant Land

39.7 acres of the City's land area is vacant land. As Figure 4-6 demonstrates, numerous vacant parcels are spread throughout the City.

The General Plan will attempt to designate enough land for residential, commercial, industrial, park and public facility uses to accommodate existing and future residents. These numerous vacant parcels in the City could be used for future development or other infill opportunities like parks and public facilities in order to accommodate a growing population.

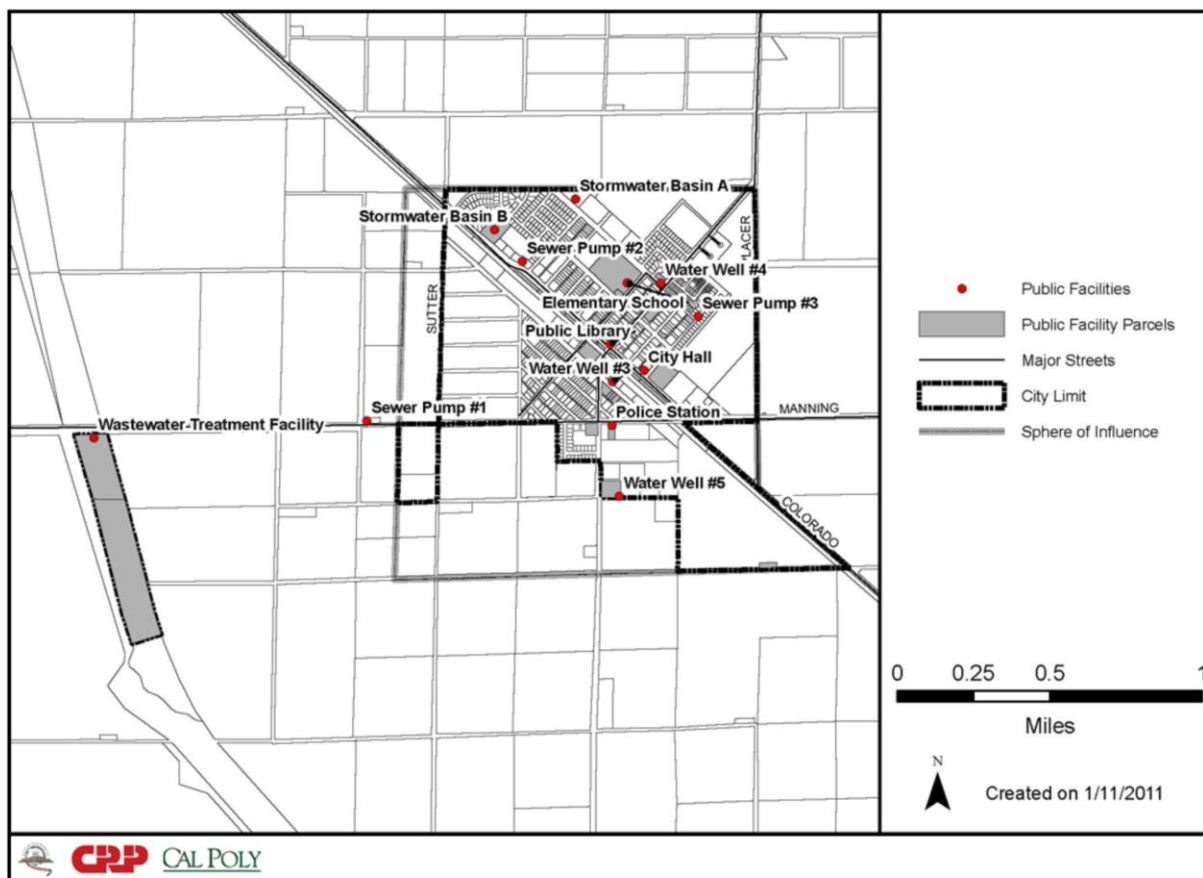
*Figure 4-6. Vacant Parcels*



#### 4.2.6. Public Facilities

As Figure 4-7 demonstrates, land used for public facilities is distributed throughout the City. There are currently 80.27 acres of land in the City being used for a public facility purpose, including an elementary/middle school, City Hall, a library, stormwater retention basins, and water pumps. Chapter 7, Public Facilities and Services, discusses these facilities in detail.

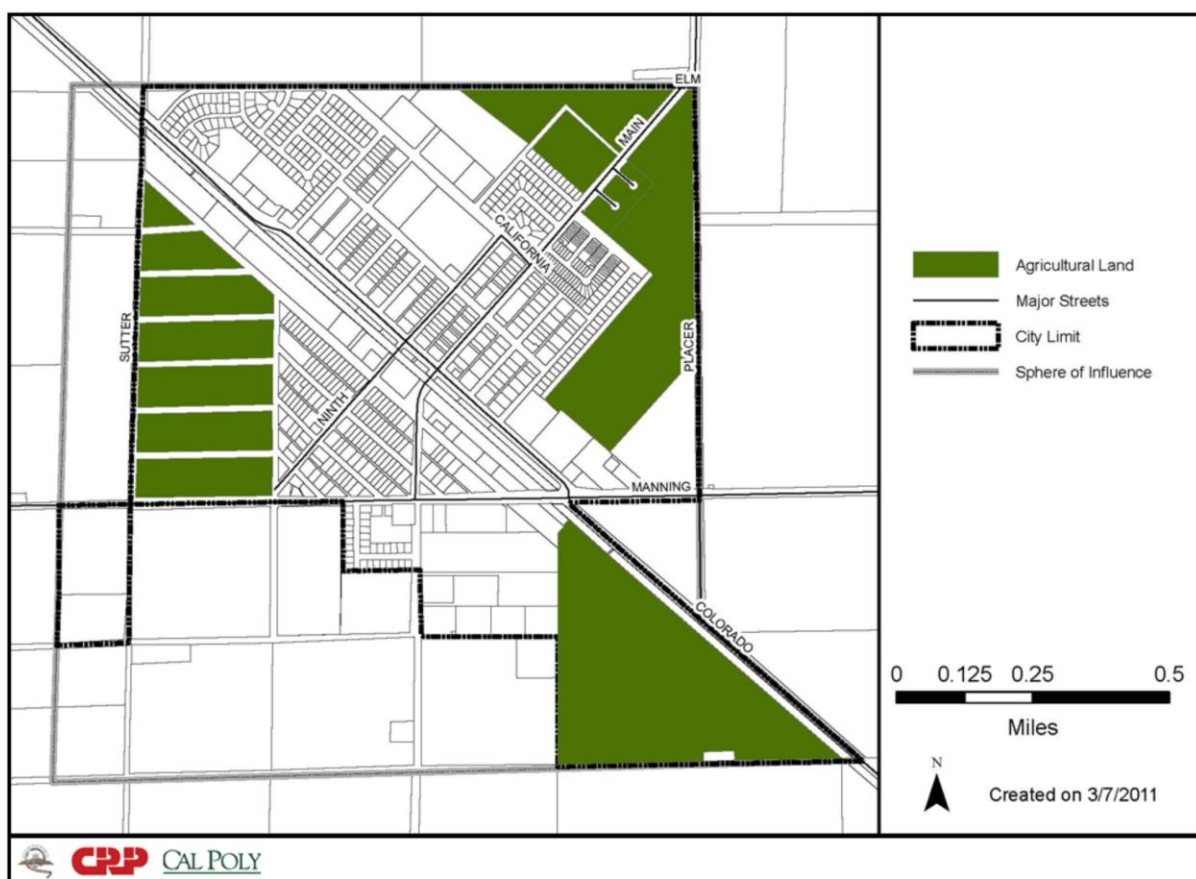
Figure 4-7. Public Facilities.



#### 4.2.7. Agriculture

There are 220 acres of agricultural land in the City, generally located on the periphery of the City as shown in Figure 4-8 below. Since none of these parcels are under Williamson Act Contract, all of this land provides opportunities for future development. However, as mentioned in Chapter 9, Open Space and Recreation, most of these agricultural parcels contain prime soil. Thus, it would be preferable to preserve these parcels and use vacant land for future development to the extent possible.

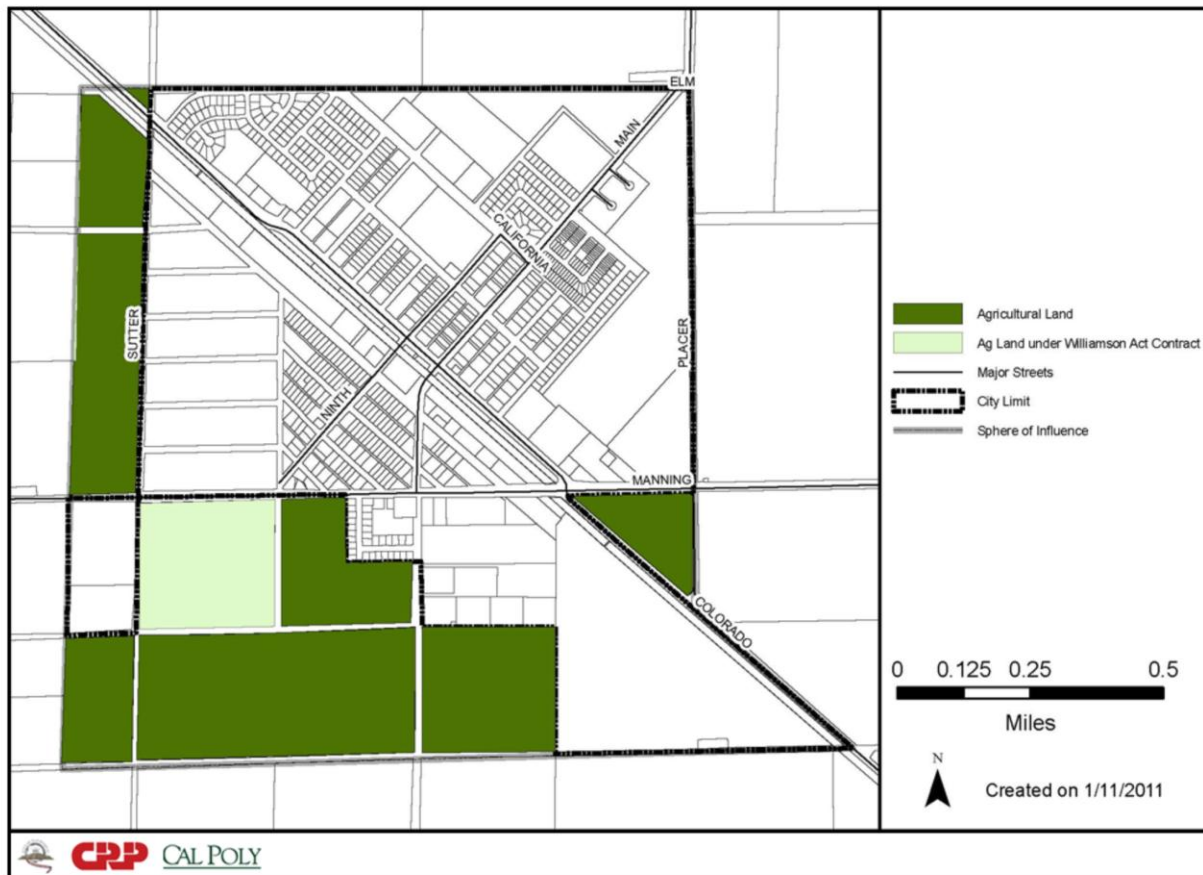
Figure 4-8. Agriculture.



#### 4.2.8. Other Lands in the Sphere of Influence

All of the land outside of the City limit and inside of the sphere of influence is agriculture and consists of 252 acres (see Figure 4-9). One of these parcels is under Williamson Act Contract and is protected from development.

Figure 4-9. Sphere of Influence Land.



### 4.3. Emerging Directions

Major themes that emerged from discussions with community members are a desire for more jobs, more parks that are centrally located, more stores and more space for a school. In order to allow for the creation of more jobs and more stores, the land use element can ensure that there is enough land provided and appropriately designated for commercial and industrial uses to meet demand. In addition, dedicating land for a variety of dwelling densities can help to attract the development of housing for a variety of income levels which could attract the development of more stores and industries. To provide more parks that are centrally located, the land use element can designate one (or some) of the existing vacant parcels in the City for park space. The General Plan could also include a policy to demand parkland or dedications for parks from new developments.

Numerous City residents also indicated a preference for the small town qualities of the City and desire to maintain a compact city form. To accommodate a growing population of people and to maintain a compact city form, future growth should be directed towards the core of the City when possible or adjacent to existing development in the City.

#### 4.3.1. Community Feedback

This section discusses the Land Use related feedback received from community members during focus group meetings and spatial preference surveys.

At Community Meeting 2, team members presented a map to the residents showing many of the large vacant parcels within the City and posed the question “what is the best place for a park?” Participants were asked to place a small sticker in the box which corresponded to the vacant parcel they would prefer as the best place for a park. Half of respondents selected a parcel near the intersection of Eighth Street and Nevada Avenue.

#### 4.3.2. Conclusions

Based upon responses from surveys, community meetings and interviews the following common inputs emerged:

- Community members want a centrally-located park
- The compact land use development of the City should be maintained and improved
- Vacant lots should be used for something
- Space should be set aside which would allow the Farmer’s Market to be held year-round
- Community members want to diversify housing by creating conditions which increase the higher-income housing options

### 4.4. References

Chiara, J., & Crosbie, M. (2001). *Time-Saver Standards for Building Types*. McGraw-Hill Professional Publishing.

City of San Joaquin General Plan. 1995.

City of San Joaquin. (September 2009). Housing Element 2008-2014 of the General Plan.  
Retrieved via email communication.

Office of Planning and Research. 2003. General Plan Guidelines. Retrieved on October 15,  
2010: [http://www.opr.ca.gov/planning/publications/General\\_Plan\\_Guidelines\\_2003.pdf](http://www.opr.ca.gov/planning/publications/General_Plan_Guidelines_2003.pdf)



# 5. CIRCULATION

---

## 5.1. Introduction

The Circulation Element is one of the seven mandatory elements required for a general plan according to California Government Code §65302. This element focuses on the City's transportation system, which includes the infrastructure used to transport people and goods throughout the City and region. The circulation system is vital because it contributes to the health of the City's physical, social, and economic environment. According to the Governor's Office of Planning and Research General Plan Guidelines (2003), the circulation element must correlate directly to the land use element. It must also address:

- major thoroughfares
- transportation routes
- terminals
- other local public utilities and facilities (details in the Public Facilities element)

This chapter covers these requirements and also addresses:

- street design
- bicycle and truck routes
- public transit system
- railroad terminals
- airports
- community feedback

Each of these circulation components is provided with a definition, existing conditions, evaluative standards, and emerging directions. These components are also evaluated to determine if they are adequate for the City's population, and to determine what changes are needed to accommodate population growth.

## 5.2. Existing Conditions

This section covers the existing conditions in the City including main arterials, collector streets and local streets. It assesses current traffic conditions, capacities, traffic volumes, levels of service, adequacy of existing street and highway systems, traffic control and road conditions.

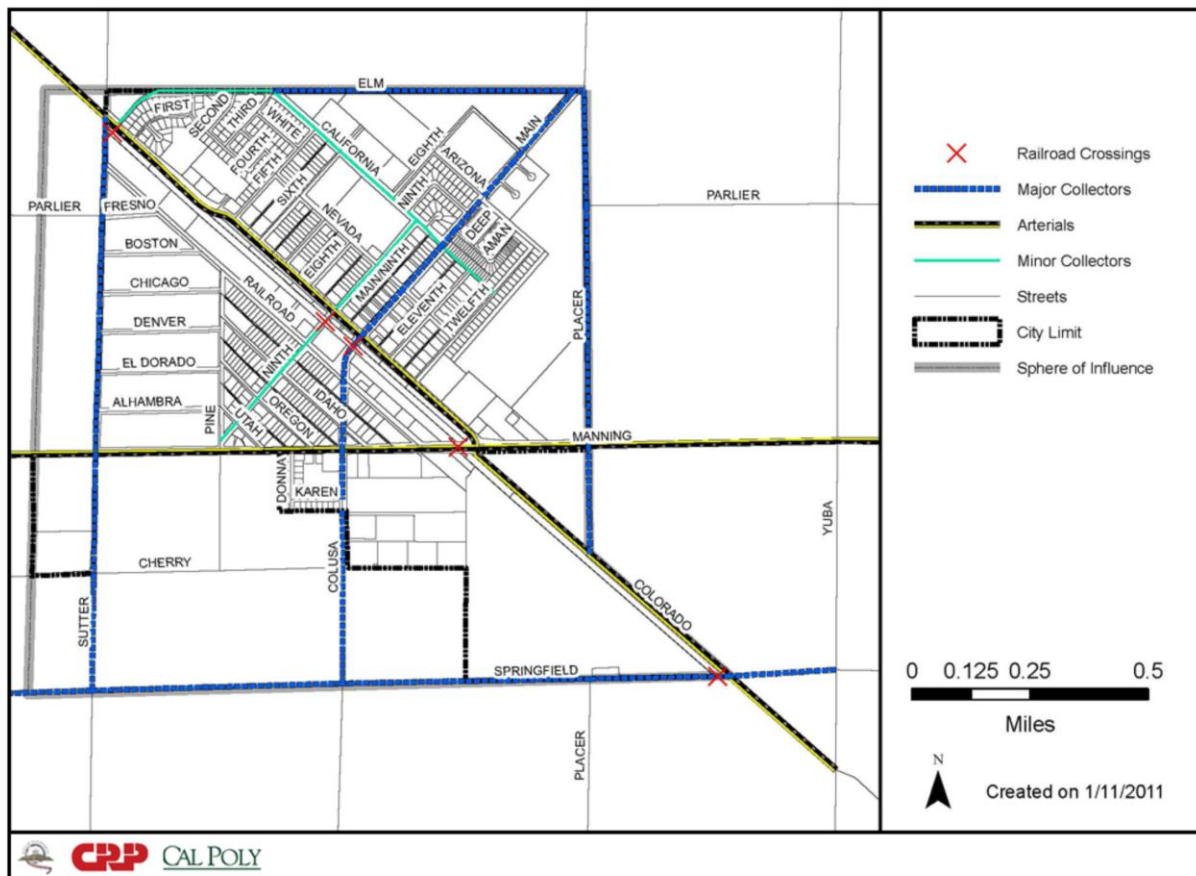
### 5.2.1. Street Layout

Two main thoroughfares cut across the City. Colorado Avenue bisects the City from northwest to southeast and Manning Avenue crosses the City from west to east. The downtown is designed in a traditional grid pattern, but the rest of the City is laid out in a mixture of loops and



cul - de - sacs. Unincorporated areas outside City limits are laid out in a grid system of widely separated avenues. The street layout is shown in Figure 5-1.

Figure 5-1. Street Layout



## Arterials

Arterial streets are primarily concerned with moving traffic safely and efficiently. There are two major arterials in the City: Colorado Avenue and Manning Avenue.

### Colorado Avenue

Colorado Avenue passes through the center of the City parallel to the train tracks. Colorado Avenue is a two - lane highway with Class II bicycle lanes on both sides of the road. Class II bicycle lanes are lanes set aside specifically for bicycle usage. These Class II bicycle lanes do not extend along the entire length of the road to the City limits. The posted speed limit is 35 miles per hour but the average operating speed from a random sample of vehicles is approximately 40 miles per hour.

Since the average speed is higher than the posted speed, a reduction in speed may be needed to accommodate pedestrians. While this major arterial serves as a main transportation route, it must also serve as a pedestrian friendly local downtown street within the City.

### Manning Avenue

Manning Avenue runs from west to east connecting the City to Interstate 5 and State Route 99 respectively, about 24 miles away from each freeway. Manning Avenue is a two - lane highway with Class II bicycle lanes on both sides of the road. Like Colorado, these Class II bicycle lanes do not extend along the entire length of the road within City limits. The posted speed limit is 35 miles per hour but the average operating speed from a random sample of vehicles is approximately 42 miles per hour.

With the average speed higher than the posted speed, a reduction in speed may be needed to safely accommodate pedestrians. While this major arterial serves as a main transportation route, its section through the City must also serve as a pedestrian-friendly local street.

### **Collector Streets**

Collector streets are roadways used to transition between highways or arterials and local streets. While highways and arterials are prioritized to move traffic safely and efficiently, collector streets are more focused on guiding users to designated land uses. The following are collector streets in the City (see Figure 5-1):

- Main Street runs perpendicular to Colorado Avenue and connects with Manning Avenue. It collects traffic from several local neighborhoods near downtown and the west side of the City.
- Sutter Street runs perpendicular to Manning Avenue, north and south on the west side within City limits and intersects Colorado Avenue in the north.
- Elm Avenue (north of Manning Avenue) collects traffic from the north side of the City and distributes it to Colorado Avenue or California Avenue.
- Placer Avenue (north of SR 166) connects traffic from Main Street and Manning Avenue running north and south on the east side within the city limits.
- 9th Street runs parallel to Main Street, collects traffic from the center of the City and distributes it to Colorado Avenue, Manning Avenue and California Avenue.
- California Avenue lies north of and runs parallel to Colorado Avenue. It collects traffic from the Northeast side of the City and distributes it to 9th Street, Main Street, and Elm Street.

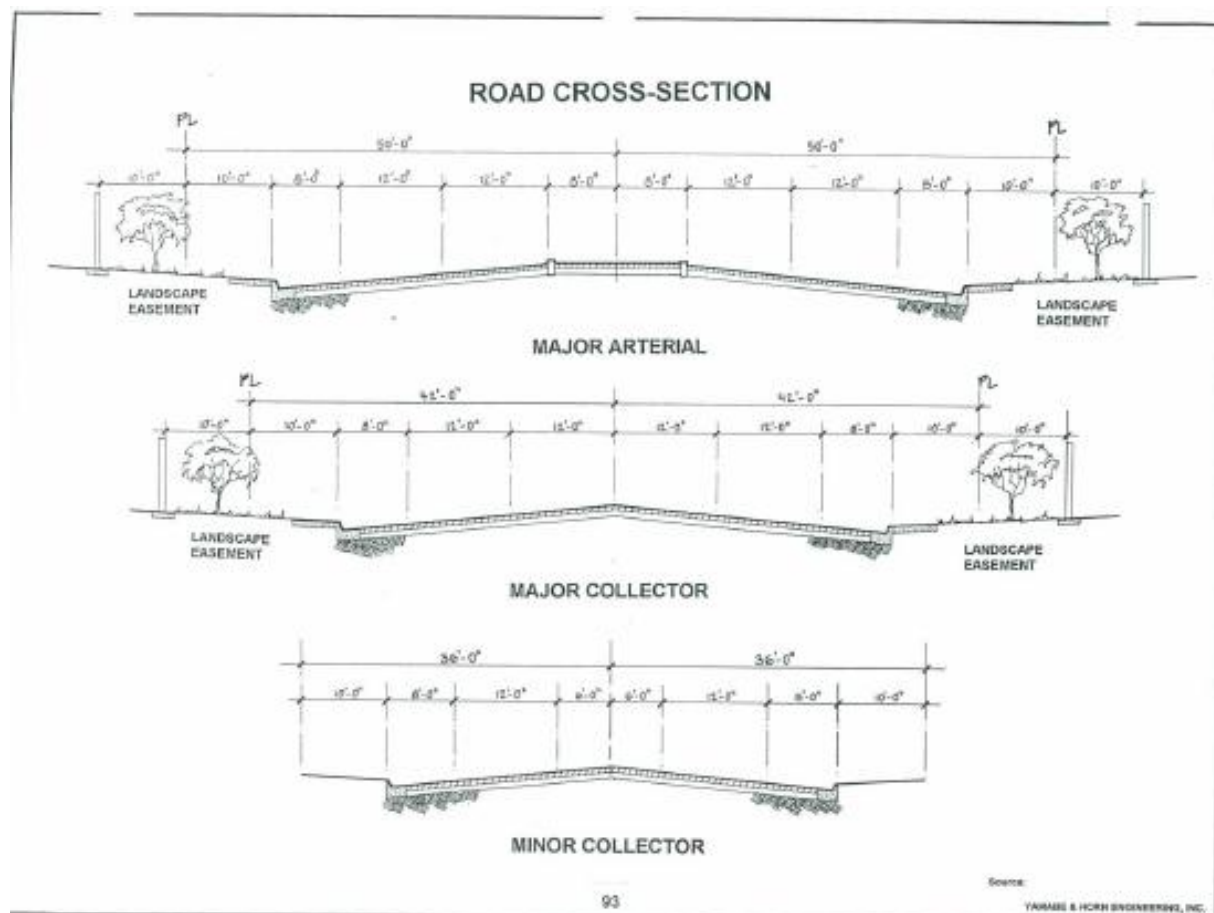
### **Local Streets**

The remaining roads in the City are classified as local streets. The primary function of local streets is to allow users to access the desired land use. Local streets are not designed to move traffic quickly. They are designed for low speeds to maintain safe, quiet neighborhoods and to enable motorists to easily find their destinations. See Figure 5-1.

## Geometric Design

The geometric design for all streets is based on minimum sight distance (Highway Capacity Manual, 2000). The four types of sight distance are passing, stopping, decision and corner. Passing sight distance is not considered in this case because all streets have two-way designs (with one lane going in either direction). Figure 5-2 shows typical cross sections of the various functional classes of roads. All roads have safe lane widths of 12 feet, which meet the required minimum of 10 feet (AASHTO, 2010). The design speeds on these collectors and arterials are 25 miles per hour and 35 miles per hour respectively (California Department of Transportation, 2010).

Figure 5-2. Typical Roadway Cross-Sections.



While the typical cross-sections in Figure 5-2 reflect four lanes on major arterials and collector streets, these streets depict two lanes in the City. It is notable that most corner crosswalks in the City have ramps and are compliant with Americans with Disabilities Act (ADA) standards. The radii of most corners are lower than the typical design in such urban centers as the City of San Diego (City of San Diego, 2002). This design forces cars to turn slowly around corners, which is

one approach to discourage speeding. San Joaquin also uses an island for traffic calming in the downtown area. The traffic-calming circle slows traffic on each approach, creates a landscaping opportunity, reduces right-of-way conflicts and tends not to divert traffic to nearby streets.

*Table 5-1. Levels of Service.*

LOS	Volume to Capacity (v/c) Ratio	Operating Condition
A	0 - 0.3	Free flow of vehicles and low volumes
B	0.3 - 0.5	Stable flow moderate Volume of 50% or less of capacity
C	0.5 - 0.75	Stable flow with volumes not exceeding 75%
D	0.75 - 0.9	Unstable flow with volumes of up to 90% of capacity
E	0.9 - 1.0	Unstable flow at street capacity
F	greater than 1.0	Forced flow and stop and go traffic

*Source: Adapted from Highway Capacity Manual, 2000*

### Level of Service

Operating conditions on transportation systems are evaluated in terms of level of service. Level of service (LOS) is a measure of the quality of service at, for example, intersections or sections of a street or highway. The LOS system uses the letters A through F, with A representing free-flow conditions and F representing high levels of congestion and delay. The Highway Capacity Manual (2000) provides a description of levels of service. Table 5-1 presents the thresholds in terms of volume to capacity ratios along roadway segments.

A variety of criteria are used to determine LOS for various types of transportation infrastructure (e.g. freeways, highways and local streets) and types of control (e.g. signalized intersections, stop-controlled intersections, etc.). The most common types of control within the City are: (a) the All-Way Stop-Controlled (AWSC) intersection, which is a 4-way stop sign intersection, and (b) the Two-Way Stop-Controlled (TWSC) intersection, which is an intersection where only the minor street has stop signs.

Table 5-2 shows the criteria for LOS at AWSC intersections. The two inputs needed to determine LOS are the number of through lanes and the approach service volumes measured in vehicles per hour (vph). The assumptions used in the table are as follows: (a) demand is equal on all approaches; (b) all lanes are identical on all four approaches; (c) Peak Hour Factor (PHF) is 0.92; and, (d) there are 10 percent left turns, 10 percent right turns and no heavy vehicles (Highway Capacity Manual, 2000). If demand is not equal on all approaches, for example 400 vehicles per hour (vph) for east and west and 300 vph for north and south, then the model assumes that all approaches would equal the highest volume, which in this case is 400 vph. All lanes need to be identical in terms of the number of through streets in the intersection.

*Table 5-2. LOS Criteria for All-Way Stop-Controlled (AWSC) Intersections.*

	Level-of-Service				
	A	B	C	D	E
Through Lanes	Approach Service Volumes (veh/h)				
1	170	260	310	340	350
2	180	320	430	480	520

*Table 5-3. LOS Criteria for Two-Way Stop-Controlled (TWSC) Intersections.*

Major Street 2-Way Volume (veh/h)	LOS				
	A	B	C	D	E
	Minor Street Approach Service Volumes for Single-Lane Approach (veh/h)				
200	110	450	630	700	760
400	N/A	280	460	530	590
600	N/A	150	320	390	440
800	N/A	40	210	270	320
1000	N/A	N/A	120	180	230

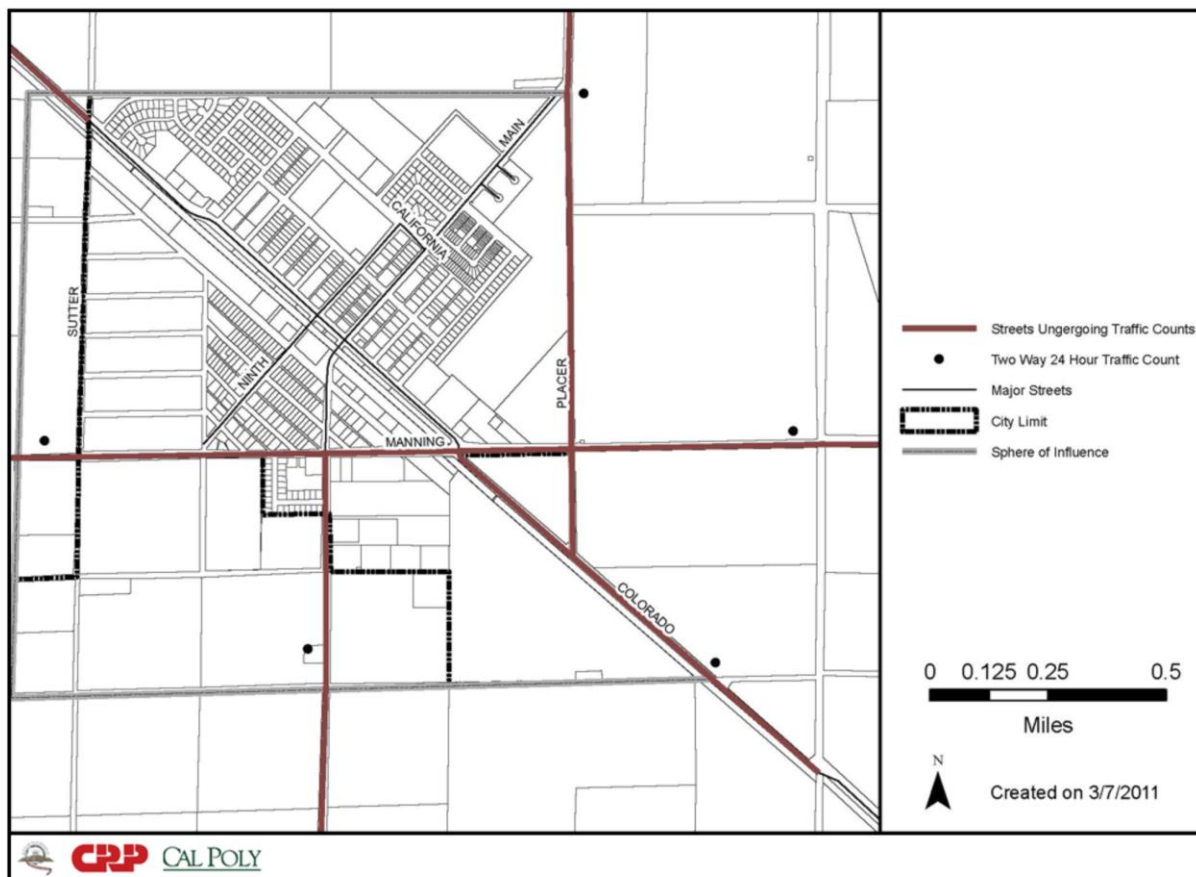
Peak Hour Factor describes the relationship between hourly volume and the maximum rate of flow within the hour ( $PHF = \text{hourly volume} / \text{maximum rate of flow}$ ) (Highway Capacity Manual, 2000). Ten percent of right turns and left turns are assumed to take place at the intersection, and it is assumed that no heavy vehicles will go through the intersection. Because all streets in the City are two-way streets, each approach has only one through lane.

Table 5-3 shows the criteria for LOS at TWSC intersections. The two inputs needed to determine LOS are the two-way volume of the major street and the minor street approach service volumes measured in vehicles per hour. The assumptions used in the table are: (a) the minor street left turns and right turns are equal; (b) major street left turns and right turns are each 10 percent of the approach volume; (c) Peak Hour Factor (PHF) is 0.92; (d) heavy vehicles equal 2 percent of the approach volume; (e) grades are equal; and, (f) pedestrian flows are zero (Highway Capacity Manual, 2000).

Figure 5-3 shows Average Daily Traffic (ADT) volume counts along selected roadway segments in the City. The intersection of Manning Avenue and Colorado Avenue has a four-way stop control. The highest count for the day on either roadway is 1100 vehicles. If ten percent of ADT occurred during the peak hour in the day, then each roadway would have 110 vph. This means the collective vehicles per hour on all approaches would equal 220 vph. Using the classifications listed in Table 5-2, the LOS at this intersection is "B". At the intersection of Placer Avenue and Colorado Avenue (a two-way stop controlled intersection), the ADT on Colorado Avenue (the major street) is 1100 vehicles per day while the ADT on Placer Avenue is 1588 vehicles per

day, yielding peak hour volumes of 110 vph and 159 vph respectively. Again using Table 5-2, the LOS of the intersection of Placer Avenue and Colorado Avenue is “B”.

*Figure 5-3. Average Daily Traffic Volumes (1990).*



### Road Surface Conditions

Road surface conditions in the City are judged to be fair. Road conditions were inspected through a windshield survey of all roads. Many streets have potholes and deteriorating pavement. Although it is safe to drive everywhere, a significant amount of maintenance is needed. These road conditions do not generally allow for smooth rides on bicycles.

### 5.2.2. Transportation Routes

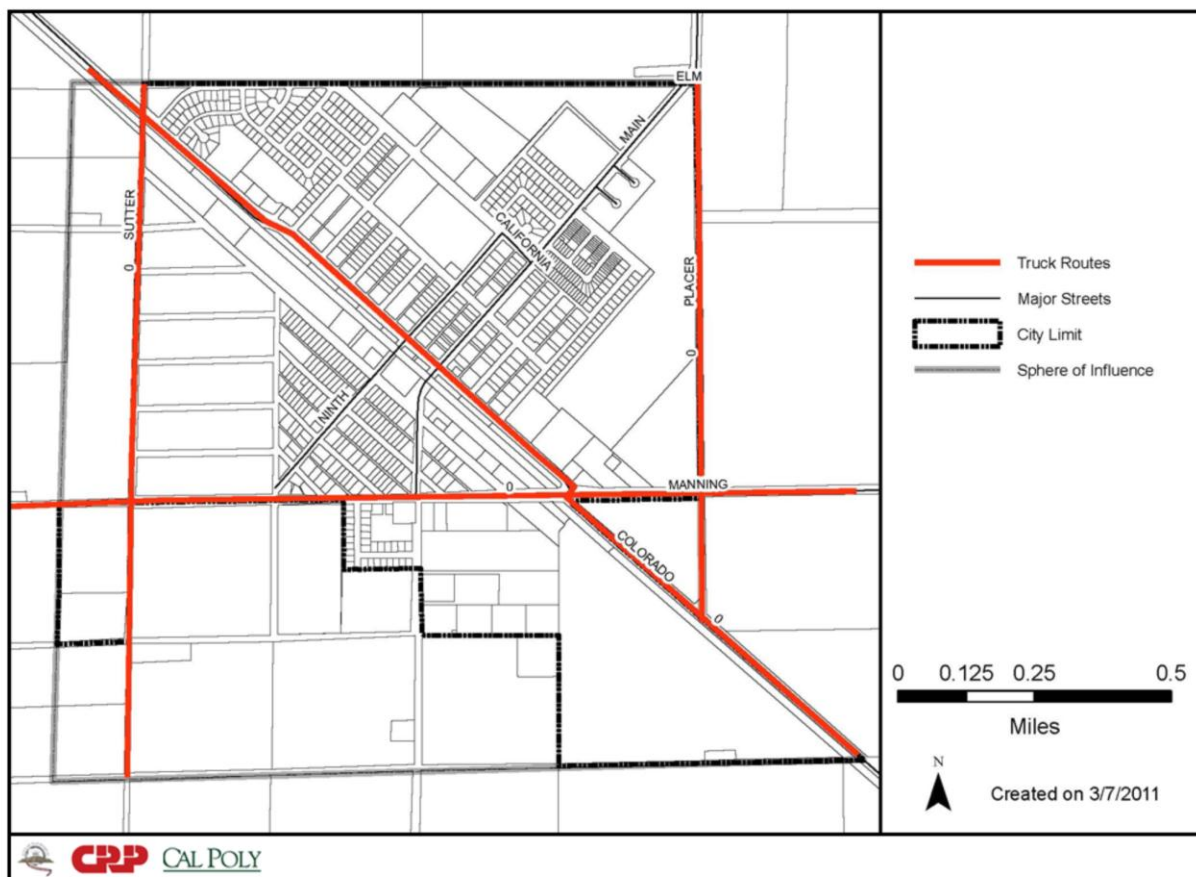
There are three types of transportation routes that are significant to the City: major thoroughfares, truck routes and bicycle routes. This section assesses the adequacy of these existing routes and facilities.



## Major Thoroughfares

As shown in Figure 5-1, the primary transportation corridors in the City are Colorado Avenue, Manning Avenue, Main Street, and the railroad running along Colorado Avenue.

Figure 5-4. Truck Routes.



## Truck Routes

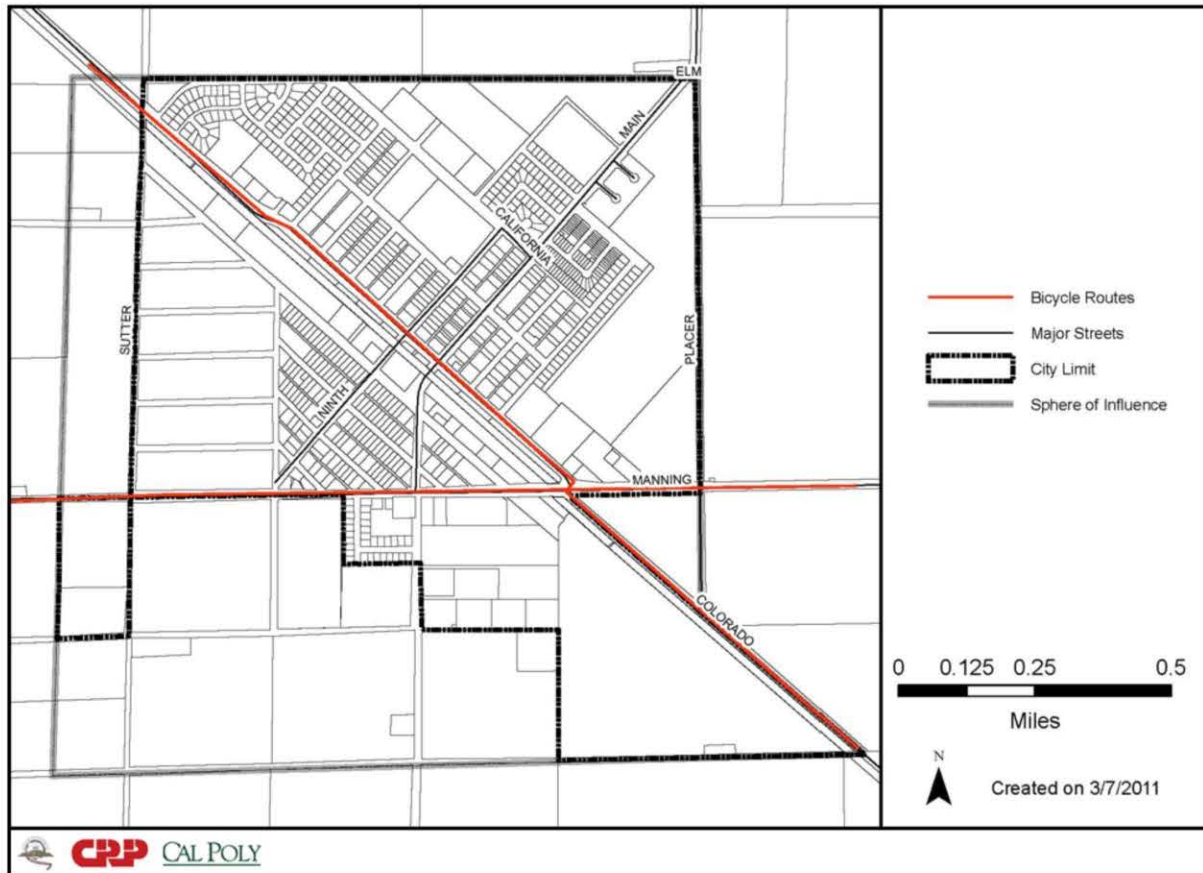
There are four designated truck routes: Colorado Avenue, Manning Avenue, Sutter Avenue and Placer Avenue as shown in Figure 5-4. There is signage to alert people on the road of trucks traveling on these streets. Community members have expressed concern about trucks parking near their homes, which takes up parking spaces and contributes to unwanted noise.

## Bicycle Routes

The City is compact, covering approximately one square mile, and its topography is flat. These conditions are attractive for bicycling and walking, however little bicycling occurs in the City. The bicycle network lies along two main arterials, Colorado Avenue and Manning Avenue, which are

displayed on Figure 5-5. There are signs posted along the streets for riders and motorists to be aware of the bicycle routes.

*Figure 5-5. Bicycle Routes.*





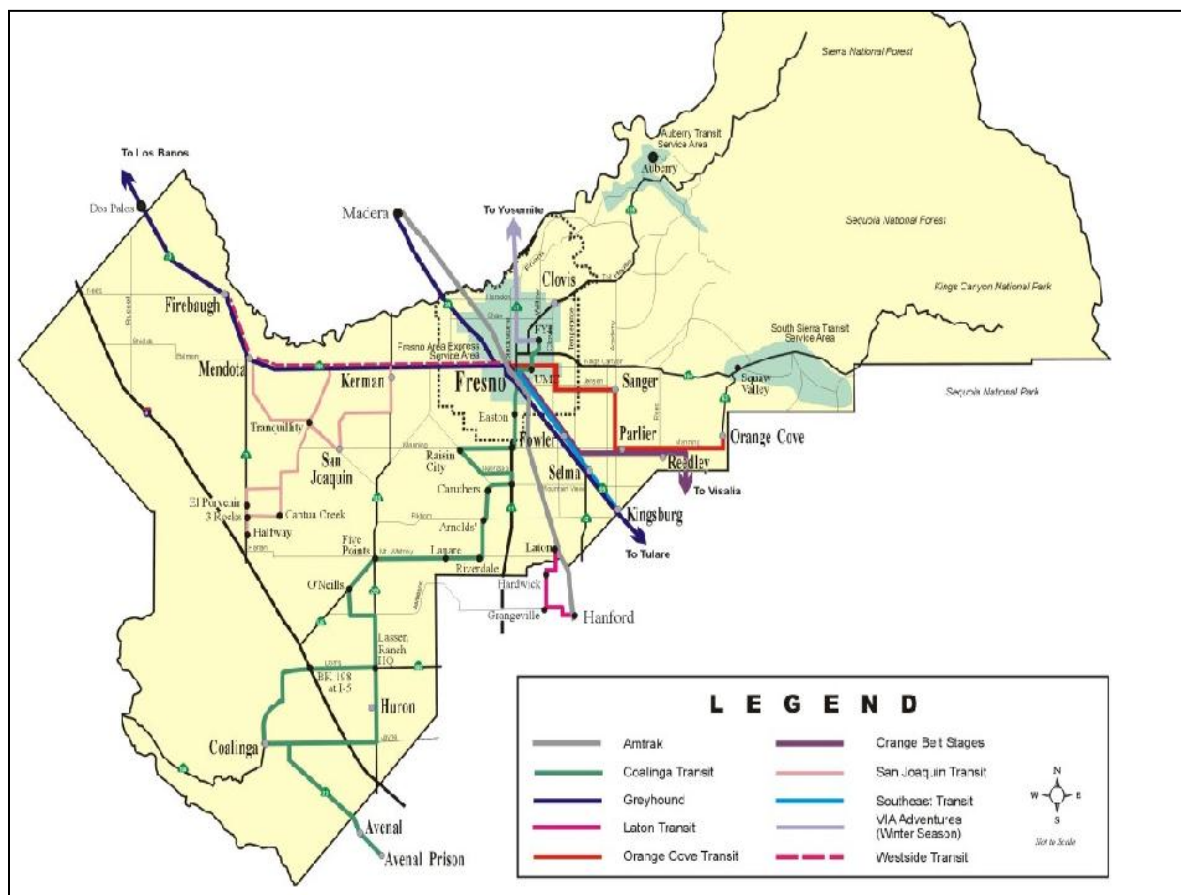
### 5.2.3. Terminals

This section identifies various transportation terminals that serve the City. These include a public transit bus terminal, a train stop and airports.

#### Public Transit

The Fresno County Rural Transit Agency (FCRTA) provides public transit service to each of the 13 rural incorporated cities of Fresno County including the City of San Joaquin. San Joaquin Transit (SJT) directly services the City under the umbrella of FCRTA. Transit services operate under a Dial-A-Ride model, which is a type of paratransit. Paratransit is defined as an alternative mode of flexible passenger transportation that does not follow fixed routes or schedules (Vuchic, 2007). In order to ride the bus within the city limits, riders must call SJT for pick-up at a later time to be dropped off at the desired destination. Riders can call for a ride on the same day that service is required. For a ride to a destination outside the city limits, riders must arrange for pickup at least a day in advance. Figure 5-6 shows the collection and types of public transit routes provided by the FCRTA.

Figure 5-6. Service Map of the Fresno County Rural Transit Agency.



Source: [http://www.ruraltransit.org/graphics/fcrt\\_a\\_service\\_area1024-774.jpg](http://www.ruraltransit.org/graphics/fcrt_a_service_area1024-774.jpg)

## **Rail**

The rail corridor traveling through the City services freight traffic only. No passenger service is provided. There are four railroad crossings as displayed in Figure 5-1. These crossings are not ideal because only one sign is used on either side of the crossing to indicate railroad tracks. Stop signs can create a safer railroad crossing, but the most effective precautionary measure is a crossing guard.

## **Airport**

The nearest international airport to the City is the Fresno Yosemite National Airport, approximately 40 miles east of the City. There are no direct public transportation systems to reach this airport. People must travel by personal means, take a taxi or use multiple buses.

## **5.3. Emerging Directions**

Transportation data reveal that the City is a very automobile-oriented community. The limited public transit service and bicycle infrastructure makes transportation by modes other than the private automobile difficult. The main thoroughfare is Manning Avenue, which has an average operating speed that is higher than the posted speed limit. This suggests the need for traffic calming.

At the second community meeting, a visual exercise asked residents to indicate which type of bike lane design they preferred. In this exercise, the people made choices among: (a) a bike lane separated from the road by a median; (b) a regular striped bike lane next to a traffic lane and parked cars; and (c) a bike path created in alley ways. The design that the people chose most frequently was the bike lane separated from the road by a median. Since major roads have adequate right-of-way for four lanes, the implementation of bike lane separated from the travel lanes by a median is feasible with redesign of the main arterials.

Based on the data gathered about existing conditions and feedback received at the community meetings, some possible options for the future are to improve public transportation, design complete streets (discussed in section 5.3.2) and improve routes for bikes, trucks and trains.

### **5.3.1. Public Transportation**

Based primarily on feedback from the community, additional public transportation services are desired. Because the population does not yet warrant the implementation of a fixed-route public transportation service, the existing Dial-A-Ride service should be enhanced or publicized until the city grows to a sufficient size to support fixed route service. One way to improve the existing transit service is to provide better information about its availability and guidelines for its use.

### **5.3.2. Complete Streets**

Complete streets are roadways designed and operated to enable safe, attractive and comfortable access and travel for all users, which include pedestrians, bicyclists and motorists (drivers and transit riders). Although the City is a safe place to drive and walk, there are many

roads and sidewalks that need maintenance, to improve the streets and design improvements to accommodate all users.

### 5.3.3. Other Improvements

Major arterials need repaving to improve ride comfort for bicyclists. In addition, railroad crossings need to be upgraded with crossing guards or other devices to make them safer for everyone, especially when trains are traversing the City.

## 5.4. References

AASHTO *The Voice of Transportation*. (2010). Retrieved 2010 1-November from American Association of State Highway and Transportation Officials: <http://www.transportation.org/>

California Department of Transportation. (2010). Retrieved 2010 1-November from California Government: <http://www.dot.ca.gov/>

City of San Diego. (2002). *Street Design Manual 2002*. San Diego, California, USA.

Transportation Research Board. (2000). *Highway Capacity Manual: 2000*. Washington, D.C.: Transportation Research Board.

Vuchic, V. R. (2007). *Urban Transit Systems and Technology*. New Jersey: John Wiley & Sons, Inc. .

## 6. HOUSING

---

### 6.1. Introduction

The Housing Element is one of the seven State mandated elements of the General Plan. This background report addresses the existing conditions with respect to housing affordability, type and quality in the City. It also identifies emerging directions for housing planning within the City, based on the conditions and initial input from community members.

According to the California Governor's Office of Planning and Research (OPR) General Plan Guidelines, the purpose of the element is to ensure that local governments adopt land-use plans and regulatory schemes that "provide opportunities for, and do not unduly constrain, housing development for all income groups" (2003, p. 61). The State of California Department of Housing and Community Development (HCD), as explained by OPR, requires that the element have at least the following content: a review of the previous housing element, a housing needs assessment, an inventory of land and financial resources, an assessment of governmental and non-governmental constraints on housing, programs to promote development of needed units and a statement of quantified housing development objectives by income group.

Housing is the only element that is statutorily required to be updated and certified by HCD. Several housing, community development and infrastructure funding programs include housing element compliance as a criterion in order to incentivize cities to produce effective plans that comply with state law. The City's current Housing Element 2008-2014 was adopted by the City Council in September 2009 and certified by HCD on March 22, 2010.

California Government Code §65584 requires HCD to project statewide housing needs and then allocate those needs to each region in the State. San Joaquin is a member of the Council of Fresno County Governments (Fresno COG). HCD determines the regional housing need for Fresno COG, which then distributes the Regional Housing Needs Allocation (RHNA) to counties and the incorporated cities within its region. Fresno COG allocates housing production goals for each jurisdiction primarily based on their "fair-share" of the region's population growth, which is outlined in Fresno County's 2007 Regional Housing Needs Allocation Plan (RHNAP).

The projected housing needs in the RHNA are categorized by affordability based on standards for very low-, low-, moderate- and above moderate-income households established by the U.S. Department of Housing and Urban Development (HUD) (California Health and Safety Code §50079.5). The upcoming Housing element update must demonstrate the City's ability to accommodate residential development to meet the RHNA for the planning period, as well as the projected housing needs for the target date of the General Plan.

## 6.2. Existing Conditions

This section discusses the existing conditions in the City with respect to housing affordability, housing stock and special needs populations. Overall, the City has fairly affordable housing options, evidenced by the fact that the percentage of households overpaying for housing is comparable or lower than regional and national trends. However, the needs assessment and public outreach indicate that additional housing stock is needed, especially for large families.

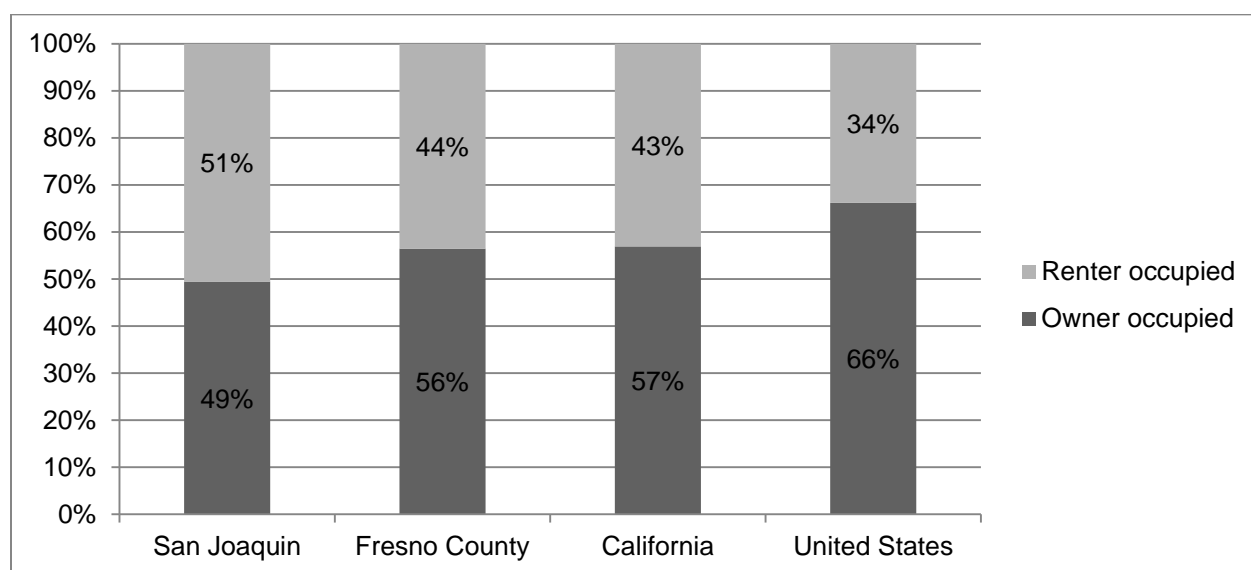
### 6.2.1. Housing Affordability

Housing affordability addresses the match between a population's income and the cost of housing in the area. To be affordable, the cost of housing, which includes monthly rent or mortgage payments as well as utility costs, should be no more than 30 percent of household income. This section discusses housing affordability through indicators such as tenure, overpayment and RHNA targets by income level.

#### Tenure

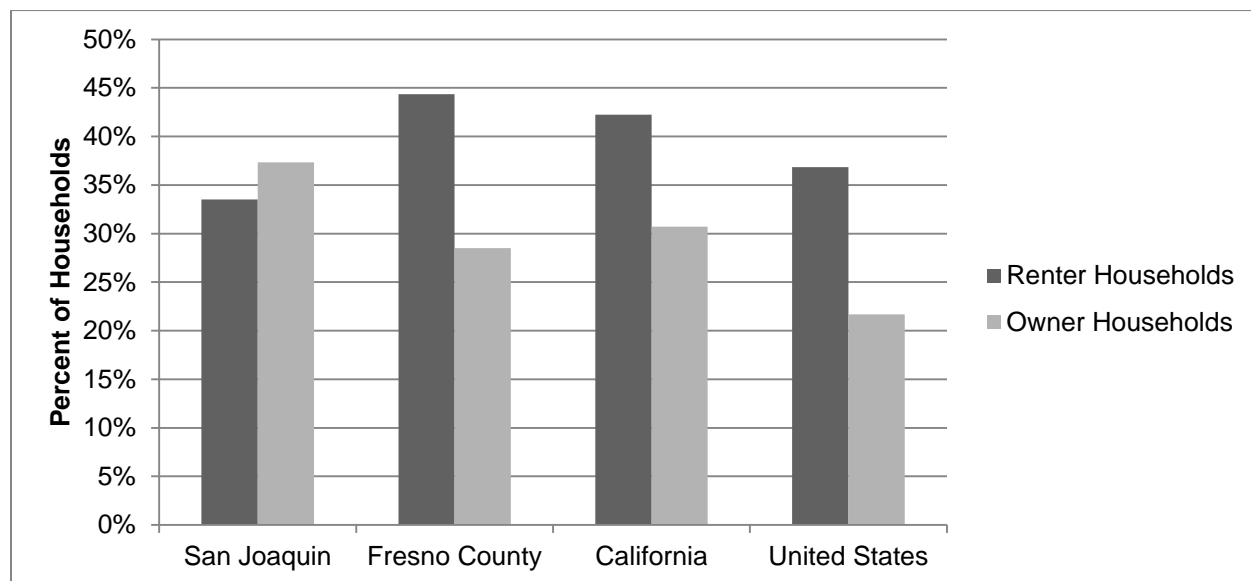
Tenure, the ratio between owner-occupied and renter-occupied households, can be affected by many factors. Variables such as housing cost, housing type, housing availability and consumer preference may impact the City's tenure ratio. Half of City units are renter-occupied and half are owner-occupied. This mix is reflective of Fresno County and California, while the nation has a larger proportion of owners than renters. City staff and civic leaders have indicated that one deterrent to home ownership in the City is the lack of high-quality housing stock to attract higher-income residents to the City. Figure 6-1 shows the tenure in the City as compared to local and national statistics.

Figure 6-1. Housing Units by Tenure.



Source: Census 2000 SF1 Table H4

Figure 6-2. Overpayment Among Households by Tenure



Source: Census 2000 SF3 Table H73 and H97

### Overpayment

As mentioned previously, overpayment means that a household's housing costs exceed 30 percent of its income. Regionally and nationally in 2000, a larger proportion of renters were overpaying than owners. In the City, however, there was a slightly higher proportion of owners overpaying than renters. See Figure 6-2 for a comparison of overpayment rates by tenure.

### Regional Housing Needs Allocation

The current Housing Element 2007-2014 includes an evaluation of the previous 2002-2007 Housing element, which achieved 67 percent (155 units) of the units allocated in the 2000-2007 RHNA cycle. The Housing Element 2008-2014 addresses the units needed based on 2007-2014 RHNA cycle. Of the approximately 40,000 housing units allocated to Fresno COG through RHNA for the planning period January 2006 to June 2013, the City needs to accommodate 200 units.

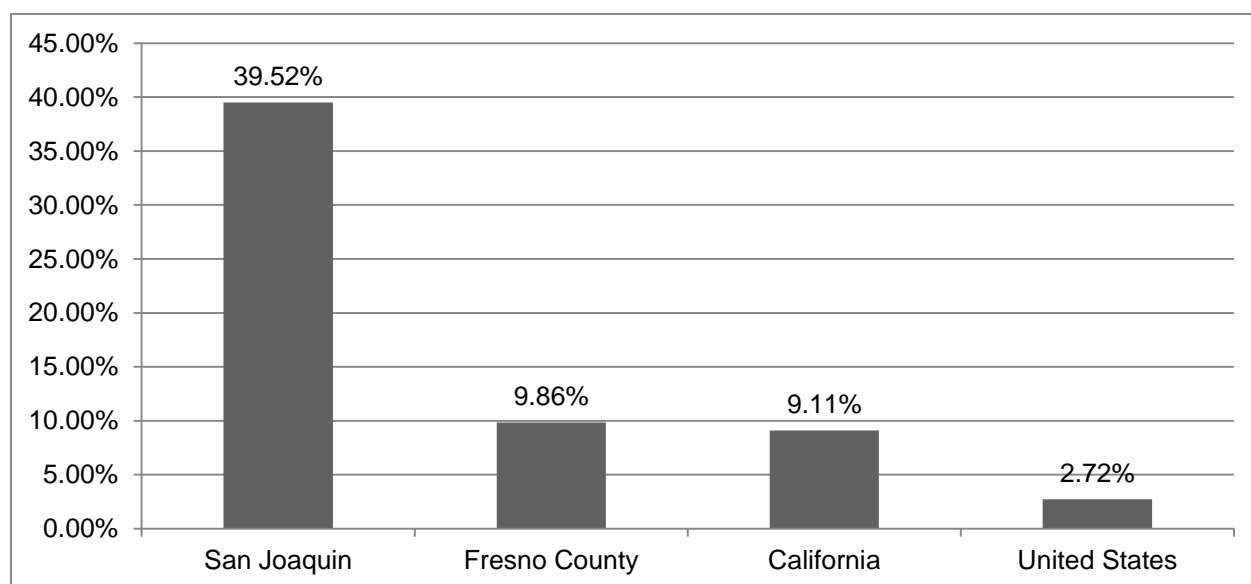
Table 6-1 summarizes the RHNA requirements for units of each income level, as well as the units accommodated during the first four years of the cycle (2007 through 2010). The table also projects the units to be built in the remaining four years of the RHNA cycle, based on the average annual constructed units during the first four years. The projections reveal that if trends continue, the targets will not be met for all income levels, except for the moderate-income units that are projected to be provided in excess of the RHNA target.

Table 6-1. Regional Housing Needs Allocation Progress

	RHNA Requirement	New Units Years 1 through 4 (2007 through 2010)	Projected New Units (2011 through 2014)*	Potential Unmet RHNA Needs by 2014
<b>Extremely Low</b>	27	0	0	27
<b>Very Low</b>	27	0	0	27
<b>Low</b>	43	0	0	43
<b>Moderate</b>	40	26	26	0
<b>Above Moderate</b>	63	25	25	18
<b>Total Units</b>	<b>200</b>	<b>51</b>	<b>51</b>	<b>98</b>

\*Average of annual units constructed from 2007 to 2010, multiplied by 4 remaining years  
Source: *Housing Element 2008-2014*, p. 77

Figure 6-3. Percent of Households with Severe Overcrowding



Source: *Census 2000 SF3 Table H20*

### Overcrowding

According to HCD, overcrowding increases health and safety concerns and stresses the condition of the housing stock and infrastructure (HCD, 2010). Overcrowding is often a symptom of insufficient housing, inadequacy of affordable housing and high proportions of low-income residents. HCD, relying on the U.S. Census definition of overcrowding, considers a dwelling to be overcrowded when the ratio of household members to rooms (other than bathrooms or kitchens) exceeds 1 (HCD, 2010). Severe overcrowding occurs when this ratio exceeds 1.50. As shown in Figure 6-3, the percentage of households with severe overcrowding in the City is

approximately four times the rate in Fresno County and California and 12 times the rate nationwide.

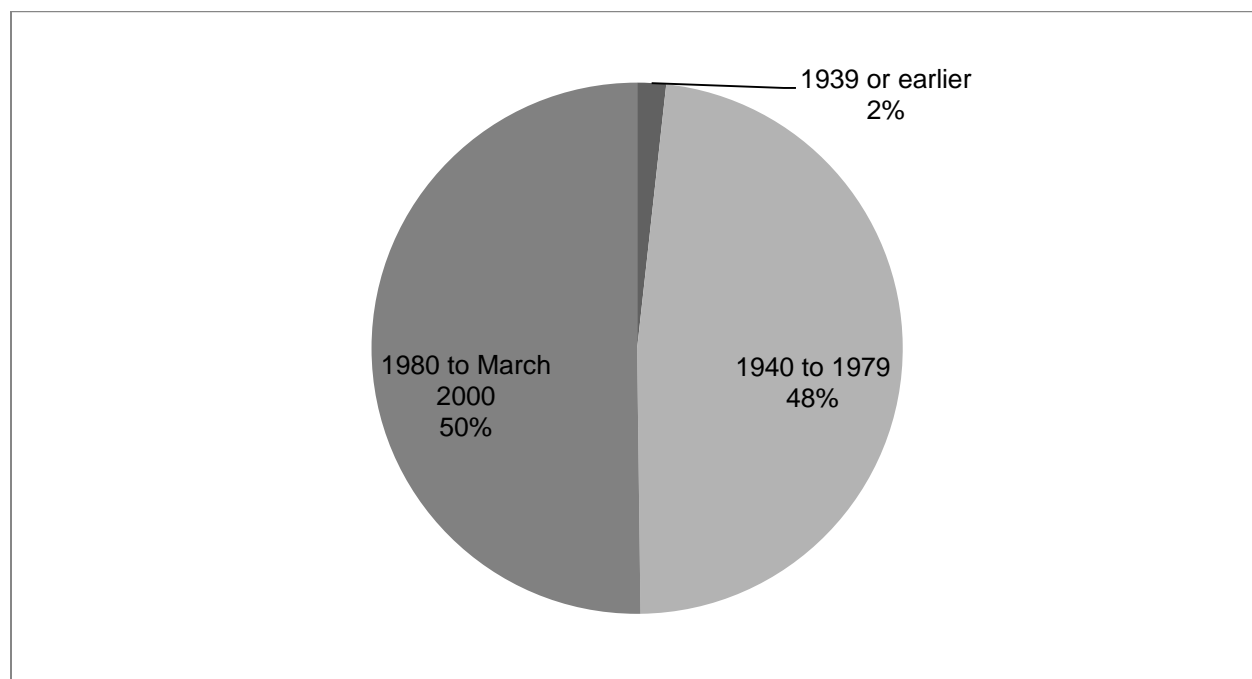
### 6.2.2. Housing Stock

The following section discusses various characteristics of the City's housing stock, such as the age, size (number of bedrooms), and types (single family, multi-family, etc.) of housing units.

#### Age of Housing Stock

According to the 2000 U.S. Census, half of the 743 housing units in the City were constructed after 1979. Most of the remaining units were built between 1940 and 1979, while only 13 units were built before 1940. Asbestos and other hazardous materials used in construction prior to the 1980s can be a housing concern, but has not been identified as a problem in the City. The 2000 U.S. Census indicates that 80 percent of the City's housing units have at least 3 bedrooms. Over half of the City's units are single family detached, while the remaining are duplexes, multi-family and mobile homes. Figures 6-4, 6-5 and 6-6 show the age, sizes, and unit type of the City's housing.

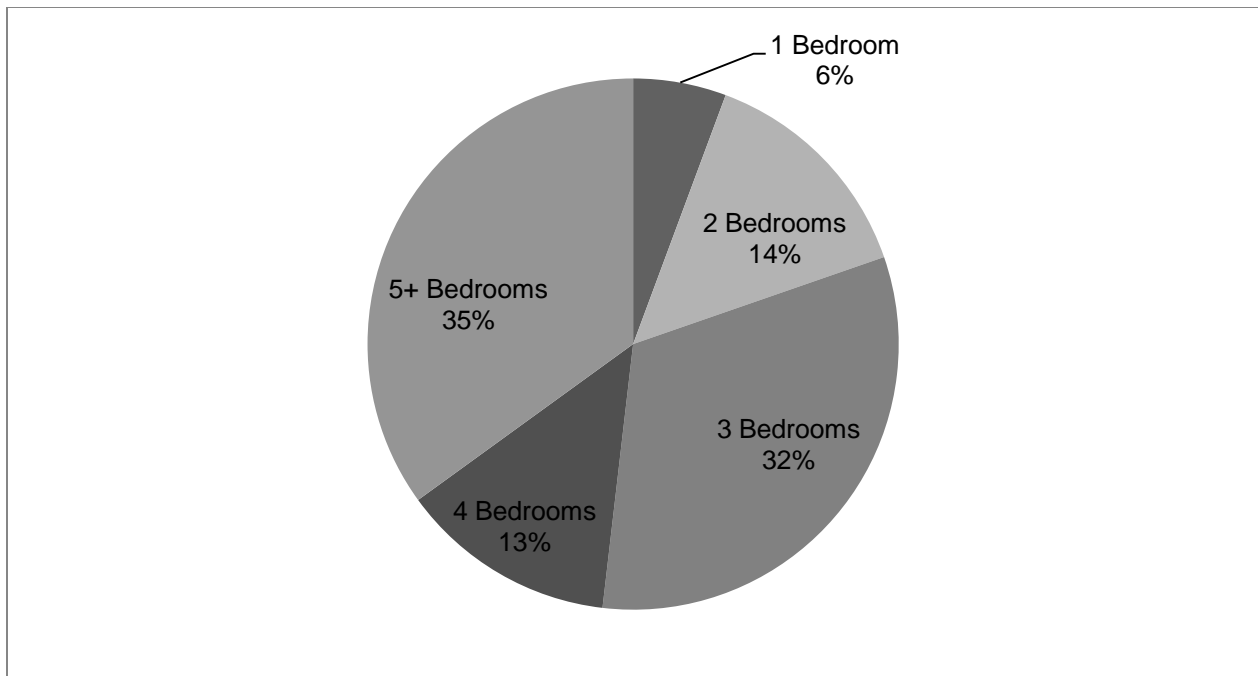
*Figure 6-4. Housing Stock by Year Constructed.*



Source: Census 2000 SF3 Table H34

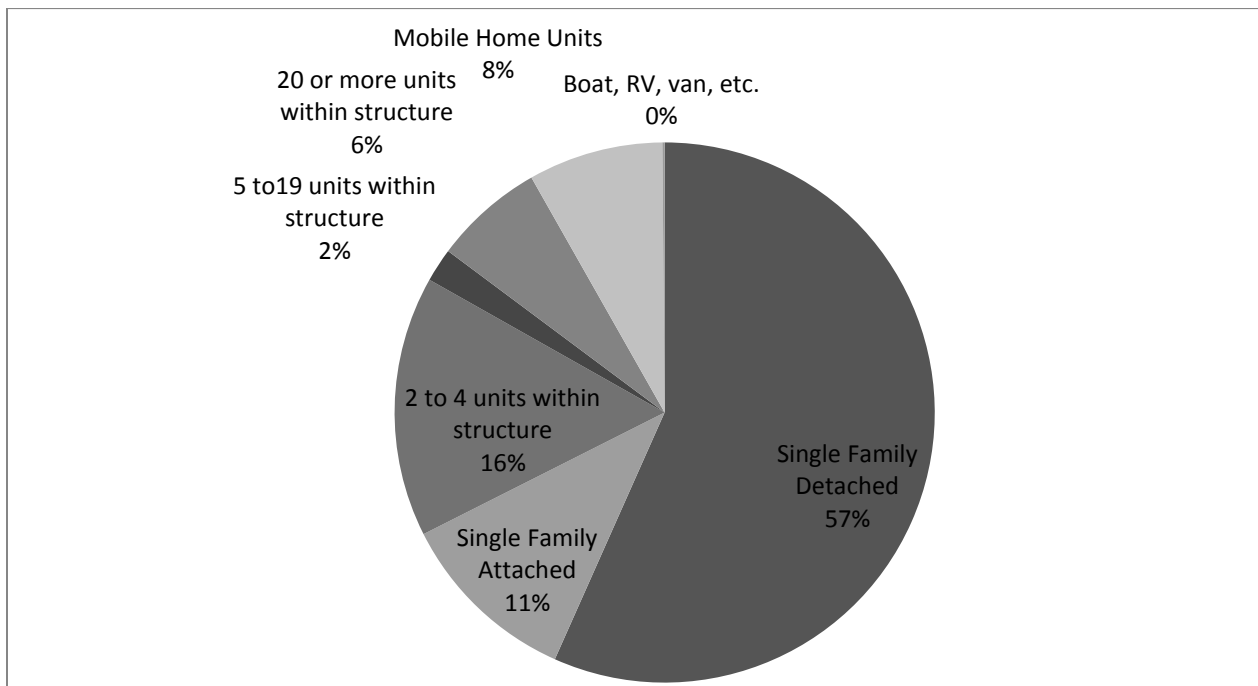
*Figure 6-5. Housing Units by Size*





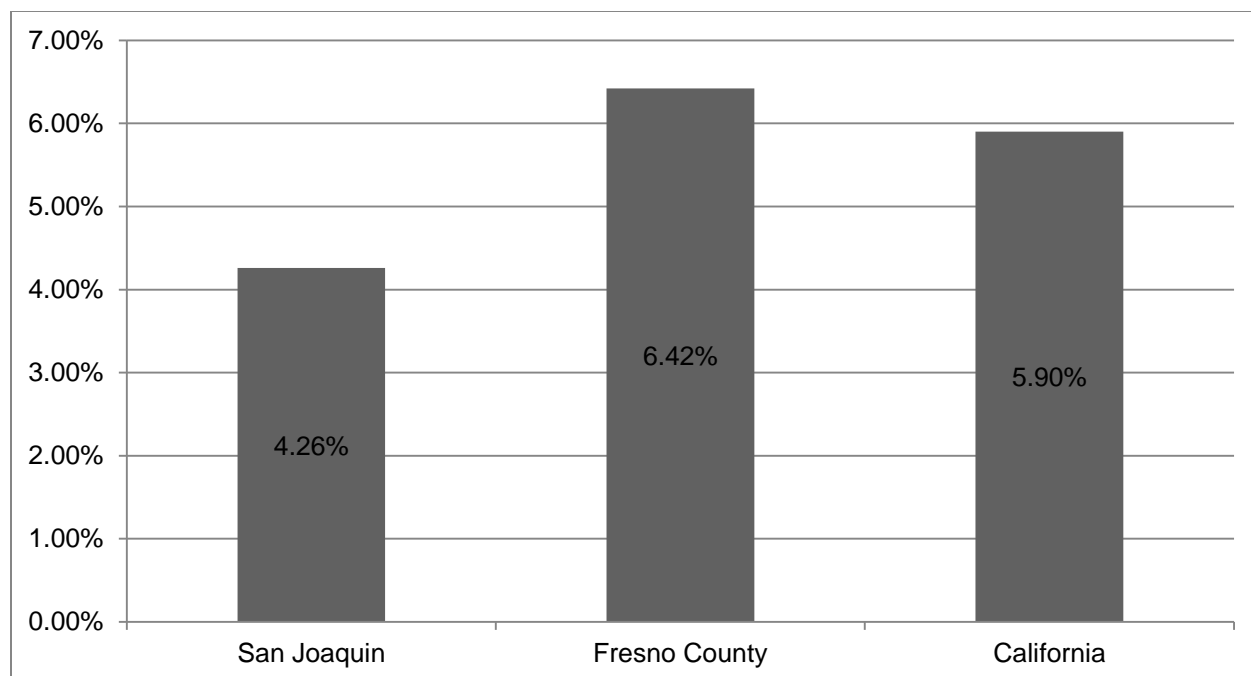
Source: Census 2000 SF3 Table H26

Figure 6-6. Residential Units by Type



Source: Census 2000 SF 3 Table H30

Figure 6-7. Vacancy Rate



(Source: California Department of Finance 2010 Table E-5)

### Vacancy

Vacancy rate is an indicator of housing supply and demand and the ability of available units to accommodate turnover. Low vacancy rates are associated with higher housing prices, while higher vacancy rates are associated with lower housing prices. A five to six percent vacancy rate is generally considered ideal. In 2010, the California Department of Finance estimated the City's vacancy rate at 4.26 percent, indicating that the housing market can accommodate an increased supply. Figure 6-7 shows that average rates for Fresno County and the State were about six percent in 2000.

### Housing Conditions

The condition of housing units is an indicator of potential public health and safety risks. Risks are associated with structural damage, inadequate plumbing and electrical wiring and use of hazardous materials. In 2008, the City conducted a survey of housing conditions. The survey found that nearly 96 percent of housing units in the City were in good condition (not in need of major repairs or demolition). Of the 895 units surveyed, 24 needed minor repairs, 15 needed moderate repairs and only one unit needed to be demolished. Among the most common minor repairs needed were electrical wiring and siding/stucco upkeep.

In October 2010, Cal Poly students conducted a comprehensive land use survey of the City. The survey included a simple assessment of housing conditions. Through observation of the front exterior of units, surveyors found that residential units remain in good condition, with few minor repairs needed. Of 1,067 residential units, 93 percent (989 units) were found to be in "good" condition based on cursory exterior evaluation, and 7 percent (78 units) were found to be

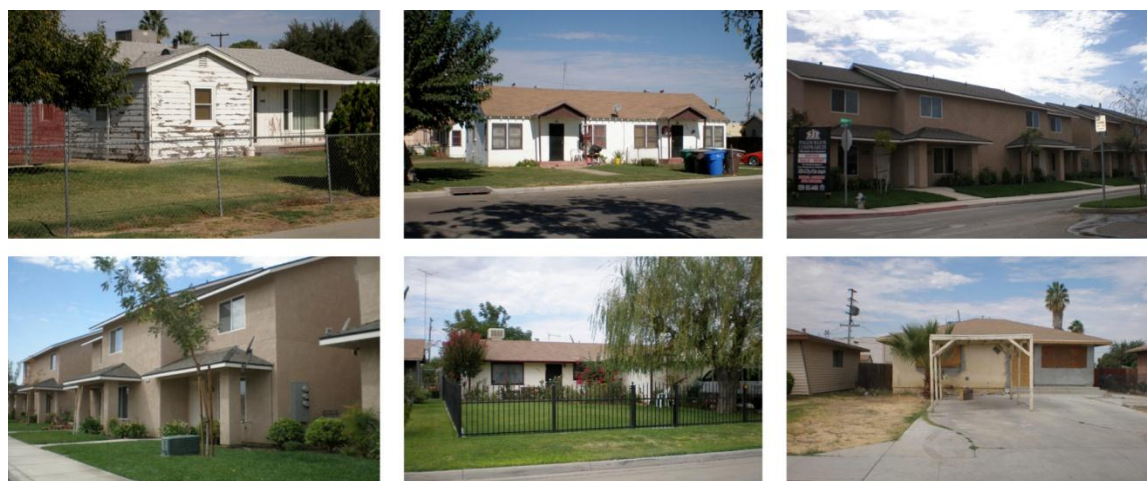
in “fair” condition, in need of minor repairs such as cracked stucco or deteriorating siding. No units were found to need major repairs or demolition. In light of the 172 units, which are new and likely to be in “good” condition, built between 2008 and 2010, the 2010 housing conditions survey is consistent with the findings of the 2008 comprehensive housing conditions survey. See Table 6-2 for a summary of the housing conditions trends. Figure 6-8 shows examples of housing units in the City.

*Table 6-2. Housing Conditions in San Joaquin.*

	Year			
	1999	2008	2010	Change from 1999 to 2010
Good Condition	628	855	989	361
Need Minor / Moderate Repair	117	39	78	-39
To be Demolished	11	1	0	-11
<b>Total Units</b>	<b>756</b>	<b>895</b>	<b>1,067</b>	<b>311</b>

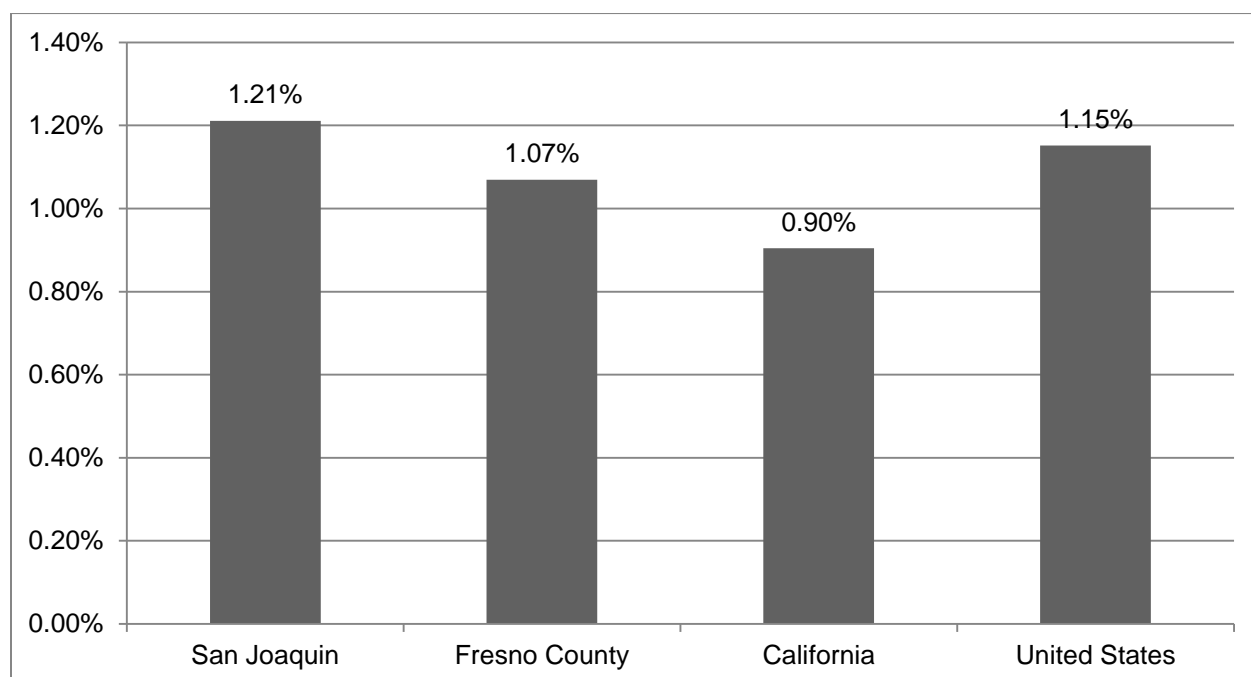
*Source: City of San Joaquin Housing Element March 2003; Housing Element 2008-2014; 2010 Land Use Survey*

*Figure 6-8. Examples of San Joaquin Housing Units*



*Source: Darci Palmer, Cal Poly*

*Figure 6-9. Percent of Dwelling Units with Incomplete Plumbing.*



Source: Census 2000 SF3 Table H47

In 2000, a total of nine housing units in the City had incomplete plumbing. Figure 6-9 shows that the City's rate of incomplete plumbing exceeded that of the County, State and nation.

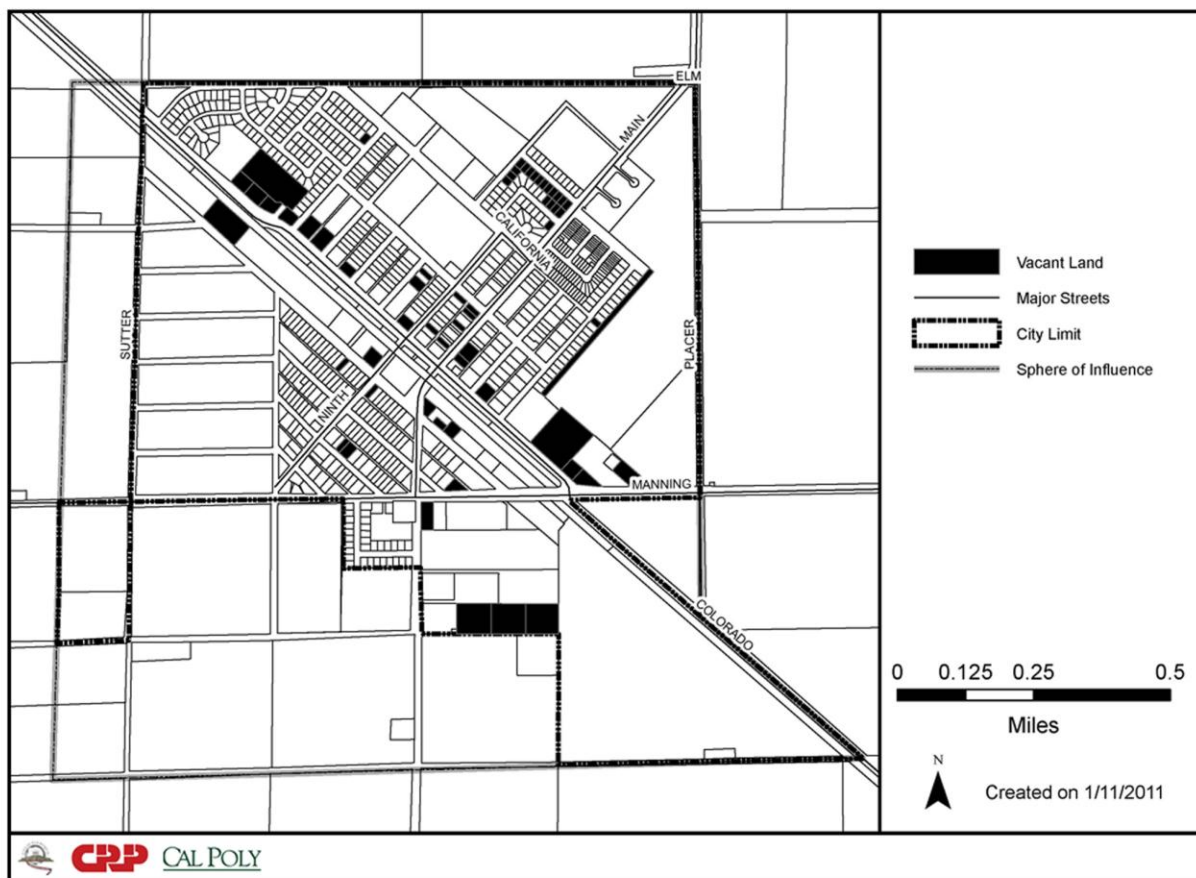
### **At-Risk Housing**

According to the Housing Element 2008-2014 and City staff, no affordable subsidized units are at risk of conversion to market rates, except for Garden Valley Homes II in 2035.

### **Parcel Inventory**

In the 2010 Land Use Survey conducted in October 2010, surveyors identified 61 vacant parcels of various zoning designations. The vacant parcels totaled 39.7 acres. Figure 6-10 is a map depicting the vacant land in the City. While some of these parcels are not currently zoned for residential use, the availability of land represents the opportunity for land needed to develop housing units. A more comprehensive analysis is needed to identify opportunity sites for housing development, based on infrastructure, location of amenities and community input.

Figure 6-10. Vacant Parcels in San Joaquin. 2010



Source: Land Use Survey

### 6.2.3. Special Needs

California State Government Code §65583(a)(6) requires that housing elements dedicate particular attention to planning for special needs populations that are especially vulnerable and in need of housing accessibility. These special needs populations include seniors, persons with disabilities, large households, single-parent households, households with income levels below the poverty line, farm workers and the homeless population. The following section details the special needs populations within the City.

#### Seniors

According to the Housing Element 2008-2014 Needs Assessment, 67 households in the City included a senior (age 65 or older) householder. It is estimated that senior-headed households increased by approximately 40 percent between 2000 and 2008 to 94 households. The element also projected that the number of senior-headed households in the City will increase another 12.8 percent to 106 households by 2013.

The Housing Element also notes the changes in tenure among senior households. From 1990 to 2000, in both the City and Fresno County, there was a decrease in the proportion of senior households that rented and an increase in homeownership. Despite this trend, senior households disproportionately earn extremely low incomes. Over 60 percent of senior households earned less than \$20,000 annually in 2008 (Housing Element 2008-2014).

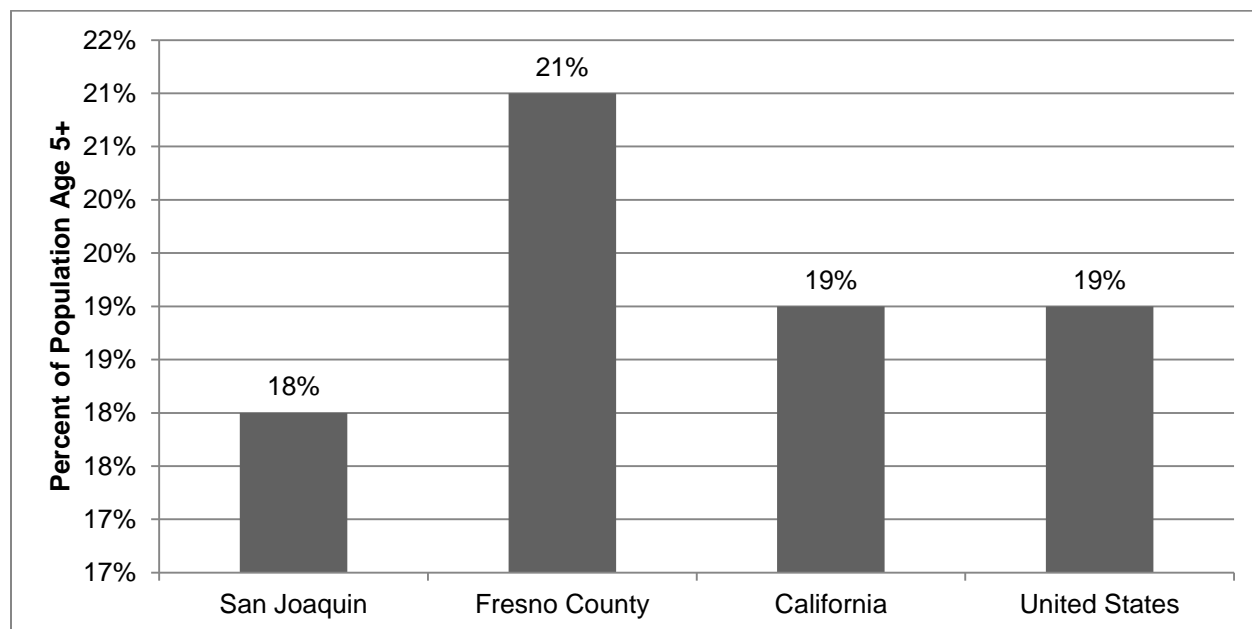
### Persons with Disabilities

As stated in OPR's General Plan Guidelines, the Element must demonstrate the City's efforts to "remove governmental constraints on housing for persons with disabilities, such as accommodating procedures for the approval of group homes, ADA retrofit efforts, an evaluation of the zoning code for ADA compliance or other measures that provide flexibility in the development of housing for persons with disabilities" (2003, p. 69).

According to the Housing Element 2008-2014, the City planned to adopt a Reasonable Accommodation Ordinance (RAO) by June 2010 to help promote housing adaptations to accommodate persons with disabilities. As of November 2010, the RAO was not adopted.

As shown in Figure 6-11, in 2000 the City had a smaller percentage of residents living with one or more disabilities, as compared to the County, State and nation. Eighteen percent (531) of residents over age five reported having one or more disabilities, while one percent (25) of residents in the age group reported a self-care disability.

Figure 6-10. Persons with one or more disabilities.



Source: Census 2000 SF3 Table PCT26

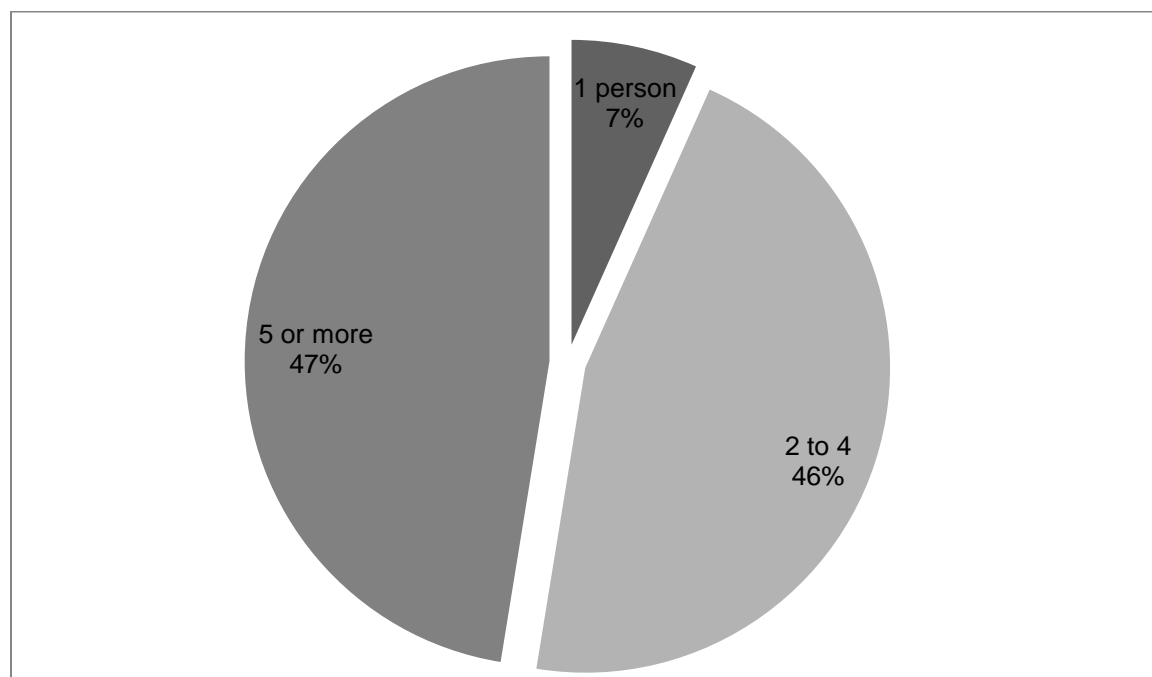
As explained in the Housing Element 2008-2014, approximately 83 percent of the population of disabled persons was between ages 16 to 64 in 2000. Of this age group, nearly 48 percent were unemployed, evidencing the need for assistive housing for this special needs population.

### Large Households

Nearly half (47 percent) of City households are considered “large”, defined as households with five or more persons. To prevent overcrowding, housing types and sizes should accommodate the population’s frequency of large households by providing enough units with three or more bedrooms. As shown in Figure 6-12, 46 percent of households have two to four household members, requiring medium sized housing. Only seven percent of households comprised single individuals.

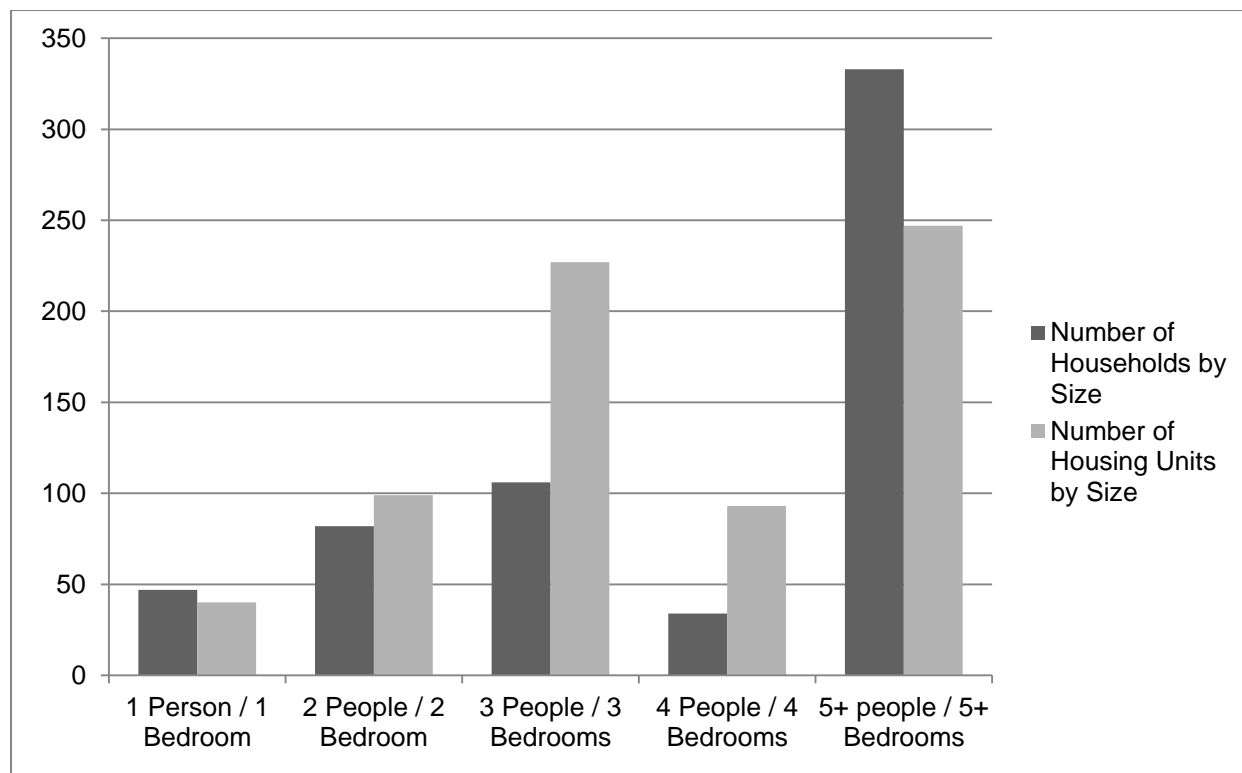
Figure 6-13 compares the housing sizes to household sizes in 2000. The comparison suggests that there is sufficient stock of housing for 1, 2, 3 and 4-person households, but that the population of 5-person or larger households exceeds the supply of housing units by approximately 75 households.

*Figure 6-11. Households by Size.*



Source: U.S. Census 2000 SF1 Table P26

*Figure 6-12. Comparison between household sizes and housing unit sizes.*

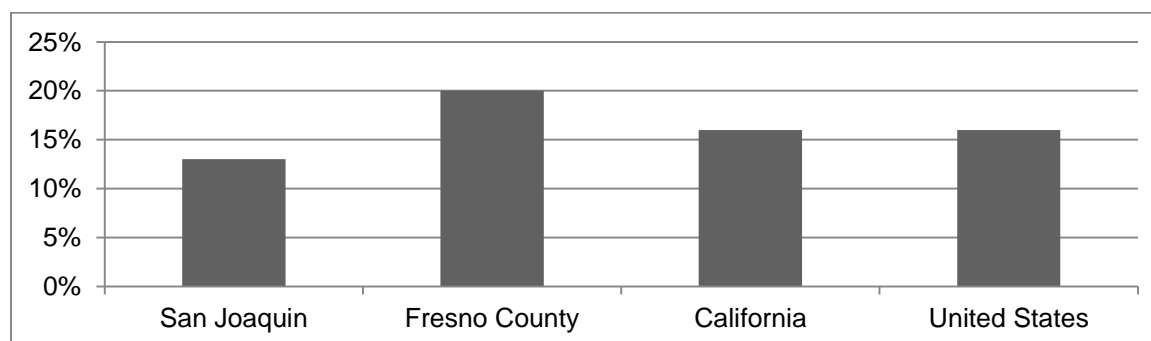


Source: Census 2000 SF3 Table H26 and SF1 Table P26.

### Single Parent Households

As of 2000, a total of 81 householders were unmarried and responsible for children under age 18 in the home. The City had a lower rate (13 percent) of single-parent households than Fresno County or the State. Figure 6-14 depicts the single-parent rate in the City as compared to surrounding geographic regions.

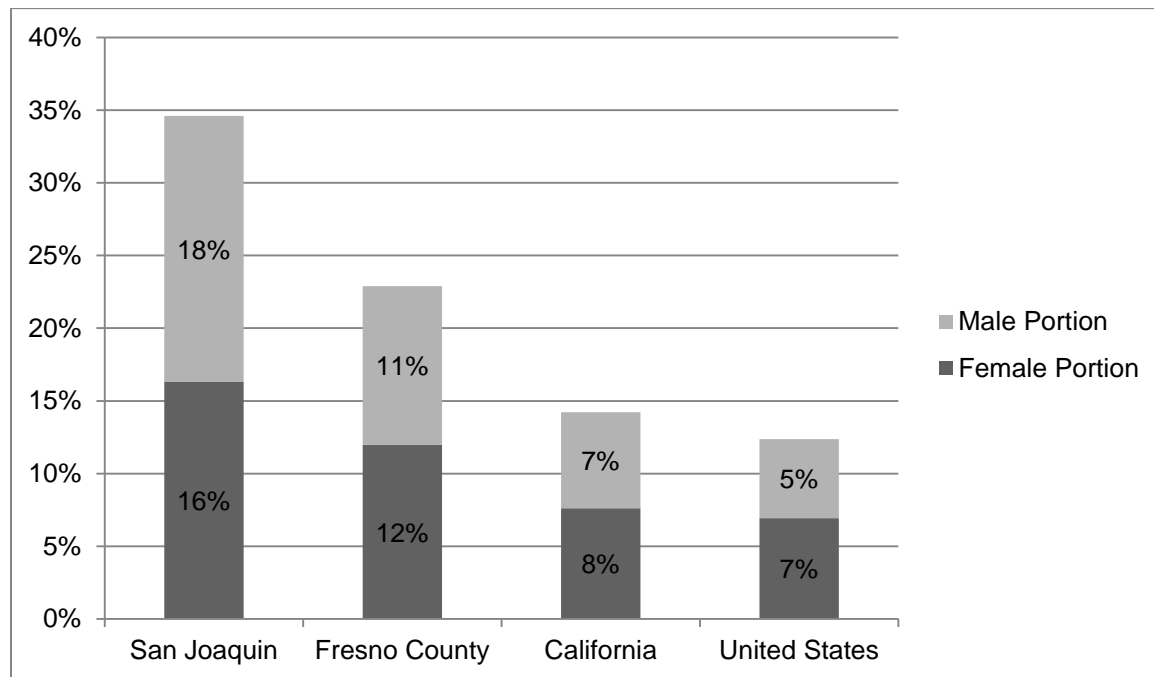
*Figure 6-13. Single Parent Families with Children*



Source: Census 2000 SF3 Table P12



Figure 6-14. Percent of Population Below Poverty Line



Source: Census 2000 SF3 Table PCT49

### Households Below Poverty Threshold

According to the U.S. Census, the median income for a family of four in the City in 1999 was \$24,934. For the same year, the federal poverty threshold, as defined by the U.S. Census, was \$17,029 for a family of four (U.S. Census, 2003). Figure 6-15 shows the percentage of the population living below the poverty threshold in 2000, in the City and surrounding regions. At 34 percent, The City's poverty rate is notably higher than the other geographical regions.

### Farmworkers

As of 2008, the largest employment sector for City residents was the Farming/Fishing/Forestry Industry, representing approximately 42% of City residents' employment (Housing Element 2008-2014). According to the Housing Element 2008-2014, migrant farm workers have difficulty accessing temporary and affordable housing. The element proposes a zoning ordinance amendment to permit and encourage development of farm worker housing on agriculturally zoned land. It is unclear whether the City has adopted this amendment.

### Homeless Persons

According to the Housing Element 2008-2014, there are virtually zero individuals living without shelter on any given night in the City. This is attributed in part to the geographic isolation of the City, which is surrounded by agricultural land and underserved by transit. Services for the

homeless, the hungry and job training are provided by County social service agencies and privately by Catholic Charities. With the recent decline in the local and regional economies and the high unemployment rate in the City, it is possible that the population in need has grown.

While the City has no group quarters, Fresno County offers assistance to families that are at risk of homelessness (Fresno County). These programs include the Homeless Prevention & Rapid Re-Housing Program (HPRP), funded by the American Recovery and Reinvestment Act and the Homeless Assistance Program for eligible families, both located in the City of Fresno.

### 6.3. Emerging Directions

The needs assessment and community members' comments offer insight into the emerging directions for the City's planning needs. With relatively high population of low-income households, a mismatch between housing unit sizes and household sizes, and identified needs to improve maintenance and quality of housing stock, the following is a preliminary outline of the City's primary housing needs:

#### **Development of Larger Units for Lowest Income Levels**

The needs assessment of the City's population and housing reveals three primary issues:

1. Prevalence of low income households;
2. Prevalence of large family sizes; and
3. Relatively low supply of units with appropriate number of bedrooms.

These existing conditions indicate a need for large (five or more bedroom) units that are affordable to extremely low- and low-income households in the City.

In November 2010, an economic survey was administered to 41 City residents. The economic survey addressed topics such as employment, amenities and housing. The housing questions gathered information about housing unit sizes in relation to household size. While several respondents provided incomplete information for the housing questions, the 24 responses gathered were consistent with the Census data findings on overcrowding. Fifty-eight percent of respondents had overcrowding, with a person-to-room ratio of more than 1.0. Seventeen percent of surveyed households were severely overcrowded, with a person-to-room ratio of more than 1.5. These findings are consistent with the 2000 Census data.

#### **Development of Housing to Attract High-Income Residents**

During the first community workshop, City staff and civic leaders indicated an economic development goal of attracting moderate- and above moderate-income households to the City. One obstacle identified for this goal was the absence of appropriate housing stock for higher income households. While moderate and above-moderate income units have been provided, as indicated by Table 6-1, it remains unclear whether these units are appropriately designed to attract higher-income new residents to the City. Further investigation of moderate housing demand and market competitiveness would help indicate what types of housing are needed to accomplish the goal of attracting above-moderate households to relocate to the City.

### **Address Maintenance of Rental Units**

At the first community workshop, community input included concerns regarding poor maintenance of rental units in particular. Community members also indicated that future sites of housing developments should be located with concern for residents who do not own cars and require housing that is located within walking distance of amenities.

At the second community meeting, informal conversations with attendees revealed systemic and management problems with the maintenance and livability of subsidized units, especially the Section 8 Housing located on California between 6<sup>th</sup> Street and 8<sup>th</sup> Street. One resident reported that the management forced her to pay for plumbing repairs that were not her responsibility. This resident reported that rehabilitation had been started on some units, but stopped without explanation. The air conditioning units are reportedly broken and unreliable, and the property's community building with air conditioning is no longer available to residents, making the housing unlivable during the hottest months of the year. This input indicates a need for improved housing programs to address code enforcement and financial aid for housing maintenance.

## **6.4. References**

Cal Poly – SLO. (October 2010). 2010 Land Use Survey.

City of San Joaquin. (March 2003). City of San Joaquin Housing Element March 2003.

City of San Joaquin. (September 2009). Housing Element 2008-2014 of the General Plan.  
Retrieved via email from City staff

Office of Planning and Research. 2003. General Plan Guidelines. Retrieved on October 7, 2010, from [http://www.opr.ca.gov/planning/publications/General\\_Plan\\_Guidelines\\_2003.pdf](http://www.opr.ca.gov/planning/publications/General_Plan_Guidelines_2003.pdf)

Housing & Community Development. 2010. Building Blocks for Effective Housing Elements.  
Retrieved on November 9, 2010, from [http://www.hcd.ca.gov/hpd/housing\\_element/](http://www.hcd.ca.gov/hpd/housing_element/)

State of California, Department of Finance. (May 2010). E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Retrieved on November 17, 2010, from <http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2001-10/>

U.S. Census Bureau. 2000. 2000 Census of Population and Housing. Retrieved on October 17, 2010, from <http://factfinder.census.gov/servlet/BasicFactsServlet>

U.S. Census Bureau. 2003. Poverty: 1999; Census 2000 Brief. Retrieved on November 10, 2010, from <http://www.census.gov/prod/2003pubs/c2kbr-19.pdf>

# 7. PUBLIC FACILITIES AND SERVICES

---

## 7.1. Introduction

Public facilities and services provide much of the physical and virtual foundation upon which a community evolves. A functioning and capable physical infrastructure is a critical prerequisite for development and growth of a City and effective public services are crucial to providing a high quality of life for residents, as well as an attractive environment for ongoing economic development and prosperity.

The overall goal of the Public Facilities and Services Element is to provide a basis and orientation for City policy and program development over the lifespan of the General Plan. Ultimately, the general policies and needs identification included in the Public Facilities and Services element should positively contribute to neighborhood function, quality of life and the community's fundamental identity. The Public Facilities and Services element is an optional component of a general plan, according to General Plan Guidelines (2003) published by the State of California Governor's Office of Planning and Research (OPR).

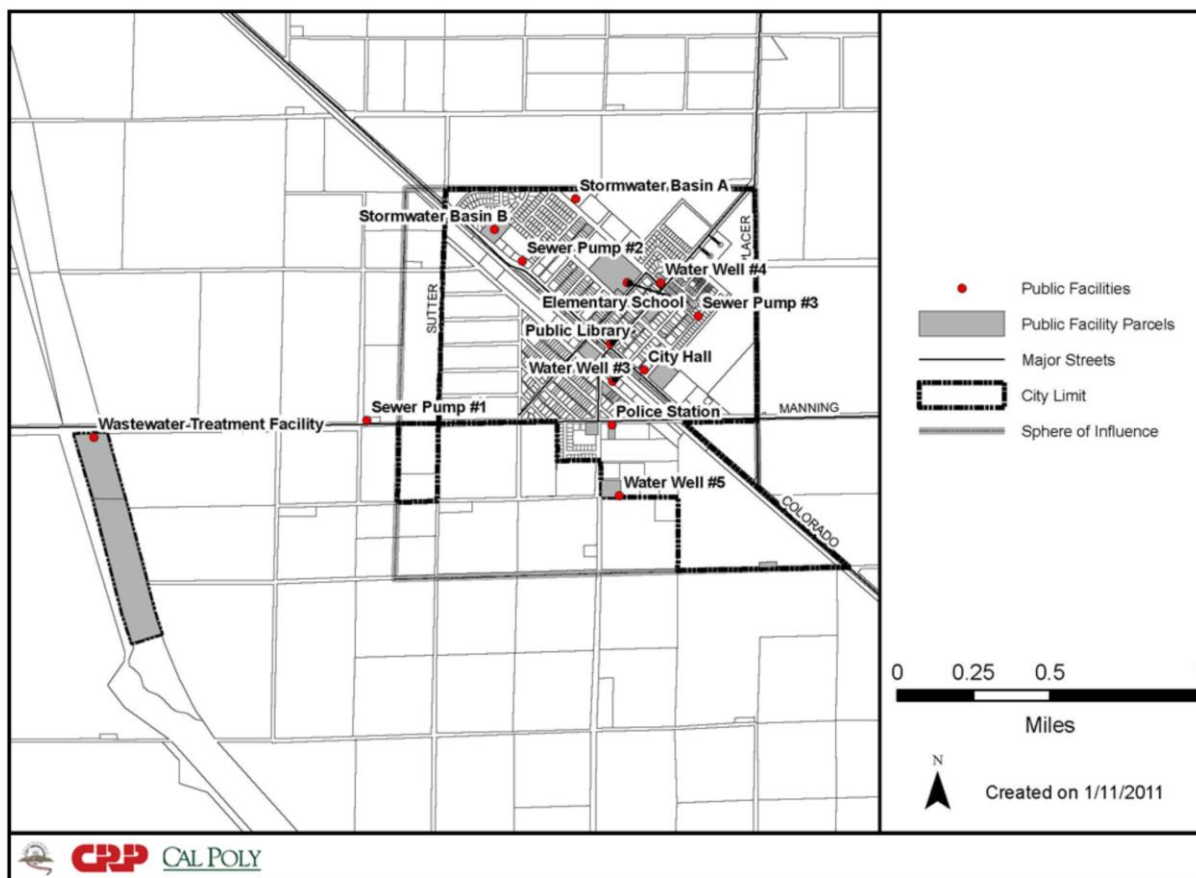
OPR guidelines recommend that Public Facilities and Services elements include an evaluation of current and future capacities of a wide variety of public infrastructure and support programs crucial to the City's overall function and healthy growth. These analyses should consider other General Plan element findings, particularly those discussing projected changes in population, land uses and development intensity, but also including community design, conservation and recreation, among others. The analysis should include consultation with service providers, analysis of equitable distribution of facilities and services and identification of potential implementation funding sources.

In this chapter, eight types of public facilities and services are analyzed individually: water, wastewater, stormwater, solid waste, police services, fire protection, public schools and public libraries.

## 7.2. Existing Conditions

This section addresses each type of public facility and service, including analysis of current capacities and their adequacy to address projected future demands. For each type, current conditions are evaluated against prevailing standards and projected uses based on expected growth and development patterns. This evaluation is combined with community input to identify recommendations and suggestions for the future in section 7.3. Figure 7-1 shows the location of all public facilities discussed in the following sections.

Figure 7-1. Locations of all public facilities within or operated by the City.



### 7.2.1. Water

The City of San Joaquin utilizes pumped water from subterranean groundwater aquifers for its entire water supply. The City does not purchase water from other sources or purveyors. The groundwater supply serves all users within the City, including residential, commercial, industrial and irrigation uses. Surrounding agricultural users outside the City also utilize groundwater for irrigation purposes.

The City's current Water Master Plan was adopted in 1995, outlining anticipated improvements to the City's water infrastructure to accommodate expected demand growth through 2020. The Plan focuses on infrastructure needs throughout the City's sphere of influence, in addition to areas within City limits.

Table 7-1. City Groundwater Pump Facilities

Well #	Location	Year Built	Design Discharge (gpm)	Current Status
3	City Corporation Yard	1968	1,200	In production
4	Main & California Streets	1978	1,200	Not in production
5	Cherry & Colusa Streets	2003	1,100	In production
Note: Wells 1 and 2 have been abandoned.				

### Water Infrastructure

The City currently has three groundwater pump stations as listed in Table 7-1, with a theoretical pumping capacity of 3,500 gallons per minute (gpm) (Yamabe & Horn Engineering, Inc., 2008). One of these wells, Well #4, is currently offline due to suspected *Escherichia coli* bacterial contamination, resulting in an operational capacity of 2,300 gpm as of October 2010. Each well is equipped with a 150 horsepower electrical pump. Two of the three wells are equipped with emergency backup generators to maintain capacity in the event of an electrical power failure, but the City has no water storage capacity (G. Horn, personal communication, October 8, 2010). The City's Water Master Plan includes a total of six wells at full build-out.

On average, groundwater well facilities have a design life of 20 years, although the pump mechanisms, motors and shafts will require more frequent replacement. Based on this standard, two of the three in-production wells have exceeded their design life and will require replacement in the near-term. The City has included construction of a new well in the 2008 Capital Improvement Plan (CIP), although funding for this new well or for anticipated maintenance of existing wells has not been identified (Yamabe & Horn Engineering, Inc., 2008). The City is also seeking grant funding to repair or replace Well #4.

Water from the City's three active wells is routinely tested in accordance with the requirements of California Code of Regulations (CCR) §64449 and §64819 (California Department of Public Health [CDPH], 2010). Pumped groundwater is chlorinated prior to distribution, but requires no other pretreatment action to meet minimum water quality requirements. Fluoride is not added.

### Water Consumption

In 2009, the City consumed 0.705 million gallons of water per day (mgd), or approximately 489 gallons per minute (gpm). This translates to a usage rate of approximately 169 gallons per capita per day (gpcd), slightly lower than the City's five-year average usage rate of 175 gallons per capita per day. This compares quite favorably to per-capita water use rates elsewhere in the region. The City has recently implemented a Water Conservation Plan to reduce its water consumption, discussed in more detail in Chapter 8, Conservation.

Most residences and businesses served by the City water system are unmetered, preventing specific analysis of water consumption for different land uses. The City anticipates retrofitting its system with individual water meters by 2020, in advance of state requirements mandating water metering set to take effect in 2025.

Without meters in place, water consumption data are based upon readings from flow meters installed on each pump, recorded each workday by City Public Works staff. Engineers under contract to the City then analyze these data annually to identify trends and refine future demand projections. These data can be unreliable due to equipment failure – water will continue to flow from a pump if its metering system is inoperative. Data fluctuations due to equipment failure have been periodically observed in practice.

### **Demand Forecasts**

Water demand forecasts are modeled upon per capita use projections combined with linear population forecasts, with the rates of population growth and per capita consumption based upon historic trends. The current annual growth rate used in City projections is 2.60%, slightly lower than the growth rate utilized for long-term projections in the City's 1995 Water Master Plan, which assumed growth at 2.80%. The current annual consumption rate is assumed to be 175 gpcd.

After estimating base average daily consumption for the system as a whole in terms of gallons per day, engineers then calculate a number of flow rate projections, each in terms of gallons per minute:

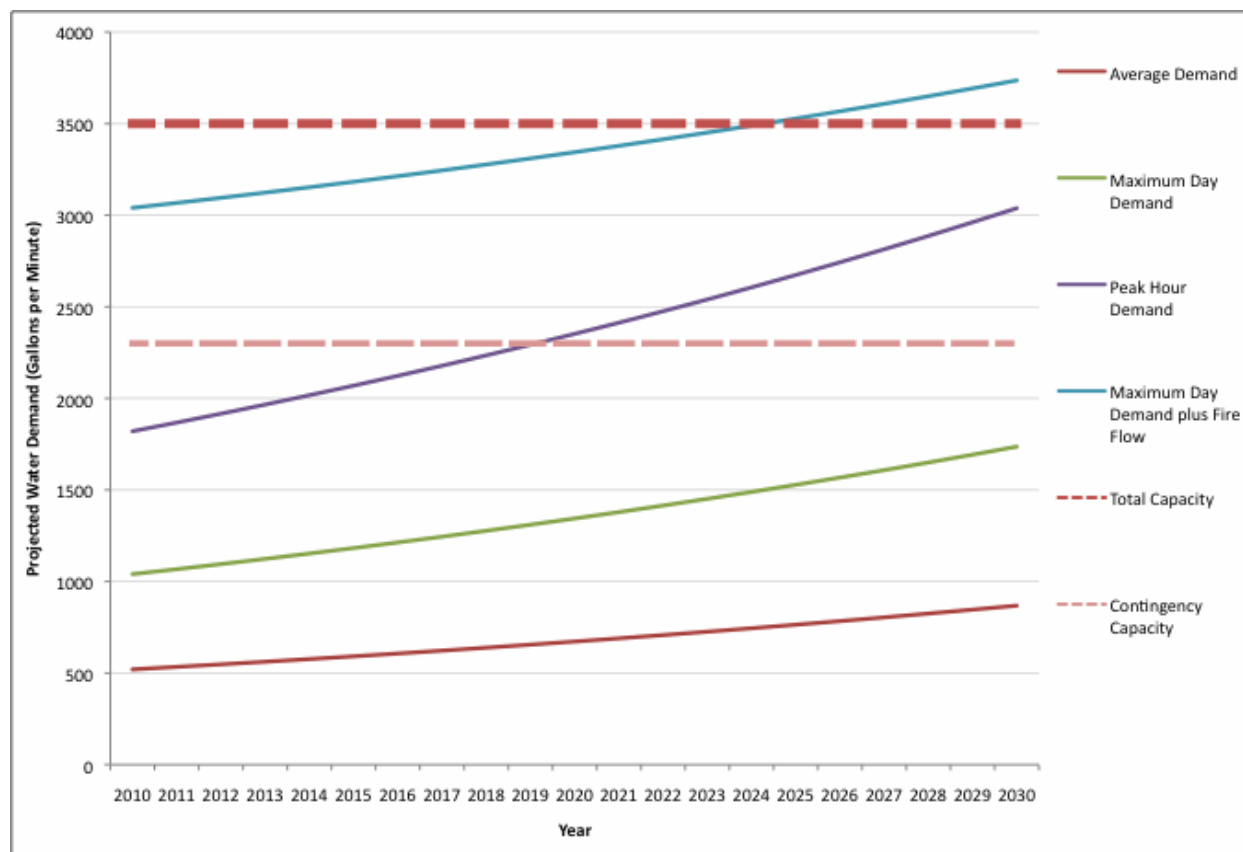
- Average Demand, by converting total gallons per day into gallons per minute;
- Maximum Day Demand, by applying a standard peaking factor of 2.0 to the Average Demand;
- Peak Hour Demand, by applying a standard peaking factor of 3.5 to the Average Demand; and,
- Maximum Day Demand plus Fire Flow, by adding an assumed flow rate to the Maximum Day Demand. The assumed rate is the flow necessary to maintain firefighting flows at a residual pressure of 20 pounds per square inch (psi). The current Fire Flow rate assumption in San Joaquin is 2,000 gpm.

These rates are calculated for each year of the demand projection; then compared to system pumping capacity to assess overall water supply adequacy for the City. Supply capacity should meet all of these projected flows with one pump out of service (usually assumed to be the largest capacity pump). Industry standards allow for storage capacity to be considered in these evaluations, which the City currently lacks.

Figure 7-2 charts demand rate forecasts for the City from 2010 to 2030. Assumed population growth rates and per-capita water use rates are those used by City engineers: 2.60% annual growth and 175 gpcd, respectively. Total capacity levels assume that all pumps are operational; contingency levels assume that one of the two largest pumps is out of service. These projections assume no change in the City's pumping capacity and do not include potential water use reductions resulting from conservation measures.



Figure 7-2. Forecasted Water Demand vs. System Capacity



Based on these projections, a number of conclusions can be made about the City's water system capacity both at present and in the future. Although current contingency capacity is expected to handle average and maximum day demands through 2030, the City cannot accommodate maximum day demands plus fire flow at the present contingency capacity. Fire flow demand will exceed total capacity by 2025. Peak hour demand will exceed contingency capacity beginning in 2020.

It is important to note that the City is already at the contingency capacity level due to the status of Pump #4, discussed earlier. This condition is expected to persist until grant funding can be secured to repair the pump. These projections highlight the importance of both restoring the capacity of Pump #4 in the near term, as well as adding additional storage and/or pump capacity within the next 15 years.

It is also worth noting that the total available water volume, draft rates and recharge rates of the groundwater supply have not been established. Total annual City water use is projected to increase nearly 67% by 2030, from approximately 273 million gallons today to over 456 million gallons in 2030. Thus, the City should consider working with regional partners to better



understand the capacity of the subterranean aquifers upon which it is totally dependent and identify potential options for alternative water sources in the event that demand exceeds supply.

### 7.2.2. Wastewater

Wastewater is generally defined as liquid waste originating from residential, commercial and industrial users accommodated by the City's sanitary sewer system. The City maintains separate sanitary and stormwater sewer systems, although some runoff does enter the sanitary sewer system. Stormwater management is discussed in a separate section later in this chapter.

The City's current Sewer Master Plan was adopted in 1995, outlining anticipated improvements to the City's water infrastructure to accommodate expected demand growth through 2020. The Plan focuses on infrastructure needs throughout the City's sphere of influence, in addition to areas within City limits. The City adopted a Sewer System Management Plan in 2008 pursuant to more recent requirements enacted by the California State Water Resources Control Board (SWRCB).

#### **Wastewater Generation Rates and Forecasts**

In 2009, the City generated approximately 121 million gallons of wastewater, averaging 0.332 million gallons per day (mgd). Over the past 10 years, wastewater generation has fluctuated, averaging between 0.212 and 0.376 mgd. Per-capita wastewater generation for the past five years has averaged 81 gallons per capita per day.

In general, wastewater systems are not metered at the individual user level. To calculate wastewater production, flow meter readings are recorded each workday by City staff. These data are analyzed annually by engineers under contract to the City to refine demand estimates and assess capacity. Sewage flow meters are more accurate than water pump flow meters: the design of sewage flow meters precludes unmetered flow in the event of an equipment malfunction.

Like water demand forecasts, wastewater generation forecasts are based upon linear population growth models using historical data to identify an assumed growth rate, most often identical to the growth rate used in water demand forecasting. Peaking factors in wastewater generation forecasts are handled differently from water demand forecasting, however; the application of peaking factors does not result in increased system flow estimates, but are instead realized in estimates of flow rates in individual collection lines.

Wastewater generation forecasts for San Joaquin are shown in Table 7-2 for five-year intervals. These forecasts indicate that wastewater generation will increase at a rate similar to water consumption, approximately 67% between 2010 and 2030. Total wastewater volume in 2030 is projected to be approximately 211 million gallons annually, or 0.578 million gallons per day.

*Table 7-2. Wastewater Generation Forecasts, Five-Year Intervals*

Year	Annual Generation (mg)	Average Daily Flow (mgd)
2010	126.42	0.346
2015	143.72	0.394
2020	163.35	0.448
2025	185.67	0.509
2030	211.01	0.578

### **Wastewater Treatment Facilities and Capacity**

The City owns and operates a wastewater treatment facility serving all City users, located on Springfield Avenue approximately 1.5 miles southwest of the City. Constructed in 1975, the present facility is designed to accommodate both primary and secondary treatment processes. Primary treatment utilizes sedimentation tanks where sludge is allowed to settle and collect on the tank bottom while greases and oils rise to the top and can be skimmed off. Secondary treatment mitigates the biological content of sewage, usually through aerobic biological processes. The resulting treated effluent is then pumped into unlined disposal ponds for reabsorption. The current facility contains 13.5 acres of disposal ponds. These treatment processes are consistent with standards in effect at the time of the plant's original construction.

The design capacity of the current facility is 0.25 mgd; current wastewater generation rates exceed this capacity by nearly one-third. Due to capacity constraints, the SWRCB adopted a Cease and Desist Order in 2002 compelling the City to expand its treatment facility. Funding for this expansion has been recently secured and the project is proceeding toward construction. Upon completion, the expanded plant will accommodate 0.5 mgd. The expansion project will also improve secondary treatment capabilities to bring the plant into compliance with current treatment standards. Additional disposal ponds will also be constructed. Despite the newly-added capacity, wastewater generation projections indicate that the expanded plant will once again reach capacity by 2025.

Despite the mismatch between the capacity and current flow of the wastewater treatment facility, the City has not experienced sanitary sewer overflows (SSOs) or spills as a result. Spills that have occurred have been largely due to localized problems expected to result in the normal course of wastewater collection and treatment operations. In 2006, the California State Water Resources Control Board enacted regulations that mandate reporting of all SSOs by sanitary sewer system operators using an online data collection system (California State Water Resources Control Board, 2010). The City participates in this system.

In addition to the wastewater treatment facility expansion, the City has also investigated on-site pre-treatment options for anticipated industrial expansion sites, both in an effort to preserve plant capacity and as a means of mitigating impacts from fats, oils and grease (FOG) in municipal sewage. High levels of FOG in sewage can reduce the effectiveness of primary and secondary treatment processes, and SWRCB standards require municipalities to evaluate and mitigate significant impacts from FOG sources. On-site pre-treatment is an effective FOG

control method in some cases. The City also educates users about the proper disposal of these contaminants and has enacted ordinances banning the disposal of FOG materials in the sanitary sewer system.

### **Collection Infrastructure**

Wastewater is collected from users through a series of sewer pipes and mains distributed throughout the City. The collection system also utilizes three lift stations to move sewage toward the treatment facility, each consisting of two electric pumps. One of these lift stations is identified in the 2008 Capital Improvement Plan for rehabilitation and upgrade. The oldest pump in the system is approximately 12 years old.

Sewer mains must be carefully engineered and constructed to ensure enough slope to facilitate sewage flows using gravity. Some mains within the City's sewer system are not adequately sloped, and as a result, may require additional maintenance by City public works crews to ensure adequate function. In peak flows, these mains could also become overloaded. The sewer main underneath Colorado Avenue is most likely to exhibit these issues. The City has identified one sewer main replacement project, along Ninth Avenue, in its 2008 Capital Improvement Plan.

### **7.2.3. Stormwater**

Stormwater consists of unabsorbed runoff from rainfall, collected through a series of gutters, pipes and retention basins separate from the sanitary sewer system. The City's current Storm Drainage Master Plan was adopted in 1995 and focuses on stormwater infrastructure within City limits and the City's sphere of influence.

Adequate stormwater capacity is critical to preventing flooding within the City following rainfall events. Stormwater facilities are typically designed to accommodate rainfall rates based on observed local weather patterns. These observations inform design criteria for stormwater collection pipes and retention basins. Stormwater collection pipes are typically sized to handle storms with a 50 percent chance of occurrence in any given year. Retention basins are generally sized to accommodate runoff from very large storms with just a one percent chance of occurrence in any given year (often referred to as a 100-year storm).

This method rationalizes investment in stormwater infrastructure while providing adequate protection for unexpected or uncommon large storm events. Although retention basins may appear to be oversized in comparison to collection pipes, this is an intentional design decision. Stormwater retention basins are often interconnected to provide redundancy in the system, but this interconnection also means that if one basin overflows, it can overwhelm other basins and cause the entire system to fail. Smaller collection pipes could result in localized, temporary flooding during very large storm events, but this also ensures that drainage will continue to be effective as water is evenly distributed to basins.

The City's Storm Drainage Master Plan divides the City and sphere of influence into seven geographic zones; of these, four are currently developed. These zones are served by two

retention basins (Basins A and B) and a temporary basin in the City's industrial park. Basin A is designed to handle a 10-year storm, while Basin B can accommodate a 100-year storm. To mitigate localized flooding that could result from the lower capacity in Basin A, a temporary pump has been installed to pump water from the basin into an adjacent irrigation canal operated by the Jones Irrigation District. The City does not actively measure the volume of stormwater entering its basins, nor does it monitor the amount of stormwater pumped into irrigation canals.

The City has included installing a permanent pump in Basin A as a project in the 2008 Capital Improvement Plan. The City has also purchased land for a new permanent basin located on Colorado Avenue north of Fifth Street, to be developed as future development proceeds in the area. Both of the current basins are in generally good repair, although some weed mitigation work is required in Basin A.

#### 7.2.4. Solid Waste

Two statutes guide the evaluation of solid waste stream and recycling diversion performance for California jurisdictions: the Integrated Waste Management Act of 1989 (Assembly Bill 939) and Senate Bill 1016 of 2008. AB 939 required cities to achieve a 50 percent waste diversion rate by 2006. Diversion rate is defined as the share of generated waste that is not disposed in landfill facilities, and is instead recycled or otherwise mitigated. The City successfully met the 2006 mandate: between 1995 and 2006, the diversion rate in San Joaquin rose from 22 percent to 51 percent (California Department of Resources, Recycling, and Recovery [CalRecycle], 2010).

SB 1016 overhauled standards to focus on individual waste generation rather than on aggregate waste stream diversion rates for an entire City. Beginning with analysis of 2007 data, Cities are evaluated on a per-capita disposal rate basis, defined as the amount of landfill waste generated by the municipality divided by the current population. CalRecycle sets per-capita targets for each jurisdiction annually.

In 2008, the City sent a total of 2,071 tons of waste to the landfill, resulting in a per-capita disposal rate of 2.8 pounds per person per day (ppd) and meeting target rates of 2.9 ppd set by CalRecycle. The City's per-capita disposal rate is much lower than the statewide average of 4.5 ppd and is the lowest of any jurisdiction within Fresno County. The countywide average per-capita disposal rate in 2008 was 5.9 ppd.

Undiverted landfill waste is sent to the American Avenue Landfill, located approximately 6 miles to the northeast of the City in unincorporated Fresno County. The landfill opened in 1971 and is operated by Fresno County. The facility is permitted to receive up to 2,200 tons of waste per day and as of 2005, approximately 90 percent of the facility's ultimate capacity remained. The facility is expected to continue operation through at least 2031.

Refuse collection services are provided to residential, commercial and industrial users by a private carrier under contract with the City. A variety of waste reduction programs are available to City residents, including residential curbside recycling and organic material collection, composting facilities, commercial on-site recyclables pickup, school recycling programs, public

outreach and education efforts, government and commercial source reduction programs and special or hazardous waste handling programs.

### 7.2.5. Police Services

Law enforcement services within the City are provided by the Fresno County Sheriff's Office under contract to the City. The Sheriff maintains its Area 1 Patrol Station within the City. In addition to providing police services for San Joaquin, this station covers more than 2,400 square miles of western Fresno County. Services available at this station include patrol and detective services, crime prevention, youth services and community policing initiatives (Fresno County Sheriff's Office, n.d.).

Currently, the contract provides 10 hours of police protection each day, equating to a staffing level of approximately 0.8 full-time equivalent officers. As a result, the officer-to-resident ratio within the city is 0.22 officers per 1,000 residents, much lower than the countywide ratio of 0.9 officers per 1,000 residents and the regional ratio of 0.74 officers per 1,000 residents for cities in the Western United States with fewer than 10,000 residents (Federal Bureau of Investigation [FBI], 2010).

Uniform crime rate statistics published by the Federal Bureau of Investigation include city-specific crime rate only for jurisdictions with their own police or law enforcement agency. Thus, specific crime rate data for the City are not available. Anecdotally, City residents and staff report very little crime within the City. Overall crime rates within the County are much higher than national averages, however (FBI, 2010), as shown in Table 7-3.

The City participates in the Fresno Countywide Gang Protection Council (FCGPC), a regional consortium that coordinates gang activity response, prevention, and awareness efforts throughout Fresno County. Unofficial statistics published by FCGPC indicate that there are "validated gang members" known to reside in the City. In San Joaquin, gang crime enforcement efforts are led by the Fresno County Sheriff Department under the terms of the intergovernmental agreement for police services discussed earlier (Fresno Countywide Gang Protection Council, 2007).

*Table 7-3. Crime Rate Statistics, 2009*

Area	Violent Crimes per 100,000 residents <sup>1</sup>	Property Crimes per 100,000 residents <sup>2</sup>
Fresno County (Excluding City of Fresno) <sup>3</sup>	402.7	3,229.1
National (Nonmetropolitan Counties)	206.6	1,640.2
Notes: 1: Includes murder, nonnegligent manslaughter, forcible rape, robbery and aggravated assault. 2: Includes burglary, larceny/theft and motor vehicle theft. 3: Calculated by subtracting City of Fresno population and number of reported crimes from countywide data, and then calculating rates per 100,000 residents from the remainders.		

Source: Federal Bureau of Investigation. *Crime in the United States (2009). Table 18.*

### 7.2.6. Fire Protection

The Fresno County Fire Protection District provides firefighting, emergency medical service and rescue services in San Joaquin. The City does not have its own fire station – the nearest station, District Station 95, is located in Tranquility, approximately 4 miles to the northwest of the City. This station is staffed with a combination of full-time and paid-call firefighting staff. Reserve firefighters are also available through a mutual aid agreement with the California Department of Forestry and Fire Protection (CAL FIRE).

District firefighters respond to fire calls in an average time of 13.9 minutes (Fresno County Fire Protection District, 2008), compared to national standard target response times of five minutes for 90% of calls. The rural nature of the District and distances covered by each station precludes answering most calls within the five minute standard. Although the City is closer to its nearest fire station than many other rural areas within Fresno County, it is unlikely that the five minute standard can reasonably be met in 90% of calls due simply to the distances involved.

Structures within the City generally receive a rating of six on Insurance Services Office (ISO) Fire Protection Rating Scale. The ISO scale evaluates the relative fire risk of a particular location on a scale of one to 10, one representing the best rating, taking a number of characteristics into account. These include the distance to the nearest firefighting services, available firefighting water supply, ratio of engine companies to population and land size and firefighter personnel capabilities and training (Insurance Services Office, Inc., 2010). As a risk assessment tool, ISO ratings have a direct impact on total insurance costs for residential and commercial customers within the City. A downgrade of ISO ratings could materially increase the cost burden of fire insurance on citizens.

### 7.2.7. Public Schools

The Golden Plains Unified School District (GPUSD) provides public school services within the City. San Joaquin Elementary School is the only public school facility within City limits and



accommodates children in kindergarten through grade eight. High school grades nine through 12 are offered at Tranquility High School, located approximately four miles to the northwest of the City. No high school courses are offered by GPUSD within San Joaquin.

San Joaquin Elementary School is located on Ninth Street. The school was constructed in 1950 with a design capacity of 400 students. 808 students were enrolled for the 2008-09 school year, which is over double the design capacity of the facility and is the largest school within GPUSD. Enrollment has exceeded 800 students each year since the 1998-99 school year (California Department of Education [CDOE], n.d.). Temporary buildings have been placed on the school campus to address crowding. According to school report card data from 2007, the school building is in good condition, with a number of noted structural and environmental system repairs needed (Golden Plains Unified School District, 2008).

Both the elementary school and the district as a whole have repeatedly failed to meet Adequate Yearly Progress (AYP) standards set forth by the Federal No Child Left Behind (NCLB) Act. All public schools statewide are evaluated annually by the California Department of Education to assess compliance with NCLB provisions. San Joaquin Elementary School is currently designated as a Year 5 Program Improvement School (CDOE, 2010). Schools with Year 5 designations are required to take action to address their poor performance and risk mandated restructuring which can include complete staff replacement or state takeover of school operations (CDOE, 2009).

The current school facility is located in a relatively central portion of the City and is accessible on foot to many City residents. Standards for the optimum distance between residences and schools vary by age: in general, residences should be within one-quarter mile to a traditional elementary school (grades K-5) and one-half mile of a traditional middle school (grades 6-8). San Joaquin Elementary provides education for grade level K-8. Most residences meet these standards, but especially in the northwest and southwest areas of the City, some residences are one-quarter mile from the school facility. A few are more than one-half mile away. Distance standards for high school facilities do not apply in this case because the District offers bus transportation for students to the high school in Tranquility.

### **7.2.8. Public Libraries**

The Fresno County Public Library (FCPL) operates a branch location within San Joaquin. FCPL is a library services district comprised of a large central library facility in Fresno and 34 branch locations throughout the County. FCPL participates in a regional library consortium combining their resources with those in Kern, Kings, Madera, Mariposa, Merced and Tulare counties.

Public library services were first offered in the City in 1916. The current branch facility on Main Street was constructed by FCPL and opened in 1983. The library is open six days per week, but afternoon, evening and weekend hours are limited. The library is open until 7:00pm one day per week and 5:30pm three days per week, but is closed on Sundays.

Services offered at the branch library facility include Internet access, computer printers, photocopiers and fax machine access. Programs at the library include children's storytelling times, a student film festival, resources for seniors and the visually impaired, arts and crafts activities and nature education events.

## 7.3. Emerging Directions

Based on the discussion above and input received from community members and city staff, a number of emerging directions can be identified to ensure continued effectiveness of the City's public facilities and services. These directions fall into three main categories: infrastructure investments, facility investments and program enhancements. Each is discussed below.

### 7.3.1. Infrastructure Investments

A number of infrastructure investments and improvements are necessary to ensure that the City can accommodate future residential, commercial and industrial growth. These include:

- Expansion of the City's water pumping capacity to include restoration or replacement of Pump #4 and the addition of another similarly-sized pump to address future and peak demands;
- The addition of water storage capacity to address unforeseen equipment failures;
- Evaluation and potential replacement of aging well equipment;
- Replacement of sewer mains that have settled or do not have proper slope to ensure good function;
- Long-term planning for further treatment facility expansion once its capacity is reached in 2025; and
- Identification of current and future funding sources that minimize the amount of deferred maintenance and reduce the City's dependence on one-time revenue sources (like grants) to conduct routine operational and maintenance work.

### 7.3.2. Facility Investments

Community members strongly stated a preference to have high school services, in addition to other educational resources, within the City of San Joaquin. Adding these services is not likely to be possible with current facilities. Building an additional school facility to accommodate high school courses along with community college, job training and other community educational assets will be needed to address these needs.

The current condition and population of the existing school facility indicates its inadequacy in terms of capacity and its aging condition that will necessitate additional maintenance expense in the future. It would likely make the most sense for the City and GPUSD to examine replacing this facility with a new, larger facility that can serve as an educational and activity hub within the community.



### 7.3.3. Program Enhancements

Program enhancements play an important role in positioning a City to grow because these programs support the effective use of infrastructure and resources already in place. A number of program enhancements should be examined, based on the evaluation discussed above in tandem with community input:

- Police services should be expanded from their relatively low level to ensure that the City's low crime rate will persist as the City grows. Particular emphasis should be placed on addressing gang membership issues and quality of life issues such as animal enforcement and community policing; and
- Educational performance in local schools must be addressed and improved in order to sustain a healthy job base, which in turn supports future economic development. The City and GPUSD should partner to ensure that scarce resources are most effectively utilized to create a coordinated approach to improving academic achievement within the local school system.

## 7.4. References

California Department of Education. (2009). NCLB Program Improvement School Requirements. Retrieved from <http://www.cde.ca.gov/ta/ac/ti/nclbpireq.asp>

California Department of Education. (2010, October 14). Dataquest: 2009-10 Accountability Progress Reporting (APR), San Joaquin Elementary School. Retrieved from <http://dq.cde.ca.gov/dataquest/AcntRpt2010/2010APRSchPIReport.aspx?allcds=10752346007223>

California Department of Education. (n.d.). Dataquest: K-12 Public School Enrollment (Time Series), San Joaquin Elementary School. Retrieved from <http://dq.cde.ca.gov/dataquest/DQ/EnrTimeRptSch.aspx?cYear=2009-10&Level=School&cName=SAN+JOAQUIN+ELEMENTA&cCode=6007223&dCode=1075234>

California Department of Public Health [CDPH]. (2010, August 24). Drinking Water Monitoring Schedule, District 23 (Fresno). Retrieved from <http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Monitoringschedule/FresnoDistrict23.pdf>

California Department of Resources, Recycling, and Recovery [CalRecycle]. (2010). Jurisdiction Profile for City of San Joaquin. Retrieved from <http://www.calrecycle.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID=441&JUR=San+Joaquin>

California State Water Resources Control Board. (2010, September). Sanitary Sewer Overflow (SSO) Reduction Program. California Environmental Protection Agency. Retrieved from [http://www.waterboards.ca.gov/water\\_issues/programs/sso/](http://www.waterboards.ca.gov/water_issues/programs/sso/)

Federal Bureau of Investigation. (2010, September). Crime in the United States [Table 71]. U.S. Department of Justice. Retrieved from [http://www2.fbi.gov/ucr/cius2009/police/population\\_group.html](http://www2.fbi.gov/ucr/cius2009/police/population_group.html)

Fresno County Fire Protection District. (2008). Fresno County Fire Protection Plan: Strategic Plan for 2008-2012.

Fresno County Sheriff's Office. (n.d.). Patrol Bureau: Area 1. County of Fresno. Retrieved from <http://fresnosheriff.org/Sheriff/Bureaus/PatrolBureau.htm#Area1>

Fresno Countywide Gang Protection Council. (2007). Frequently Asked Questions. County of Fresno. Retrieved from <http://www.fcgpc.org/faq.htm>

Golden Plains Unified School District. (2008). School Accountability Report Card, School Year 2006-07: San Joaquin Elementary School.

Insurance Services Office, Inc. (2010). Fire Suppression Rating Schedule (FSRS). Retrieved from <http://www.iso.com/Products/Public-Protection-Classification-Service/Fire-Suppression-Rating-Schedule-FSRS-manual-for-PPC-grading.html>

Yamabe & Horn Engineering, Inc. (2008, October). Five-Year Capital Improvement Program. City of San Joaquin, California.



# 8. CONSERVATION

---

## 8.1. Introduction

As defined by the State of California, conservation is the planned management, preservation, and wise use of natural resources (Office of Planning Research [OPR], 2003). This chapter describes the existing conditions of natural resources of the City and the surrounding area. It also provides emerging directions for their conservation and development.

The natural resources described in this chapter include components of the environment such as water quality and supply, air quality, soil and wildlife. Additional components include water conservation, greenhouse gas inventory and reduction and a green building section. These components correspond to related State laws and pressing local issues.

The conservation chapter of the background report covers the following topics:

- Location
- Topography
- Climate
- Soil
- Minerals
- Biological Resources
- Water Conservation
- Energy Conservation
- Green Building
- Air Quality
- Greenhouse Gas Inventory

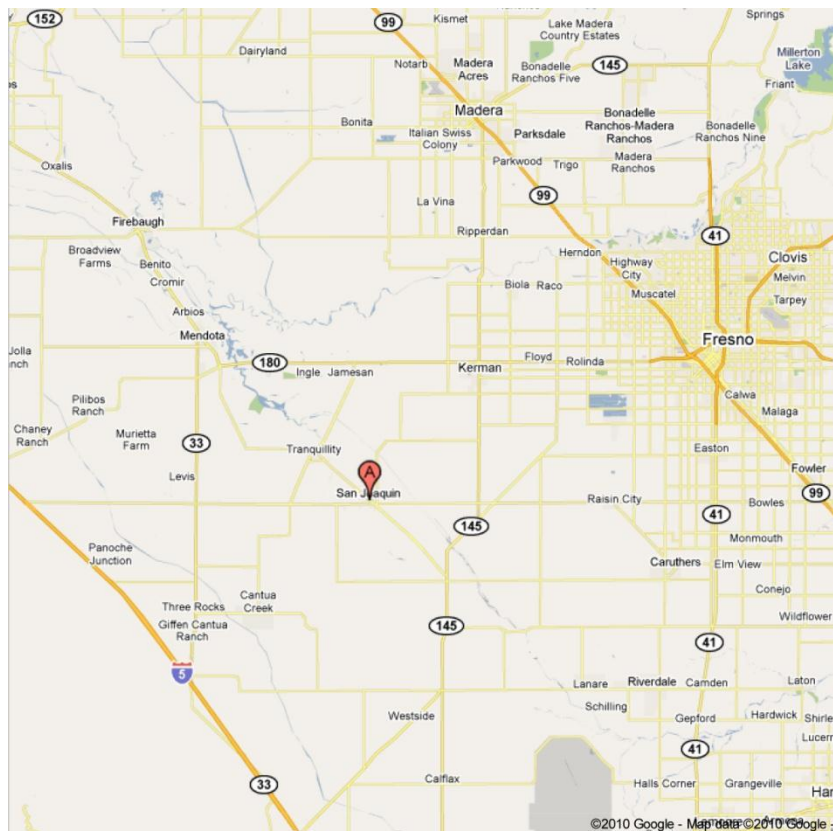
## 8.2. Traditional Components

### 8.2.1. Location

The City rests in the alluvial trough of the San Joaquin Valley surrounded by the Coastal mountain range to the west, the Sierra Nevada range to the east and the Tehachapi Mountains to the south. The City is located between the I-5 corridor and Highway 99. Figure 8-1 shows the location of the City in relationship to the rest of the region.

The City lies within the San Joaquin Valley Air Basin. Because of the surrounding mountain ranges, a bowl-like topography is created in the southern end of the San Joaquin Valley.

*Figure 8-1. Location Map.*



Source: Google Maps, 2010

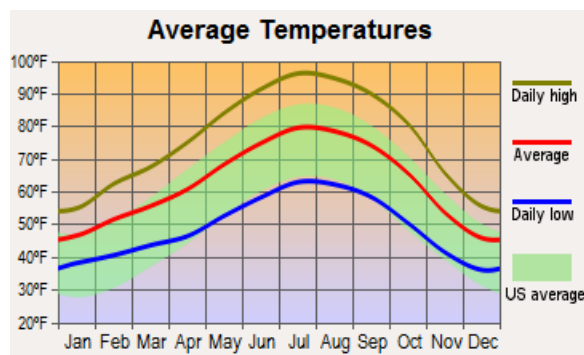
### 8.2.2. Topography

The topography of the land in the Upper Kings Basin and its subbasins is relatively flat. The landscape generally slopes westward and northward at an approximate rate of about three to four feet per mile with local variations caused by remnants of hydraulic channels. Elevations range from 160 to 180 feet above sea level. (Draft Joint Groundwater Management Plan 2010).

### 8.2.3. Climate

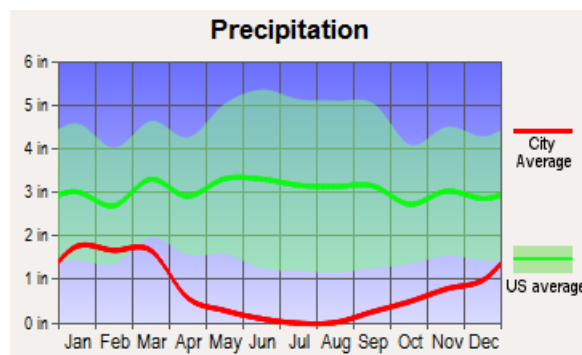
The City's climate is semi-arid. It is characterized by cool, mild winters and hot dry summers, typical of an "inland Mediterranean" climate. The region has a climate averaging over 260 sunny days per year. Average temperatures range from 82 °F in July to 46 °F in January (see Figure 8-2). Average high temperatures in the winter are in the 50s, but highs in the 30s and 40s can occur on days with persistent fog and low cloudiness. The average daily low temperature is 45 °F. Temperatures below freezing are unusual (SJVAPCD, 2005). The average annual precipitation is about seven inches and is indicated in Figure 8-3, with 80 percent of the rainfall occurring from December through April. Figure 8-4 shows that humidity ranges from 90 percent in the winter months to 60 percent in the summer.

Figure 8-2. Average Temperatures.



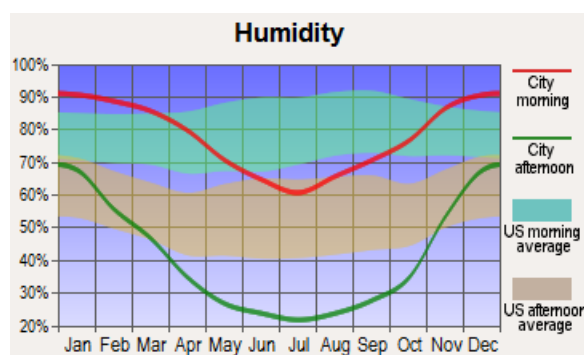
Source: City-Data.com, 2010

Figure 8-3. Precipitation.



Source: City-Data.com, 2010

Figure 8-4. Average Humidity.



Source: City-Data.com, 2010

Generally, precipitation in this region is not suitable to meet the water needs of crops. Crop water needs are met via irrigation systems during the summer. The growing season is typically 250 days per year (Draft Joint Groundwater Management Plan 2010).

During the summer, wind usually originates at the north end of the San Joaquin Valley and flows in a south-southeasterly direction through the San Joaquin Valley, through the Tehachapi pass, into the Southeast Desert Air Basin. During the winter, wind speed and direction usually originates from the south end of the Valley and flows in a north-northwesterly direction. Also during the winter months, the Valley experiences variable winds (less than 10 mph).

#### 8.2.4. Soil

Soil mapping distinguishes parts of the landscape that have different capacities of use and different management requirements. Soils provide stability for buildings and roads, and provide

Map Scale: 1:39,200 if printed on A size (9.5" x 11") sheet.

0 500 1,000 2,000 3,000 Meters

0 2,000 4,000 8,000 12,000 Feet

a growing medium and nutrients for plants. Certain soils are suitable for particular farming methods and crops, while some are better suited for development. Soils immediately surrounding the City consist of Merced Clay, Merced Clay Loam and Altaslough Clay Loam. The fertile clay loam soils allow for quality agricultural production (Natural Resources Conservation Service, 2010).

Most of the Mineral Claims within Fresno County are west of I-5 or in the eastern portion of the County in the foothills and into the Sierra Nevada Range. Minerals mined in the county include: barium, quartz, sand and gravel, fossil fuels, chromite, copper, gold, mercury and tungsten, granite, gypsum, diamite and limestone. Aggregate minerals (sand and gravel) and petroleum are considered Fresno County's most significant extractive resources.



## 8.3. Biological Resources

The following discussion provides an overview of the existing conditions of biological resources in Fresno County and the City of San Joaquin as of 2010, or as noted. It includes: a) a summary of federal and State regulations relating to biological resource conservation; b) identification of the types of plants and animals found in particular habitats; and c) a discussion of the protection and creation of natural communities, wetlands and wildlife corridors in the City.

### 8.3.1. Regulatory Framework

The regulatory setting for biodiversity protection, relevant to the City, is discussed below.

#### Federal Regulations

##### Clean Water Act – Section 404.

Section 404 of the federal Clean Water Act established a permit program to regulate the discharge of dredged or fill material into the waters of the United States, including wetlands. Activities in waters regulated under this program include fill for development, water resource projects, infrastructure development, and mining projects, unless the activity is exempt. Many normal agricultural practices are exempt (Environmental Protection Agency [EPA], 2010).

##### Federal Endangered Species Act (ESA).

The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitat in which they live. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses and trees. The law requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to risk the existence of any listed species or the destruction of designated critical habitat. The law also prohibits any action that causes a “taking” of any listed species of endangered fish or wildlife (EPA, 2010).

##### Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act.

The Migratory Bird Treaty Act provides that it is unlawful to “take” migratory birds, their eggs, feathers and nests. A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. The Bald and Golden Eagle Protection Act offers additional protection to all bald and golden eagles. The U.S. Fish and Wildlife Service enforces both acts and reviews federal agency actions that may affect such species (U.S. Fish and Wildlife Service, 2010).

#### State Regulations

##### California Fish and Game Code § 1601 – 1616.

California Fish and Game Code § 1601-1616 regulates the modification of streams, rivers and lakes. Modification is defined as diverting or obstructing the natural flow of, or substantially changing or using any material from the bed, channel, or bank of, any river, stream or lake.



#### California Endangered Species Act (CESA).

The California Department of Fish and Game (CDFG) administers the California Endangered Species Act of 1984, which regulates the listing and “take” of endangered and threatened species. The definition of “take” includes harassing, pursuing or harming a species. The CESA does not supersede the federal ESA; rather, it operates in conjunction with it. Species may be listed as threatened or endangered under one or both acts. A “take” may be permitted by CDFG through implementing a management agreement. Under the State laws, the CDFG is authorized to review projects for their potential impacts to listed species and their habitats.

The CDFG maintains lists for Candidate-Endangered Species and Candidate-Threatened Species. California also designates Species of Special Concern which are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value (California Department of Fish and Game, 2010).

#### Porter-Cologne Water Quality Control Act.

This act authorizes the Regional Water Quality Control Board (RWQCB) to regulate the discharge of waste that could affect the quality of the State’s waters. Projects that do not require a federal permit may still require review and approval by the RWQCB. The RWQCB ensures that projects do not adversely affect the “beneficial uses” associated with waters of the State. Beneficial uses typically include the use of water for drinking as well as plant and animal habitat. In most cases, RWQCB requires the integration of water quality control measures into projects that will require discharge into waters of the State. Most projects are required to implement Best Management Practices (BMPs) during construction phases (California Natural Resources Agency, 2002).

#### California Native Plant Society (CNPS).

CNPS is a non-governmental conservation organization that has developed lists of plants of special concern in California. A plant designated 1A on the CNPS list is a species, subspecies or variety that is considered to be extinct. A List 1B plant is considered rare, threatened or endangered in California and elsewhere. A List 2 plant is considered rare, threatened or endangered in California but is more common elsewhere. A List 3 plant is a species for which CNPS lacks necessary information to determine if it should be assigned to a list. A List 4 plant has a limited distribution in California. All of the plant species on List 1 and 2 meet the requirements of the CESA and Native Plant Protection Act and are eligible for State listing (California Native Plant Society, 2010).

### **8.3.2. Existing Conditions**

The following descriptions of the vegetation and wildlife habitat are primarily based on a review of pertinent literature and database queries.

#### **Biotic Region**

The City lies in the southern San Joaquin Valley sub-region of the Central Valley. This southern sub-region is generally hotter and dryer than the regions to the north. The valley floor has undergone extensive conversion of native habitats that existed before European settlement of

the State. At present, this region, including the City, supports a vast amount of agriculture and urban development.

In the few remaining areas not converted to urban or agriculture use, unique biological features exist. Mixed in with areas of grassland habitat are freshwater and alkaline vernal pools that support a unique flora and fauna. The rivers and streams originating from the mountains in the east historically flowed through broad floodplains. Because of urbanization and agriculture, these broad floodplains have been restricted to narrower belts along the rivers and streams. The San Joaquin River, the Kings River and the Fresno Slough are the major waterways in the County (County of Fresno, 2000).

### **Habitat Types**

Historically, the natural vegetation of the region was characterized by a diverse array of perennial bunchgrass ecosystems including prairies, oak-grass savannas, desert grasslands, as well as a mosaic of riparian woodlands, freshwater marshes and vernal pools. Perennial grasses that were adapted to cool-season growth dominated the habitats. Riparian forests once bordered many of the Valley's major rivers. Willows, Western Sycamore, Box Elder, Fremont Cottonwood, and the Valley Oak were dominant tree species (World Wildlife, 2001).

Presently, the City's habitat includes mostly annual/ruderal grassland, vernal pool, cropland, or urban (County of Fresno, 2000). Each of these is discussed in more detail below.

Annual/ruderal grassland habitat - consists largely of non-native annual plant species that have become naturalized and have effectively excluded the growth of native grass species. Annual/ruderal grassland habitat is found in open non-irrigated pastures along the edges of road and fields, vacant land areas and along fallow fields. Ruderal grassland exists in areas that have been affected by cut and fill construction activity such as levee or road maintenance. There is minimal annual grassland habitat in the City because most has been converted to cropland, orchards, vineyards or urban uses (County of Fresno, 2000).

Vernal pools habitat - temporary wetlands that form in shallow depressions in the ground. These depressions fill with rainwater during the fall and winter and can remain flooded until spring or early summer, sometimes filling and emptying during the wet season. A vernal pool is commonly found within annual grasslands, where the soil hardpan restricts water percolation allowing for the pool to become inundated. Specialized vertebrate species such as fairy shrimp, aquatic insects and amphibians such as frogs, toads and salamanders rely on these ponds for spawning. The presence of vernal pools in the City is minimal (County of Fresno, 2000).

Cropland habitat - is used for cultivation of annual or short-lived crops and is a dynamic landscape feature that is regularly altered or disturbed throughout the year. Cultivated vegetable, fruit and grain crops are grown on cropland in Fresno County and consist primarily of corn, cotton, or grapes in this part of the Valley. Native flora does not compete well in this habitat due to the weedy non-native annual and biennial plants. Croplands provide habitat for a variety of resident and migratory wildlife species. Areas of cropland that has not been

maintained and fallow lands are suitable habitat for wildlife for food and cover (County of Fresno, 2000).

Urban habitat - typically lacks native plants as it is replaced by ornamental trees and shrubs such as eucalyptus, pines, pyracantha and oleander. A rich population of mammals, reptiles and amphibians are underrepresented in urban landscapes but a variety of birds can be found in an urban setting. Rock doves, house sparrows, and European starlings comprised over 90 percent of the birds in an urban habitat. Outside of urban development, bird diversity increases (County of Fresno, 2000).

### **Agriculture**

More than a third of the land in the City is dedicated to agriculture. Croplands encompass the majority of the agricultural lands; vegetation includes a variety of sizes, shapes, and growing patterns. The vast amount of agricultural land in the City replaced native habitats and therefore has lowered habitat values than previous habitat. Despite the loss in habitat value, many species of rodents and birds have adapted to agricultural areas. Agriculture practices can also provide benefits to wildlife. Various raptors hunt in and around agricultural fields seasonally. Flooding of agricultural fields in the fall and winter may also provide habitat and foraging opportunities for waterfowl. Open irrigation ditches and canals could potentially provide movement corridors and foraging habitat for species. Agricultural habitat may provide food and water for species but it does not offer long-term shelter due to the frequency of disturbance.

### **Special-Status Species**

Special-status species are generally defined as those listed or designated as candidates for listing under the federal ESA or CESA, plant species listed on the CNPS Inventory of Rare and Endangered Plants, wildlife species protected by the CDFG, or species considered to be of special concern by local agencies. The California Natural Diversity Database (CNDDB) is a database of the status and location of rare plants and animals and is maintained by CDFG. The CNDDB is not an extensive list and plant communities that occur on a site are often not included in the CNDDB. The CNDDB Quick Viewer query for the San Joaquin quadrangle identifies two endangered species and one proposed threatened species. A complete list of the City's rare animal species is shown in Table 8-1.

Table 8-1. Rare Species of San Joaquin

Scientific Name	Common Name	Federal Status	California Status	DFG Status	CNPS List
Charadrius montanus	Mountain plover	Proposed threatened	None	SSC	--
Athene cunicularia	Burrowing owl	None	None	SSC	--
Dipodomys nitratoideis exilis	Fresno kangaroo rat	Endangered	Endangered	--	--
Layia munzii	Munz's tidy-tips	None	None	--	1B.2
Ardea alba	Great egret	None	None	--	--
Asio otus	Long-eared owl	None	None	SSC	--
Picoides albolarvatus	White-headed woodpecker	None	None	--	--
Toxostoma lecontei	Le Conte's thrasher	None	None	SSC	--
Vulpes macrotis mutica	San Joaquin kit fox	Endangered	Threatened	--	--

Source: California Department of Fish and Game, CNNDDB Quickview Data. Provides information to the 7.5 quadrangle level

### 8.3.3. Emerging Directions

As discussed earlier in this section, plant and animal life in the City is minimal due to the expansion of agricultural activity and urban development. The community has expressed the importance of additional trees in the City. The addition of trees and creation of open spaces in the City could potentially increase plant and animal life, specifically a greater variety of bird species, in the urban habitat.

## 8.4. Water Conservation

This section of the conservation element discusses water conservation in terms of both supply and water quality. This background material includes a description of the water conservation guidelines, a description of the water policy framework that the City must operate under followed by existing water conditions that includes hydrogeology, water supply and demand, and water quality. This section finishes with a discussion about emerging directions, which ultimately ties into the development of objectives and policies outlined in the City's General Plan Update.

Water is intimately linked to economic development, environmental quality, and general growth, and yet poses many planning challenges. The State of California has a population of 34 million people and contains approximately 9 million acres of irrigated agricultural land. In total the State

uses about 80 million acre-feet of water equaling approximately 192 gallons per person per day. For the last several years, the State has been attempting to address a multiple-year drought situation that has been amplified by a shortage of water supply and a growing population. Climate change is also exacerbating drought-like conditions and reducing snowpack in the Sierra Nevada range, which California heavily relies on for water supply.

The current drought conditions and growing number of people in the state are also resulting in reduced quality of ground and surface water, quality of ecosystems and impaired bodies of water. Spearheaded by the California Department of Water Resources, the State is attempting to address the many aspects that deal with the complicated issues associated with water quality and supply throughout the state. The City relies on groundwater for its water supply and therefore has a vested interest in protecting its water resources. The economic vitality of the region is rooted in agriculture, which depends on a consistent supply of high quality water supply.

Groundwater is part of the hydrologic cycle and snowpack plays an important role in groundwater levels. As surface water becomes scarcer, water purveyors utilize groundwater to supply the agricultural network, which may have an effect on the groundwater level. Increased droughts and demand on groundwater supply may affect the ability of the City to supply its residents with quality water supply (City of San Joaquin General Plan, 1995; Joint Groundwater Management Plan, 2009).

Jurisdictions throughout California are implementing water conservation measures to address water supply and quality issues. Water conservation is the planned management and wise utilization of water resources. It is a fundamental and vital aspect of both the State water plan, water systems throughout California and for the overall health of the groundwater system. Water conservation is an important and cost-effective means of meeting water demands by changing behavior and attitudes about how water is used (City of Los Angeles Department of Power and Water, 2008). This allows the City to take immediate action to develop alternative water supplies. It is the most cost-effective and environmentally sound way to reduce demand for water. Using less water also puts less pressure on sewage treatment facilities, and uses less energy for water heating. An example of the effectiveness of water conservation is the City of Los Angeles, which has grown by 1 million people since the 1970s but still uses the same amount of water (Mono Lake Committee, 2010).

#### **OPR Guidelines for the Conservation Element: Water**

As required by California Government Code §65302(d), the Conservation Element of the General Plan is required to describe water resources. The Governor's Office of Planning and Research (OPR) provides guidelines to help jurisdictions develop comprehensive water conservation policies for their General Plan (Governors Office of Planning and Research, 2003). Guidelines for the water portion of the Conservation Element are used to assess existing conditions in this chapter. General Plan Guidelines covers several areas that include performing an inventory for existing water resources, identifying watershed boundaries, assessing local and

regional water supply and quality, assess existing programs for water efficiency, analysis of future water demands, and establish policies protection watershed and groundwater qualities.

### 8.4.2. Regulatory Framework

While the OPR General Plan Guidelines provide a framework of standards for information and policies, the State has been developing a series of water conservation measures and standards that the City is required to implement. These water conservation standards and the City's ability to comply are discussed below.

#### **State water policy framework**

The State provides a statewide policy framework with mandates for water managers, water purveyors, legislators, developers, planners and the general public. As the water situation in California grows increasingly dire, the State has enacted a series of new policies in an attempt to manage existing and projected water quality and quantity needs. This section discusses this policy framework relating to water conservation in the City.

#### Senate Bill 610 and Senate Bill 221

Under this legislation, the City is required to provide water supply assessments to ensure adequate water supply for any development over 500 housing units, 500,000 square feet of retail use, 250,000 of office use, 500 hotel rooms, 40 acres or 650,000 of business park use or mixed-use project with any combination equal to the scale above. The document needs to be part of the CEQA documents prepared for the project. If there is not enough adequate water to reliably supply the project and all other present and future anticipated demands in normal, dry and multiple dry years, new water sources need to be identified. Urban water management plans may be used in part to satisfy the water assessment requirement.

This legislation prohibits a land use agency from approving a subdivision map of more than 500 housing units unless there is written verification from a water provider that sufficient and reliable water supply is available. Sufficient water supply is defined as adequate water to supply the new growth in normal, dry, and multiple dry years taking account of existing and planned water demands on the system (Department of Water Resources, 2009). Water entitlements, capital financing, and all regulatory permits must be included in the document. Reliable water sources must be secured. Infill housing and exclusively affordable housing are exempt.

The City's small size and generally small development projects allow developers exemption from SB 610 and SB 221 because of the unit requirements that activate these laws. Regardless of this exemption, the City should still require that proof of a sustainable water supply is available well into the future.

#### California State Water Plan 2009 Update: 20 percent reduction by 2020

Under the direction of the California Department of Water Resources (DWR), the State is working to reduce water consumption by 20 percent per person by 2020. The California Water Plan is the overarching framework that is updated every five years to reflect new findings regarding the water situation in California. The State Water Plan Update of 2009 provides a



framework to help water managers, the general public and legislators improve and meet water code standards that meet the goals that reflect California's dire water situation. It was last updated in 2009, and attempts to acknowledge and address future multiple year droughts. The overall goal of the State Water Plan 2009 Update is to reduce statewide water consumption 20 percent per capita by the year 2020. This water conservation goal affects the City because of the state policies that supplement this goal.

#### Senate Bill X7-6 – Groundwater Elevation Monitoring

This legislation directs local agencies dealing with groundwater to systematically measure water level elevations in all basins and subbasins in California. The Department of Water Resources (DWR) prefers monitoring to be performed by local entities, (California Statewide Groundwater Monitoring Act, 2009). The goal of this legislation is to demonstrate seasonal and long-term trends in groundwater elevations. The Joint Groundwater Management Plan specifies that the City will have access to the James Irrigation District annual spring and fall well elevation monitoring data. Since groundwater is a regional resource, the city should assess groundwater data regionally. DWR is working to organize a centralized groundwater elevation information source. The Joint Groundwater Management Plan (2010) suggests the District performs monthly monitoring at its shallow well sites.

According to California Water Code § 10928 and 10932, parties seeking to assume groundwater elevation monitoring functions must notify DWR by January 1, 2011. Monitoring entities will also begin reporting seasonal groundwater elevation measurements by January 1, 2012.

#### AB 1420

AB 1420 requires The Department of Water Resources and other State agencies to condition water management grants and loans to urban water suppliers on implementation of the Demand Management Measures (DMMs). This legislation has been effective as of January 1, 2009.

DMMs correspond to the fourteen Best Management Practices (BMPs) listed and described in the CUWCC MOU.

#### Senate Bill X7-7: Urban Water Conservation Act.

The legislation sets an overall goal of reducing per capita urban water use by 20 percent by December 31, 2020. The State will make incremental progress toward this goal by reducing per capita water use by at least 10 percent by December 31, 2015. The following reflects how the City is affected by Senate Bill X7-7:

- According to the legislation, the City shall include in its water management plan baseline daily per capita water use, water use target, interim water use target, and compliance daily per capita water use by July 2011. The Department of Water Resources (DWR), through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this plan.

- A Commercial, Institutional, and Industrial (CII) task force is to be established that will develop and implement urban best management practices for statewide water savings.
- Effective 2016, urban retail water suppliers who do not meet the water conservation requirements established by this bill are not eligible for state water grants or loans.

This legislation is tied to the Urban Water Conservation Council, which has developed four best management practice (BMP) methods that cities can adopt and follow in order to comply with the Urban Water Conservation Act. State funding (AB 1420) for local water projects is anticipated to be available once the City adopts one of the BMP methods.

Assembly Bill 2572: Water metering compliance.

The City has approximately 953 water service accounts. Residential accounts are not currently metered. 48 of the 953 services accounts are commercial development, which represent about five percent of the water service accounts in the City. Approximately 20 percent of the commercial water users have water meters installed. The Draft Joint Groundwater Management Plan (2009) states that the City does not have the funding to retrofit existing infrastructure with water metering capabilities, but that it would look into funding to satisfy the statutory requirement.

This bill, with certain exceptions, requires urban water suppliers, as defined, on or before January 1, 2025, to install water meters on all municipal and industrial water service connections that are located in its service area. The bill would require urban water suppliers, beginning on or before January 1, 2010 (subject to certain exceptions), to charge each metered customer on the actual volume of water deliveries. The bill would authorize a water purveyor, including an urban water supplier, to recover the cost of providing services related to the purchase, installation and operation of a water meter from rates, fees or charges.

There are many benefits to installing water meters. Installing meters can lead to reduced water use and will enable the City to charge residents based on actual water usage. Studies show that cities with metered water use up to 15 percent less water than cities without meters. When meters are used to institute a tiered pricing structure, another 10 percent reduction can be expected. In addition to providing customers with feedback on their consumption levels, service meters, in conjunction with supply meters, enable a system to better account for leaks in the system. EPA estimates that by installing meters, water use can be reduced by 20 percent. In the Draft Joint Groundwater Management Plan (2010), meters were not found to be the most economical alternative for conserving water, compared to water saving fixtures such as showerheads and aerated faucets. Regardless, the City will likely require additional funding to assist with their purchase and installation, as complete installation of meters is required by 2025.

Assembly Bill 1881: Water Conservation in Landscaping Act of 2006

Outdoor water use makes up the majority of urban water use in the State and equates to approximately 54 percent of residential water use in the Tulare Lakes Basin (Pacific Institute 2003). This legislation requires cities and counties to adopt landscape water conservation



ordinances by January 1, 2010. In accordance with this law, DWR has prepared an updated Model Water Efficient Landscape Ordinance (MWELO). According to the Draft Joint Water Management Plan (2009), the City has adopted a Water Efficient Landscape Ordinance. This ordinance sets standards for water availability and subsequent times that residents can water their lawns, and encourages xeriscaping measures.

The City's current ordinance allows landscape watering only on certain days is also a fairly effective method in preventing over watering (City of San Joaquin Draft Water Conservation Plan 2009). The City will include inserts in water bills reminding residents of these landscape-watering rules.

The City does not currently recycle water. Wastewater effluent is currently discharged to aerated lagoons at the western end of James Irrigation District (JID) for evaporation and percolation. The annual volume of water treated is about 121 million gallons. The City plans to improve the wastewater treatment system to include advanced secondary treatment with activated sludge, nitrogen removal, and sludge handling. Construction of the new facilities is expected in 2010 or 2011. The effluent will have better quality that is suitable for non-edible crops. The City has held discussions with farmers to use the effluent, and also plans to meet with JID to discuss delivery of the water into the distribution system.

California's mandatory CALGreen Building Codes become effective January 1, 2011. These green building codes require all new buildings, in the State to be more energy efficient and environmentally responsible (California Building Standards Council, 2010). These new regulations are intended to achieve major reductions in greenhouse gas emissions, energy consumption and water use to create a more sustainable California. The CALGreen Building Codes are consistent with the 2009 California State Water Plan Update to reduce per capita water use 20 percent by the year 2020.

#### Water Quality

Groundwater in the Tulare Lakes Basin is the primary water supply but in some parts of the region, predominantly the west side, nitrates and salts threaten the water supply. Naturally occurring and human-created pesticides and other industrial chemicals have contaminated some domestic groundwater sources (State Water Plan Volume 3 2009).

In accordance with the Federal Safe Drinking Water Act, the State regulates public water service entities to ensure that potable water is within U.S. Environmental Protection Agency-established water quality levels. The California Department of Public Health's Division of Drinking Water and Environmental Management (DDWEM) operates the Drinking Water Program (DWP). DWP regulates public water services and facilities, analyzes water quality, and provides funding opportunities for water system improvements. Mandates require the city to send water samples from its wells to a water testing laboratory.

Through the Drinking Water Program, the City has several opportunities to take advantage of available funding sources to upgrade the water infrastructure. Funding sources through DWP

include: funding under Proposition 84, Proposition 50 and the Safe Drinking Water State Revolving Fund. The laboratory is then required to submit results to the California Department of Health for review. Water quality is tested for inorganic compounds such as diazinon, aluminum, antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, naturally occurring fluoride, lead, mercury, nickel, perchlorate, selenium, thallium, organic nitrate and nitrite, and various radiological elements.

The City's groundwater quality is considered to be in good condition. This can be partially attributed to high-quality surface water imports from the James Irrigation District. The City currently is limited to treating wellhead water with chlorine, which treats for microbial contaminants. Groundwater treatment varies greatly around the State. Generally, water may be treated as it is pumped from the ground to remove certain contaminants or it may be chlorinated if there is concern of bacterial or parasitic infection. The City is concerned about regional water quality and the potential for lower quality water to reach the City's water supply and would like to monitor the encroachment of these water sources (Joint Water Management Plan 2009).

The Tulare Lake Basin is largely an agricultural landscape supported in part by water from the Sacramento-San Joaquin Delta. Concerns over water quality results from the fact that the Basin has no natural discharge outlet, so imported water from the delta brings in salts that are then concentrated and have nowhere to go. Salt deposits build up in the groundwater unless captured and sequestered which is only a temporary solution to a much larger problem (Pitzer, 2009). The region's dense clay layers keep irrigation water from permeating into the ground below. According to an article from Aquaforia, "Without adequate drainage, officials say, salts accumulate in the soil and a disaster looms. Researchers at the University of California, Davis, concluded that increased irrigation in the Valley raised the water table in the 1970s, drawing up some salts that had been leached downward" (Pitzer, 2009).

Salinity is a shared problem. "Every time a farmer irrigates a field, every time a managed wetland is flooded, every time an industrial facility conducts some process requiring water, and every time you or I take a shower, we contribute to the salinity problem," notes the 2006 report, *Salinity in the Central Valley* (Central Valley Board). "The water we use and release has a higher salinity concentration than what we started with" (Pitzer, 2009). The City plans to improve groundwater monitoring and data collection, and will also develop an outline for a brief groundwater report.

#### California Assembly Bill 3030

Assembly Bill 3030 provides local public agencies increased management authority over their groundwater resources. In September 2002, Senate Bill 1938 expanded AB 3030 by requiring Groundwater Management Plans to include certain specific components in order to be eligible for grant funding for various types of groundwater related projects. The City participated in a collaborative effort with the James Irrigation District to develop a Joint Groundwater Management Plan 2010. Once adopted this plan will comply with AB 3030 and will allow the city to be eligible for groundwater-related grants.

The City also worked with the James Irrigation District on a Joint Groundwater Management Plan to better manage groundwater resources used by both the District and the City. The purpose of the Joint Groundwater Management Plan is to set a framework for both the City and the District to improve regional management of groundwater resources through better coordinated efforts including the sharing of data. This Groundwater Management Plan (GWP) is the first completed by the City and is an updated GWP for the District as required by Senate Bill 1938 as part of the newly-revised California Water Code. The Groundwater Management Plan (GWP) goals include:.

- Preserve and enhance the existing quality of the area's groundwater
- Preclude surface or ground water exports that would reduce the long-term supply of groundwater
- Coordinate groundwater management efforts between regional water users
- Maintain local management of the groundwater resources
- Implement a groundwater-monitoring program to provide an "early warning" system to future problems
- Stabilize groundwater levels in order to minimize pumping costs and energy use, and provide groundwater reserves for use in droughts and maximize the use of surface water, including available flood water, for beneficial use.

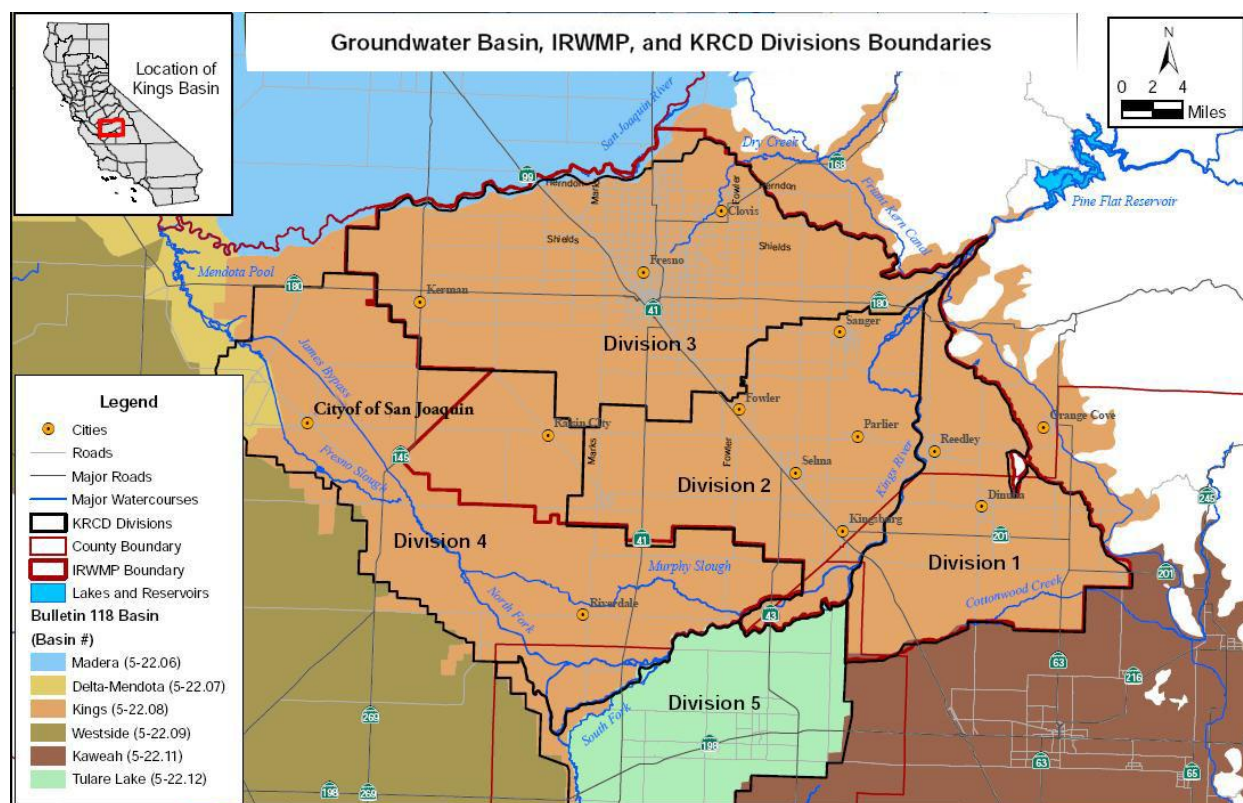
The Draft Joint Groundwater Management Plan (2010) indicates the City's desire to improve water conservation. The City recognizes that water conservation is an important alternative to developing new water supplies or increased groundwater pumping. Conservation measures include: urban and agricultural best management practices such as metering, plumbing retrofits, efficient irrigation systems, and educational programs.

### 8.4.3. Existing Conditions

#### Hydrology

The City is located in the Tulare Lakes Hydrologic Region within the southern half of the San Joaquin Valley Basin, in the Kings River Subbasin. See Figure 8-6 for a map of the Kings River Groundwater Basin.

*Figure 8-6. Upper Kings River Groundwater Basin.*



Source: *Kings Basin Integrated Groundwater and Surface Water Model (IGSM) Model Development and Calibration*, November 2007

The San Joaquin Basin covers a surface area of approximately 976,000 acres (1,530 square miles) and is comprised of up to 32,000 feet deep of marine and continental sediments. These sediments were left by periodic inundation caused by the Pacific Ocean and from erosion of the mountains surrounding the valley. The Kings Subbasin is defined by the San Joaquin and Kings Rivers, and is drained by the Kings, Kaweah, Tule, and Kern Rivers. Ultimately, these rivers flow into the Tulare drainage basin (California Department of Water Resources, 2006). The Kings Groundwater Subbasin is not court-adjudicated, however DWR Bulletin 118-03 identifies eleven basins in California as being in critical conditions of overdraft, including the Kings Basin (Department of Water Resources, 2010).

## Hydrogeology

The hydrogeology of the Subbasin is an older alluvium that serves an important aquifer for the region. It consists of combinations of clay, silt, silty and sandy clay, clayey and silty sand, sand, gravel, cobbles, and boulders (Department of Water Resources, 2006). This enormous aquifer system lies beneath the Kings Watershed Basin and extends the length and breadth of the San Joaquin Valley (Draft Joint Groundwater Management Plan, 2010).

Groundwater generally flows to the southwest. Groundwater elevations vary throughout the San Joaquin Groundwater Basin with an average water table at about 1,000 feet and the deepest points reaching 9,000 feet below the surface. An estimate by Williamson (1989) suggests total groundwater storage in the entire basin as being 93,000,000 acre-feet at a depth of 1,000 feet or less (California Department of Water Resources, 2006).

The Draft Joint Groundwater Management Plan (2010) divides the plan area (regional groundwater subbasin) into three subunits. The lower water-bearing zone water is contained in the lower section of the Tulare Formation at the base of Corcoran Clay layer. United States

Bureau of Reclamation (1955) defines the base of a fresh water aquifer as the base of the effective ground-water reservoir. The depth to the base of fresh water is from about 1,000 feet to 1,400 feet beneath the Plan Area (Page, 1973). The upper water-bearing zone is from the top of the Corcoran Clay to the upper sections of the Tulare Formation, often considered the bottom of the A-clay. The shallow or perched zone consists of a subsurface portion of the plan area extending from the City northward, from the top of the A-clay, if it is present, to the perched groundwater table which is often within 10 feet or less of the ground surface.

### **Groundwater Depth**

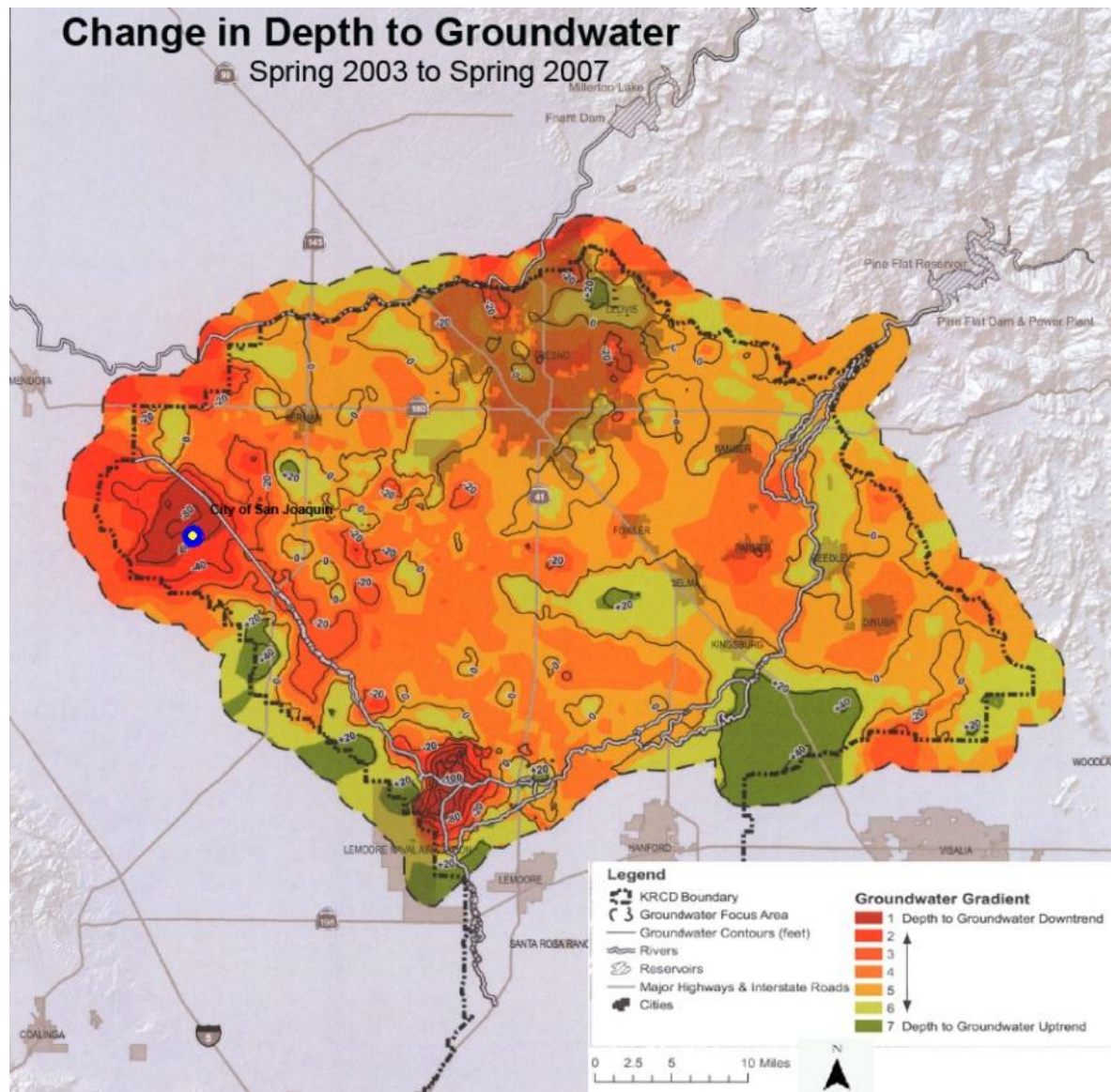
Aquifers are generally thick in the San Joaquin Valley subbasins with groundwater wells commonly exceeding 1,000 feet in depth as shown by Figure 8-7. The base of fresh groundwater in the region, at an average of approximately 1,200 feet below ground surface, is considered to be the maximum effective depth of the basin in terms of pumping and recharge. There is an overall trend towards a steady decline in water levels from the 1960s to the present. Other hydrographs for the Kings River Conservation District (2005) and for the Lower Kings Basin Groundwater Management Update also show consistent decreases in water levels.

Drought conditions (low precipitation years) and increased reliance on groundwater sources are probable reasons why groundwater elevations are dropping (Joint Water Management Plan, 2009). According to the California Department of Water Resources, groundwater levels were at their lowest in the 1960s but due to the Central Valley surface water conveyance system, groundwater recharging has increased groundwater levels; with increased demand on groundwater, however, the aquifer elevation has been dropping (California Department of Water Resources, 2010).

The Lower Kings Basin Groundwater Management plan evaluated regional groundwater levels within the basin and concluded that there has been a significant decline in groundwater levels between 1950 and 2000. This trend is expected to continue to decline. The James Irrigation District measures some water levels annually near the city. Figure 8-8 shows a general downward trend in water elevations.

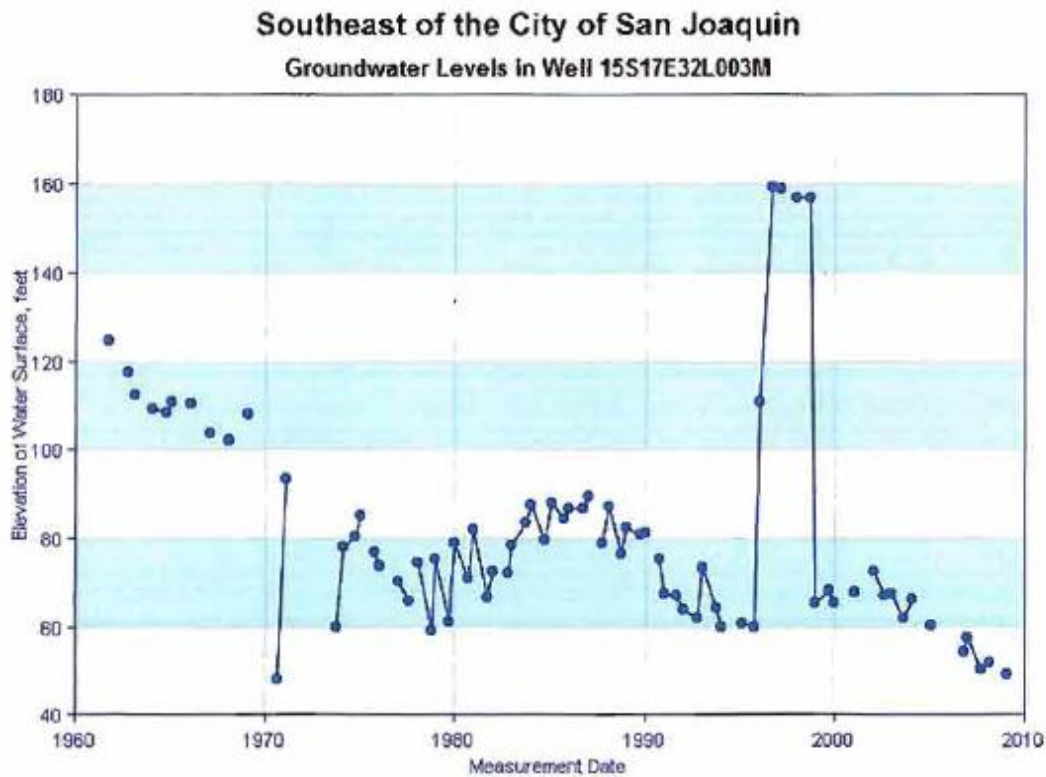


Figure 8-7. Change in Depth to Groundwater



Source: Kings Basin Integrated Groundwater and Surface Water Model (IGSM) Model Development and Calibration, November 2007

Figure 8-8. Groundwater elevation example



Source: Draft Joint Groundwater Management Plan, 2010

Table 8-2. Water Well Information.

Well #	Horse Power	Location	Design Discharge (GPM)
3	150	Corporation yard	1,200
4	150	Main and California	1,200
5	150	Cherry and Colusa	1,100
<b>TOTAL</b>			<b>3,500 GPM, 5 mgd (max)</b>

Source: Draft Joint Groundwater Management Plan, 2010

## Water Supply and Demand

The City receives its water exclusively from groundwater sources. It does not receive any surface water. The City expanded its water production capacity by constructing a new water well through a CVIG Grant from the State of California in 2005. The upgrade added an additional 1,100 gpm to the City's supply. With the addition of Well Number 5, the water supply will be able to meet maximum day demand through 2018. According to the City, water demand is not expected to outstrip supply capacity and the City should not lose its ability to meet peak demands over the next ten years unless one of the wells ceases to operate (San Joaquin Capital Improvement Plan, 2000). Table 8-2 demonstrates location and maximum capacity of the City's well system.

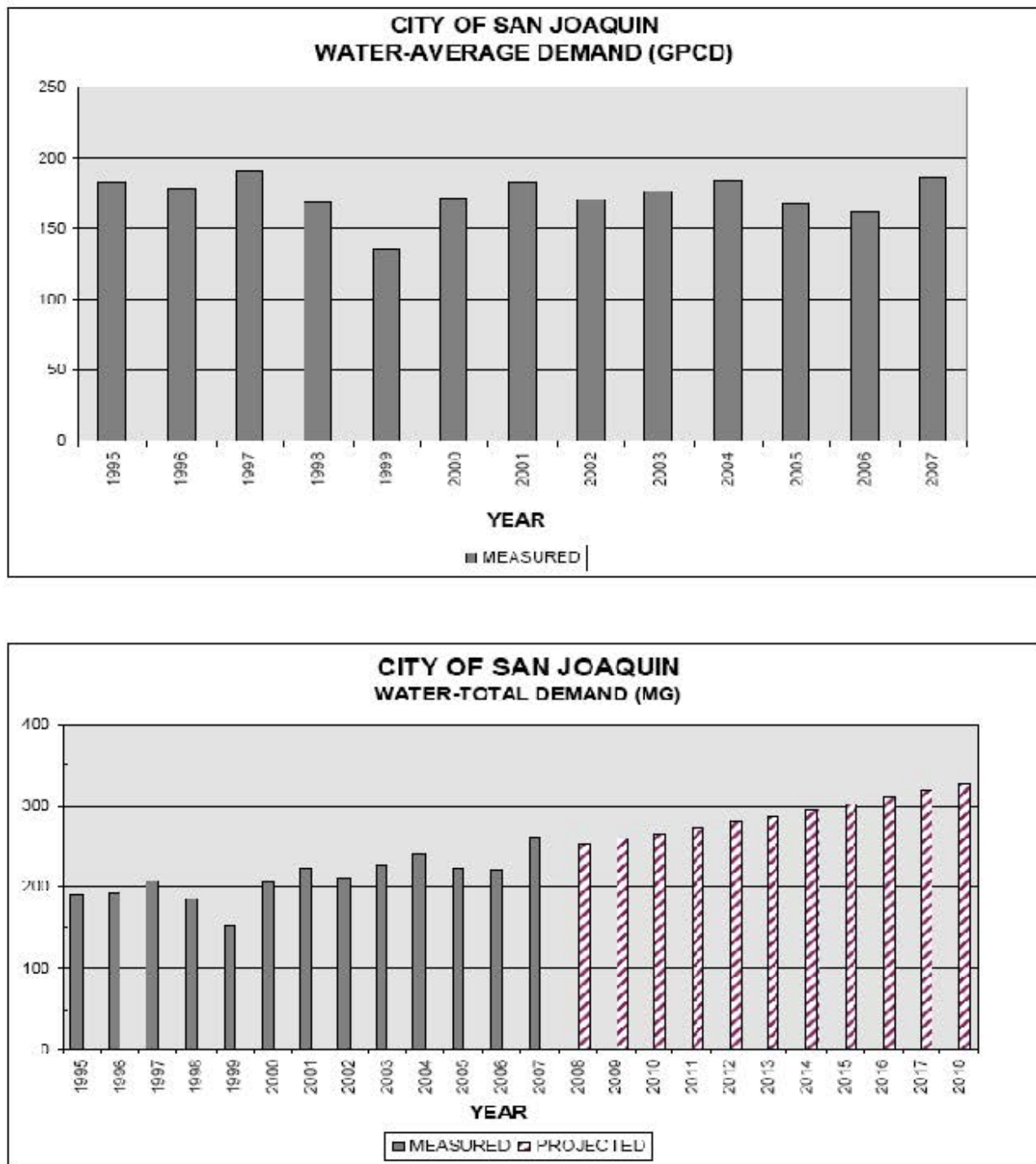
The analysis suggests, however, that the City cannot currently meet peak demand while addressing water demands for fire emergencies. This is a concern for the City since some of their wells are old and further strain on the water supply capacity could increase safety hazards for the City (San Joaquin Capital Improvement Plan, 2000; Joint Groundwater Management Plan, 2009). San Joaquin's Capital Improvement Plan examines water usage and determines that water supply, assuming constant per capita water usage, will be available well into the future. The lack of more detailed information on groundwater availability limits the City's knowledge of actual water levels in the future. Additional well construction and well redrilling can be expensive for the City.

According to the Urban Water Management Plan Act of 2009, urban suppliers, in this case the City, are required to develop water management plans to actively pursue the efficient use of available supplies. The City has developed an Urban Water Management Plan that details municipal water sources, water use by sector, reliability, supply interruption actions, and demand reduction measures. This plan estimated that the water supply is adequate to accommodate projected urban and agricultural demands.

The City's total water usage for the past ten years has fluctuated between 152 million gallons (MG) and 262 MG. Figure 8-9 shows annual total water demand for the City. The City's total water consumption is expected to continue to rise as the population is expected to increase by 2.6 percent per year. While the total water consumption is growing, the average water use per person has been relatively constant. The average water use for the last five years has been 175 gallons per capita per day (gpcd). According to the Draft Groundwater Management Plan (2010), The City's water use consumption per person in 2008 was 181 gallons per capita per day (gpcd) (Joint Groundwater Management Plan 2010). The City's average water use per capita is significantly less than that of Fresno County, which averages at 258.8 gpcd and slightly less than California's water use average which is approximately 192 gallons per person (California State Water Plan 2009). According to the Joint Groundwater Management Plan (JID) (2010) regional groundwater use has increased as drought conditions and upstream regulations have limited surface water supply. Table 8-3 demonstrates annual percentage of surface and groundwater usage by the JID.



Figure 8-9. Average and Total Water Demand.



Source: Draft Joint Groundwater Management Plan, 2010

*Table 8-3. Surface and Groundwater Usage.*

Year	Surface Water		Groundwater	
	Volume (AF)	%	Volume (AF)	%
2009	15,900	22	55,100	78
2008	21,300	27	56,900	73
2007	34,300	42	48,200	58
2006	67,400	91	6,300	9
2005	50,300	69	22,500	31
2004	38,600	47	43,000	53
2003	39,000	51	37,400	49
2002	37,400	43	48,700	57
2001	26,400	35	48,600	65
2000	35,400	49	36,400	51
Avg	36,600	48	40,300	52

*Source: Draft Joint Groundwater Management Plan, 2010*

According to a report by the California Home Building Foundation, approximately 57 percent of household water consumption is used for landscaping (2010). Fluctuations in water use per capita from year to year are due to a variety of economic, demographic, and climate factors. This suggests that outdoor water use is an area where the City can focus water conservation efforts.

### **Water Budget and Safe Yield**

Water supply and demand is quantified in terms of a Water Budget and Safe Yield. The California Department of Water Resources defines water budgeting as a balance between the inputs and outputs of water to and from the plant root zone. They equate water budgeting to balancing a checkbook (Department of Water Resources, 2010). Water budgeting inputs include precipitation, irrigation, dew, and capillary rise from ground water. The outputs include evapotranspiration, runoff and deep percolation.

The San Joaquin Valley Basin only has two Type “C” groundwater budget subbasins, one of which is the Kings. A Type C budget denotes that there are not enough data to estimate the basin’s groundwater budget or groundwater outputs from the basin. Type C classification is attributed to a low level of knowledge about groundwater inflow, outflow, or storage information in the Kings basin. The designation of a Type C budget is for the entire subbasin. This means that the collection of information will have to come from collaborative efforts to bring the subbasin to a budget type classification of A. The Kings Subbasin was determined in DWR Bulletin 118-80 to be a "critically over drafted" basin, which has not been reevaluated since the

bulletin was updated in 2003. The City does divert stormwater to basins where some is percolated, thereby recharging the groundwater. It is unknown how much water is lost to evapotranspiration and how much actually percolates into the groundwater system.

According to the California Department of Water Resources (2010), safe yield is defined as “the maximum quantity of water that can be continuously withdrawn from a groundwater basin without adverse effect.” Safe yield is difficult to measure because the aquifer is utilized by many different entities and because there is some uncertainty in defining what constitutes a “safe yield”. In the analysis of safe yield, the base period must be long enough to include both wet and dry hydrologic cycles. Safe yield is difficult to determine in this area because the groundwater system is hydraulically connected to groundwater in adjacent areas within both the Kings Basin and the Tulare Lake Hydrologic Region. If groundwater management activities substantially raised static water levels, subsurface inflow would decrease, subsequently decreasing perennial yield. Groundwater level data are not available for the City, but groundwater levels in the City are assumed to be similar to those shown on the regional map.

### **City Water Policy**

The City's 1995 General Plan Update contains limited data on hydrological and demand dynamics of the water supply. Despite receiving the water from groundwater sources that are part of a large regional groundwater basin, there is no mention of hydrologic structure or functions on a regional scale. The City does suggest some basic water conservation measures but does not include any policy mechanisms to implement programs that reduce water consumption. The 1995 Update did recognize its requirement to fulfill State and federal mandates relating to drinking water quality but does not discuss water quality issues regionally or locally.

Much of the specific information relating to water is outlined in the Draft Joint Groundwater Management Plan (2009) and there is supply and demand information found in the City's Capital Improvement Plan.

### **8.4.4. Community Feedback**

#### **First Community Meeting – 10 October 2010**

City officials, including the Mayor and City Administrator expressed a desire to make the City the model city for water conservation in the Central Valley. In the initial community meeting, there was little information gathered regarding water conservation.

#### Meeting Results

Meeting results gathered yielded little input from the community regarding water conservation. However some comments about the City's priorities on securing water supplies and protecting water quality were made at the meeting.

### Initial Survey Questions

An initial survey taken by community members resulted in an overwhelming support for water conservation measures. The survey asked:

- What is the approximate cost of your monthly water bill?
- Is your water bill too high?
- Would you participate in water conservation programs?

### Survey Results

Results from this survey included:

- Monthly water bill costs varied widely despite most of the City having flat monthly water rates
- 54 out of 86 (63 percent) responded saying their water bill is too high, 16 responded saying their water bill was not too high (18.6 percent) and 16 did not respond to the question (18.6 percent)
- 74 of the 86 respondents (86 percent) said that they would be willing to participate in water conservation programs, 12 people (14 percent) did not respond to the question.

### **Second Community Meeting – 18 November 2010**

In the second meeting, a questionnaire was distributed with the intent of gauging community interest in water conservation efforts. Six community members responded. The results cannot accurately represent the entire city. However, the responses to the survey provide valuable insights to some of the attitudes held by community members.

### Questionnaire

There were four water conservation specific questions in the survey:

- Would you purchase new water efficient appliances if the city helped pay for them?
- Would you be willing to invest a little money now to learn how your house uses water if it helped you save money over time?
- Should the cost of water reflect the amount of water used per household? (in other words, the less the water you use, the less the you pay for your water.)
- How important are the following water conservation measures to you (Rated using Most Important, Important and Not Important)?
  - Having water saving appliances
  - Learning about what you can do to save water
  - Planting water efficient plants
  - Water recycling programs
  - Requiring new development to include water efficient fixtures
- Should the cost of water change depending on the amount of water that is used?

### Questionnaire Results

Results from the questionnaire included:

- All 6 respondents responded positively with a “yes”
- All 6 respondents responded positively with a “yes”
- Four respondents responded with a “yes” and 1 with a “no”
- All of the respondents responded positively with a “very important” on questions a.– d. and on e.
- Five people responded with a “very important” and one person responded with an “important” on the last questions

This information is useful because it informs policy ideas in the general plan. It is now known that at least some community members are amenable to the idea of investing money to reduce water consumption.

### **8.4.5. Emerging Directions**

The City’s 1995 General Plan update suggests some basic water conservation measures, but does not include any policy mechanisms to implement programs that reduce water consumption. The Community has a vested interest in preserving its water resources. The City is expected to grow at about 2.6 percent per year for the next 20 years and that growth translates into increased total water usage. Water conservation measures can provide ways that would allow the City to grow and keep water usage at or below current total water usage. This section discusses the community’s water conservation values and the potential directions that will conserve both water supply and water quality.

#### **Community Values**

City officials originally indicated an interest in becoming a model city for water conservation in the Central Valley. In a survey of City residents, 86 percent of the respondents indicated that they would be interested in participating in efforts to conserve water, 14 percent of the respondents declined to answer the question and no residents indicated that they would not participate in water conservation efforts. Some of the residents in the City indicated an interest pursuing water conservation efforts both from a supply and a water quality standpoint.

The City’s interest in becoming a leading entity in water conservation will require an effort from the City and residents to implement both required and voluntary water conservation measures. The State has outlined several policies that both require and incentivize the City to comply with State water conservation measures. The City must also follow through on developed water plans and implement methods of monitoring conservation efforts as measures of success.

The following section outlines water conservation areas the City and community members should focus on to move forward with the development of the General Plan and the implementation of the Water Conservation section of the Conservation Element. Areas that the City should explore include water conservation planning, incentive-based programs, CALGreen Building Code implementation, landscaping and outdoor water use, education programming,

building infrastructure retrofits, residential water use, public facilities water conservation and funding identification.

### **Water Conservation Planning**

The City is required to adopt one of the four Best Management Practice (BMP) Methods defined by the Urban Water Conservation Council (Water Conservation Act, 2009). These BMPs will identify the conservation measures the city has identified as the most important way to reach 20 percent water reduction per person by the year 2020. Selection and implementation of these plans also qualifies the City for State water grants and loans to help implement the measures (California Urban Water Conservation Council 2010). To help ensure water conservation plans are implemented, the City should investigate and aggressively seek ways to provide both incentives and funding for water conservation projects.

### **CALGreen Building Codes**

The City should also incorporate the adoption of the CALGreen Building Codes voluntary water conservation building standards for future development. According to the California Building Standards Commission (2010), water conservation under the voluntary adopted building codes can be as high as 40 percent. As part of the CALGreen Building Codes, the California Building Standards Commission adopted Title 24, Part 5, Chapter 16A into the California Plumbing Code in January 2010. The new graywater code facilitates water conservation, makes legal compliance easily achievable, and provides guidelines for avoiding potentially unhealthy conditions. The City has indicated that the new CALGreen Building Codes went into effect in October 2010.

The new graywater code facilitates water conservation, makes legal compliance easily achievable, and provides guidelines for avoiding potentially unhealthy conditions. The City has indicated that the new mandatory CALGreen Building Codes went into effect this past October and the voluntary codes require the inclusion of greywater systems.

### **Fixture Installation**

Showers and faucets account for one quarter of indoor water use. Federal Energy policy in 1992 set the minimum flow rate at 2.5 gallons per minute but previous flow rates could be as high as 5 gallons per minute. According to the City's draft Water Conservation Strategy (2009), "Replacing showerheads with 2.0 gpm showerheads and installing aerators in the faucets to bring the flow rate to 1.8 gpm, could save an average of 17.75 gallons per capita per day. Citywide, the savings potential is over 26 million gallons per year." Installing low flow showerheads and aerators for faucets is relatively easy and can be left up to residents to install their own or City officials can provide assistance.

Toilets are also another large water user in resident's homes. The average flow rate city wide is assumed to be 3.5 gpf, and the flush rate is four times per person per day. Replacing toilets that have a lower flow rate can have a potential savings of 14,000 gallons per household annually with a citywide savings of 12.5 million gallons per year. Costs for toilets varies from \$50 to \$200.



Upgraded fixture installations are already planned to be part of the upgrades installed as part of the city's low income housing rehabilitation program and toilets should be included in the installation as well.

### **On-going Awareness and Education**

On-going education should occur to supplement other water saving requirements, such as the landscape watering requirements to ensure continued participation from residents from year to year. Water savings from education is difficult to determine, the Environmental Protection Agency suggests a 2-5% reduction is a reasonable water savings amount linked to water conservation education.

Education and awareness can be disseminated in several ways; pamphlets i.e. inserts in monthly water bills; electronic media i.e. webpages, social networking sites, etc; public meetings i.e. on tips residents can do to save water; workshops and evening classes i.e. low water lawn redesign and irrigation; and within the formal education curriculum.

The City, in the Joint Groundwater Management Plan (2010) has stated that water education has been incorporated into the curriculum in the public school system as of the 2010-2011 school year. To help supplement educators, the Department of Water Resources has a variety of educational materials available to California Teachers free of charge.

Education programs can be funded in several ways; charging additional service fees to water users and outside grant funding. By adopting one of the four Best Management Practices tracks from the Urban Water Conservation Council, the City qualifies for grant funding for a number of water conservation projects including education and awareness.

### **Incentive Programs**

Incentives are particularly important to encourage residents to participate in to the City's water conservation efforts. Some examples of incentives include a "cash for grass" program that pays residents per square foot of grass lawn removed and replaces the lawn with less water intensive landscaping. Other examples include water efficient appliance rebate programs that provide an incentive for people to buy water efficient appliances, and programs that allow residents to take advantage of easy retrofit solutions such as low-flow shower heads. California has suspended it's rebate program with the exception of a few existing water utility partners.

In order to encourage residents to participate in these incentivized programs, the City should consider an aggressive educational campaign that will disseminate water conservation information. Active community groups such as the Promotores have a big reach in the community. Active groups can help organize and facilitate educational opportunities funded by the City through grants and other outside funding. Water conservation workshops and other events provide people opportunities to learn about water conservation issues and to participate in everyday water efficiency practices in an effort to reduce water consumption.

### **Other Water Saving Programs**

Some municipalities like the City of Sacramento have passed an ordinance requiring that home sellers or home buyers, before the sale is complete, to install water saving appliances. This upgrade ordinance puts appliance upgrades on the residents completing home purchase transactions. Several state and federal rebate programs are available for residents who purchase water saving appliances.

The City of Los Angeles has a Water Conservation Ordinance that outlines allowable and prohibited water uses by the City's residents and public employees. Creation of a water conservation ordinance can save water and provide a fee generation mechanism for the City with proper enforcement of the conservation ordinance.

The City's Water Conservation Strategy (2009) suggests that the City provides water efficiency job training to residents in order to help install water meters, run household and business water efficiency audits, install greywater systems and xeriscaping lawns.

The City can then utilize trained residents to provide a service to the community and help reduce overall water consumption.

### **Water Quality**

California is one of the remaining states not to require water quality monitoring of groundwater. The Groundwater Monitoring Act of 2009 will require municipalities and water purveyors to monitor groundwater supplies for quality. The City and the James Irrigation District have been involved in the creation of a joint management plan where both entities have pledged to increase monitoring of well water and make water quality information more understood and transparent. The City should also refer to the Joint Groundwater Management Plan (2010) for goals and implementation policies and work to follow through on objectives outlined in that document.

### **Water Monitoring**

Water metering is essential to water conservation. As mentioned earlier, meter installation increases water savings by 10 to 15 percent and an addition 10 percent if a tiered fee structure is put in place to reflect payment based on actual water use. Water metering is also essential to more accurately understand whether conservation measures are working for the City. Once meters are installed on all water use accounts, the City can use water use data to assess water conservation measures and direct and funding to the most effective efforts.

The City intends to install water meters on all service accounts by 2020. The Department of Water Resources requires that water meters be installed by 2025. As mentioned earlier, installing water meters are expensive and the City will need to locate outside sources of funding, i.e. grants. Some municipalities have received assistance from American Recovery and Reinvestment Act funding to install water meters. This can be done by retrofitting existing homes and businesses with water meters and below are the areas that the City should focus on in order to reduce water usage. According to the City's Draft Water Conservation Plan (2009),



the most promising source of funding is through the Department of Housing and Urban Development's Community Block Grant Program.

The City is required to implement water metering systems on all existing and new development by 2025. Water meters on individual units can provide real-time water use data. Some municipalities have a tiered water metering system where water rates are charged depending on the water use. This is a potentially effective way to generate funds to reinvest in additional water conservation supplies and services. Water metering is essential for the City because conservation efforts should be monitored to show success and provide adaptive water conservation measures as needed. Smart metering would provide the city real time data and can help to ensure that water conservation efforts are working

The City is also working with the James Irrigation District to implement increased monitoring of water quality at regional wellheads and share information accordingly. Specific water quality goals and objectives are outlined in the 2010 Joint Groundwater Management Plan.

### **Funding Opportunities**

The City is small and lacks the funding to implement substantial water conservation measures. Therefore the City must look to other sources of funding such as state and federal grants and the potential for fee based systems.

## **8.5. Energy Conservation**

An energy conservation element is not legally required as part of the General Plan; however, in order to comply with California Assembly Bill 32, enacted in 2006, energy conservation is vitally important. Beyond legal compliance, having a framework for energy conservation allows the City to achieve the following goals:

- Reduce greenhouse gas (GHG) emissions.
- Reduce the amount of money spent on energy. The Governor's Office of Planning and Research (OPR) notes that reduced cost of construction and habitation can encourage the construction of more affordable housing.
- Brand the City as the most energy efficient in the Central Valley. This branding effort will make the City more recognizable and may catch the attention of business or industries looking to locate in the region.

### **8.5.1. Existing Conditions**

The City has a variety of energy options at its disposal. This section examines what the City currently uses, different types of electricity production available, and ways for the City to reduce energy use through building efficiency.

### **Existing Energy Options**

OPR suggests conducting an inventory of energy resources, including current energy, wind, solar, hydroelectric, and biomass (OPR, 2003). This section describes how each energy source works, their current level of service in the City, and potential for future use.

### Electricity & Gas

Electricity and natural gas currently account for a large portion of the City's residential, public and commercial energy. Electricity and gas services are provided by the Pacific Gas and Electric Company (PG&E). PG&E voluntarily provides numerous conservation programs including:

- Energy efficient appliance rebates;
- Rebates on insulation installation;
- Rebates on new HVAC systems;
- Rebates on efficient pool pumps;
- Rebates on efficient lighting fixtures;
- Funding options for self generation including solar and wind; and,
- Cheap energy audits which can be used to receive further rebates on solar installation.

### Solar Energy

There are two types of solar energy that can be harnessed to reduce the use of fossil fuels: passive and active. Passive solar energy is the use of direct sunlight to heat rooms, water, or provide light. Active solar energy uses photovoltaic panels to convert sunlight into electricity. The U.S. Department of Energy explains, "Photovoltaics is the direct conversion of light into electricity at the atomic level. Some materials exhibit a property known as the photoelectric effect that causes them to absorb photons of light and release electrons. When these free electrons are captured, an electric current results that can be used as electricity" (NASA, 2002, p.1).

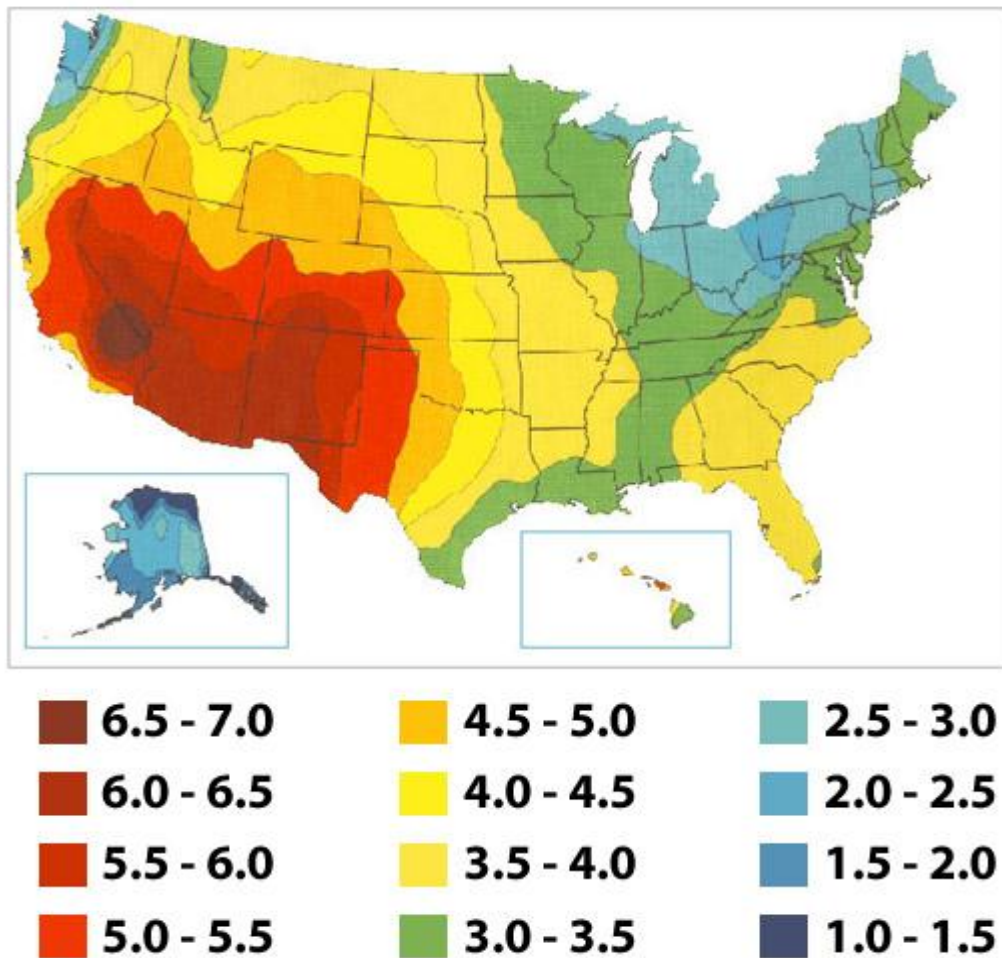
There is currently no solar generated power in the City. However, as Figure 8-10 illustrates, the City is in one of the most intense solar radiation zones in the United States. This makes it a prime location for the installation of solar both at the project scale and at the city scale.

### Wind

Wind power is one of the most promising renewable energy resources. According to the U.S. Department of Energy, "the terms, wind energy or wind power, describe the process by which the wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind into mechanical power. A generator can then convert this mechanical power into electricity".

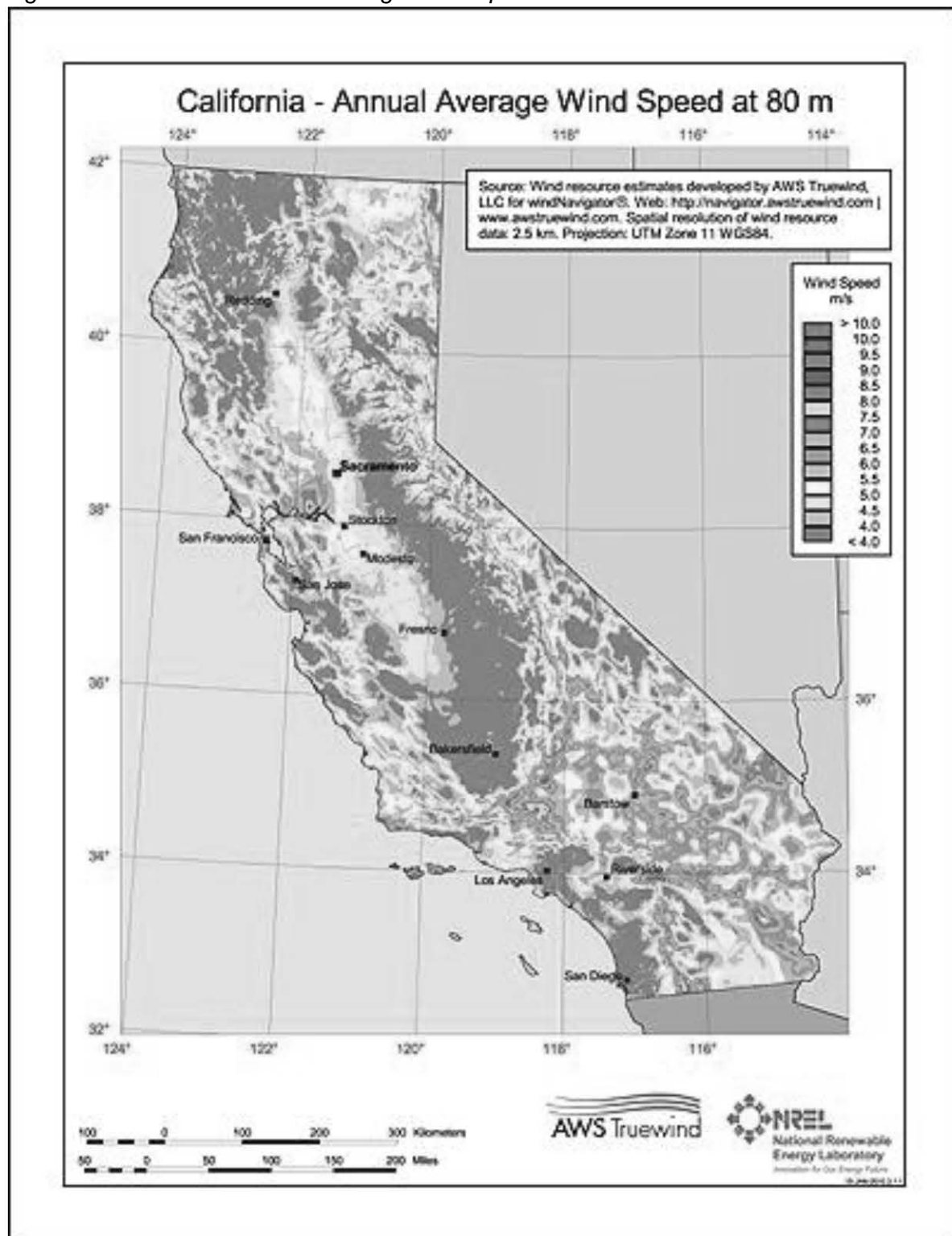
There is currently no wind-generated power in the City. Figure 8-11 suggests that the City is in a poor location to generate wind at a large scale. It may still be appropriate for small project specific wind options; at this point, however, it appears that solar would produce a better return on investment.

Figure 8-10. Average annual solar radiation at the national level in kilowatt-hours per square meter per day.



Source: SoRoeCo Solar, 2010.

Figure 8-11 California Annual Average Wind Speed at 80m.



Source: AWS Truewind, 2010.

### Hydroelectric

Hydroelectric energy is created when a hydraulic turbine converts the energy of flowing water into mechanical energy. A hydroelectric generator converts this mechanical energy into electricity. When a magnet is moved past a conductor, it causes electricity to flow.

There is currently no hydroelectric energy generation in the City, and there is no foreseeable way for the city to generate power in this way. Hydroelectric energy is in PG&E's power portfolio, however, and therefore constitutes some part of the electricity used in the City.

### Biomass

The National Renewable Energy Laboratory describes biomass energy:

Biomass can be used for fuels, power production, and products that would otherwise be made from fossil fuels. In such scenarios, biomass can provide an array of benefits. For example, the use of biomass energy has the potential to greatly reduce greenhouse gas emissions. Burning biomass releases about the same amount of carbon dioxide as burning fossil fuels. However, fossil fuels release carbon dioxide captured by photosynthesis millions of years ago—an essentially "new" greenhouse gas. Biomass, on the other hand, releases carbon dioxide that is largely balanced by the carbon dioxide captured in its own growth (depending how much energy was used to grow, harvest, and process the fuel) (2010, p.3).

There is currently no biomass created energy in the City, however given its proximity to agricultural waste, there is potential to harvest biomass in the City.

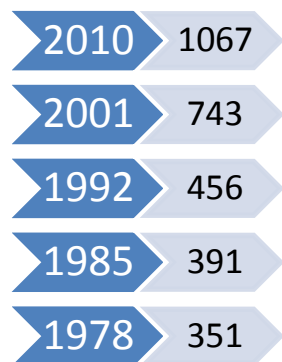
### **Building Efficiency**

Heating, ventilation, and air conditioning represent the majority of a building's energy use. Buildings with old, inefficient heaters and coolers, poor insulation, and leaky windows and doors require much more energy to heat and cool than buildings with efficient appliances, good insulation, and tightly sealed windows and doors. Buildings that have properly-oriented windows can drastically reduce the amount of energy required to heat or cool by either allowing warming winter sunlight in or keeping heating summer sunlight out.

Realizing how much energy is wasted in inefficient buildings, California established the Energy Efficiency Standards for Residential and Nonresidential Buildings in 1978. The Standards were also a response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. California's building efficiency standards (along with those for energy efficient appliances) have saved more than \$56 billion in electricity and natural gas costs since 1978. It is estimated the standards will save an additional \$23 billion by 2013 (CEC, 2010).

Using data from the 2000 Census, 47 percent of residential buildings were constructed before the first Title 24 in 1978. 391, or 53 percent of residential buildings were built before the 1985 update to Title 24. 456, or over 60 percent of buildings in the City were built before the 1992 and 1998 updates to Title 24. Since each of these updates represent an increase in

*Figure 8-12 Number of structures built before year of Title 24 Update*



conservation, these numbers tell the story that a majority of the residential buildings in the City are not efficient to 1992 standards. This also means that all 743 buildings that still exist from the 2000 Census are not efficient to the standards set in the 2001, 2005, 2008 or the 2010 Title 24 and Cal Green building codes. Figure 8-12 illustrates the residential units and their building code compliance.

No data is currently available about the age of non-residential building stock, nor is there information available about the buildings constructed since 2000. But it is safe to assume that no building in the City would meet the standards set in 2010.

### **Existing Energy Conservation Groups**

The City currently has an organization called the City of San Joaquin Energy Watch, which serves residential, small commercial and municipal customers for energy-efficiency retrofits. This organization is facilitated by PG&E with assistance from the City. Services include comprehensive energy efficiency retrofits in the small business and residential sectors, strategic energy reduction strategies for municipalities and extensive community outreach and training

### **8.5.2. Emerging Directions**

While energy conservation was not mentioned by the public in community meetings, City officials have commented that the City desires to be an energy conservation leader in the Central Valley. For these reasons in addition to legal requirements, the City should consider the following directions as it formulates General Plan policy:

- Offer retrofit rebate programs;
- Conduct energy audits;
- Prioritize the building stock by age for retrofits;
- Offer rebates/Financing for retrofitting buildings;
- Allow on-site energy creation including solar and wind power;
- Encourage biomass energy creation using surrounding area agricultural waste; and,



- Encourage the adoption of non-mandatory residential and non-residential CalGreen and Title 24 energy conservation measures.

## 8.6. Green Building

The Green Building section of the Conservation element is an extension of the energy and water conservation sections. According to the Environmental Protection Agency:

In terms of energy, buildings accounted for 39.4 percent of total U.S. energy consumption and 67.9 percent of total U.S. electricity consumption in 2002. Building occupants use 12.2 percent of the total water consumed in the U.S. per day. Buildings, and the transportation infrastructure that serves them, replace natural surfaces with impermeable materials, creating runoff that washes pollutants and sediments into surface waters. Urban runoff constitutes a major threat to water resources, as it has been identified as the fourth leading source of impairment in rivers, third in lakes, and second on estuaries ( 2010, p.3).

Having a green building framework gives the City a strong ability to reduce the energy and water consumption associated with the built environment. This will save the City and its residents money as well as reduce greenhouse gas (GHG) emissions associated with energy use.

A green building section is not required to be in the Conservation element or elsewhere within the General Plan. The City, however, intends to become a model green city in the Central Valley. Additionally, several pieces of state legislation encourage green building:

- **Executive Order S-20-04 (2004)** - encourages state agencies to reduce energy consumption for all state-owned buildings 20 percent by 2015. New construction and renovation of state buildings must meet minimum requirements for Leadership in Energy and Environmental Design (LEED) Silver certification. EO S-20-04 also created a Green Team responsible for implementing the executive order. The City can use the State's Green Action Team as a model for creating local public green buildings.
- **California Assembly Bill 2160 (2006)** - requires new public buildings to be models of energy efficiency and be designed, constructed, and equipped with energy efficiency measures, materials, and devices, subject to specified criteria, and that existing buildings be retrofitted to meet specified standards when renovated or remodeled.
- **CalGreen (Title 24) Building Code (2010)** – requires strict new standards for building energy and water efficiency. Although full compliance with the new Title 24 isn't required until January 1, 2011, it was accepted as the City's building code as of October 30, 2010.

While CalGreen is important for energy conservation, the California Governor's Office of Planning and Research (OPR) notes, "Title 24 of the California Code of Regulations incorporates energy efficiency standards into the uniform building code. However, communities can plan for greater energy efficiency in public and private construction



than is minimally required by Title 24. A more comprehensive approach to energy conservation in building construction is known as “green building.” Green building techniques integrate energy efficiency and sustainable building practices into the design and construction phases. There are several private and governmental rating systems for green buildings, such as the voluntary LEED (Leadership in Energy and Environmental Design) standard developed by the U.S. Green Building Council” (OPR, 2010, p. 127).

- **Executive Order S-3-05 and California Assembly Bill 32 (2006)**- This executive order and legislation require that the state inventory and monitor its GHG emissions to achieve GHG reduction targets as mentioned in the Energy Conservation section.

### 8.6.1. Existing Conditions

There are currently no green building ordinances or development standards in the City. Additionally, there is no mention of the concept nor is the concept alluded to in the general plan. Although the State does not provide standards or a model ordinance for green building, it does suggest using the LEED rating system for parcel-level projects. In this spirit, this element uses the LEED-ND (Neighborhood Design) rating system as an evaluative tool for green building standards.

#### LEED-ND

LEED-ND is a national rating system that evaluates sustainability in the built form at the neighborhood level. The United States Green Building Council explains, “The LEED for Neighborhood Development Rating System responds to land use and environmental considerations in the United States” (USGBC, 2009, p.7).

Although LEED-ND was established to review development and redevelopment project at the neighborhood, USGBC notes, “There is no minimum or maximum size for a LEED-ND project, but the core committee’s research has determined that a reasonable minimum size is at least two habitable buildings and that the maximum area that can appropriately be considered a neighborhood is 320 acres, or half a square mile” (USGBC, 2009, p.7). Opportunities for development in the City fit well within the limits of the LEED-ND project size.

This rating system is useful because it fulfills many of the regional planning goals set forth by OPR. For example, LEED-ND rewards development on infill sites or new developments proximate to diverse uses or adjacent to connected and previously developed land. LEED-ND also promotes the redevelopment of aging brownfield sites into revitalized neighborhoods by rewarding connections beyond the site, walkable streets within the site, and the integration of any historic buildings and structures that will give the new neighborhood development a unique sense of place.

A set of standards can be derived from LEED-ND because existing neighborhoods can also use the rating system. USGBC notes that, “LEED-ND has additional relevance for existing neighborhoods, as a tool to set performance levels for a group of owners wanting to retrofit their homes, offices, or shops, and finally for shaping new green infrastructure, such as sidewalks,

alleys, and public spaces” (USGBC, 2009, p. 7). Because LEED-ND is a carefully vetted program used to judge green building at a citywide level, it makes sense to use it as a system of standards to judge the current conditions of the City. The four most appropriate LEED-ND criteria were selected as standards: certified green building, minimum building efficiency, solar orientation, and on-site renewable energy resources.

#### Certified Green Building

Green buildings are projects at the parcel level that require significantly fewer resources for construction and operation than traditional buildings. USGBC requires that sustainable neighborhoods have at least one new or retrofitted whole building that is rated sustainable by other LEED standards. Some building specific LEED ratings include those for new construction, existing buildings operations and maintenance, homes, schools, retail new construction, core and shell.

There are currently no LEED-certified green buildings in the City.

#### Minimum Building Efficiency

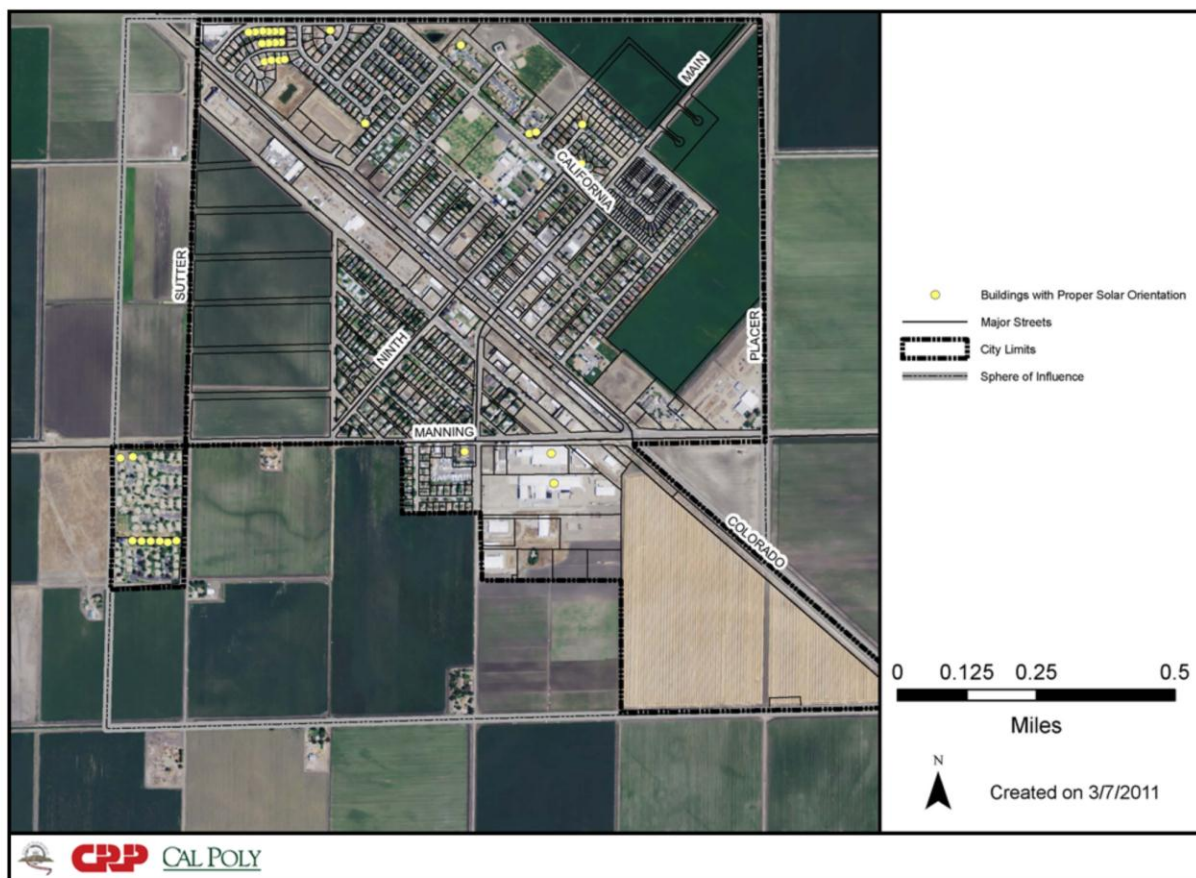
LEED-ND certification calls for a 10 percent increase over national energy efficiency standards. Since CalGreen (Title 24) also sets this goal, the City has the regulatory framework in place to meet this requirement for new buildings. A large portion of the City’s building stock was built during or before previous iterations of Title 24, however, and are out of compliance. For a more comprehensive discussion on this see Building Efficiency in the Energy Conservation section of this chapter.

#### Solar Orientation

Buildings that absorb sunlight during the winter and obstruct sun during the summer use significantly less energy than buildings designed without passive solar radiation in mind. In order to achieve a LEED-ND rating, USGBC requires that 75 percent or more of the neighborhood’s total building have one axis of each building at least 1.5 times longer than the other, and the longer axis is within 15 degrees of geographical east-west.

Figure 8-13 illustrates the buildings that currently have proper solar orientation. This is less than ten percent of the building stock. The City does not fulfill the solar orientation standard.

Figure 8-13. Buildings with proper solar orientation.



### On-Site Renewable Energy Sources

While many green building principles attempt to reduce the amount of energy required to operate a building, on-site renewable energy sources allow for additional energy use on site and in some cases can “feed the grid”, supplying power to neighbors or the power company. USGBC (2009, p.35) describes the standards as such:

To encourage on-site renewable energy production to reduce the adverse environmental and economic effects associated with fossil fuel energy production and use projects must incorporate on-site nonpolluting renewable energy generation, such as solar, wind, geothermal, small-scale or micro hydroelectric, and/or biomass, with production capacity of at least 5 percent of the *project’s* annual electrical and thermal through an accepted building energy performance simulation tool.

The opportunity for solar, biomass, and wind energy exists in the City. However, there are currently no on-site renewable energy sources in the City.

The City does not fulfill any of the LEED-ND standards. However, there are many opportunities for the City to pursue to become the gold standard for green building in the Central Valley. These are presented in the next subsection.

### 8.6.2. Emerging Directions

The residents of the City had very little to say about green building. However, City staff and the Mayor have communicated a desire to make green building a priority. There are many potential directions that the City can pursue to make development and the built environment clean, efficient and cost effective.

#### **Title 24**

The City could amend its building code to be stricter than Title 24. Creating stricter building requirements than one of the most energy efficient building codes in the country would send a message to other communities that the City is serious about energy conservation. Although stricter building standards could make construction more expensive, reduced energy requirements could offset the cost. Further, the City could market its “green” credentials to industries looking to become more environmentally friendly.

#### **Rebates for Renewable Power Generation**

The City could work with local power companies or from within the City to finance low interest loans for the installation and maintenance of renewable resource generators such as solar panels. There are currently at least two renewable energy rebate programs in California:

- California Solar Initiative. All PG&E customers that have roof or ground space that gets unobstructed sunlight from 11 a.m. to 6 p.m. year round qualify for cash back incentives for installing solar panels through the California Solar Initiative.
- Emerging Renewable Rebate Program. This California Energy Commission program provides rebates to consumers who install qualifying renewable energy systems (small wind or fuel cell electricity systems) on their property. The amount of rebate varies according to the system size, technology, and installation method.

#### **LEED-ND**

LEED-ND also has several criteria that the City could adopt into their development code, which would maximize the “greenness” of future projects.

##### Smart Location

This criterion encourages the location of new projects on sites served by existing water and wastewater infrastructure or within a legally adopted, publicly owned, planned water and wastewater service area. This criterion also suggests providing new water and wastewater infrastructure for the project if it is needed for infill development.

##### Existing Building Reuse

This criterion encourages the reuse of the existing habitable building stock. The criterion aims for reuse of 50 percent of existing building structures, 20 percent of the total existing building

stock, and absolutely no demolition of any historic buildings or any demolition that alters cultural landscapes.

#### Recycled Content In Infrastructure

This criterion seeks to reduce the adverse environmental effects of extracting and processing virgin materials for the construction of projects and infrastructures. USGBC suggests that projects should use materials for new infrastructure such that the sum of postconsumer recycled content, in-place reclaimed materials, and one-half of the pre-consumer recycled content constitutes at least 50 percent of the total mass of infrastructure materials. USGBC defines infrastructure as roadways, parking lots, sidewalks, unit paving, curbs, water retention tanks and vault, base and subbase materials for the aforementioned infrastructure, and stormwater, sanitary sewer, steam energy distribution, and water piping” (USGBC, 2009).

## 8.7. Air Quality

Good air quality is important for the health and welfare of residents in the City. The following discussion provides an overview of existing air quality conditions in the San Joaquin Valley and the City as of 2010, or as noted. It includes: a) a summary of ambient standards and the regulatory framework relating to air quality; a description of climate, air quality conditions, and typical air pollutant types and sources; and c) a discussion of air quality issues relevant to the General Plan update.

### 8.7.1. Regulatory Framework

Air quality standards, the regulatory framework, and State and Federal attainment status are discussed below.

#### **Air Quality Standards**

State and federal governments have established Ambient Air Quality Standards for six air pollutants: carbon monoxide (CO), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), lead (Pb) and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. These standards are designed to protect the health and welfare of the public.

California Ambient Air Quality Standards and National Ambient Air Quality Standards for the criteria air pollutants are listed in Table 8-4. Health effects of these criteria pollutants are described in Table 8-5.

Table 8-4. State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards <sup>a</sup>		Federal Standards <sup>b</sup>		
		Concentration <sup>c</sup>	Method <sup>d</sup>	Primary <sup>c,e,i</sup>	Secondary <sup>c,f</sup>	Method <sup>g</sup>
Ozone (O <sub>3</sub> )	1-Hour	0.09 ppm (180 µg/m <sup>3</sup> )	Ultraviolet Photometry	No federal standard	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m <sup>3</sup> )		0.075 ppm (147 µg/m <sup>3</sup> )		
Respirable Particulate Matter (PM <sub>10</sub> )	24-Hour	50 µg/m <sup>3</sup>	Gravimetric or Beta Attenuation	150 µg/m <sup>3</sup>	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m <sup>3</sup>		–		
Fine Particulate Matter (PM <sub>2.5</sub> )	24-Hour	No Separate State Standard		35 µg/m <sup>3</sup>	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m <sup>3</sup>	Gravimetric or Beta Attenuation	15 µg/m <sup>3</sup>		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m <sup>3</sup> )	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m <sup>3</sup> )	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m <sup>3</sup> )		35 ppm (40 mg/m <sup>3</sup> )		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m <sup>3</sup> )		–		
Nitrogen Dioxide (NO <sub>2</sub> )	Annual Arithmetic Mean	0.03 ppm (57 µg/m <sup>3</sup> )	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m <sup>3</sup> ) (see footnote h)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 µg/m <sup>3</sup> )		0.100 ppm (see footnote h)	None	
Lead <sup>j</sup>	Rolling 3-Month Average	–	Atomic Absorption	0.15 µg/m <sup>3</sup>	Same as Primary Standard	High-Volume Sampler and Atomic Absorption
	30-day average	1.5 µg/m <sup>3</sup>		–		
	Calendar Quarter	–		1.5 µg/m <sup>3</sup>		
Sulfur Dioxide (SO <sub>2</sub> )	24-Hour	0.04 ppm (105 µg/m <sup>3</sup> )	Ultraviolet Fluorescence		–	Spectrophotometry (Pararosaniline Method)
	3-Hour	–		–	0.5 ppm (1300 µg/m <sup>3</sup> ) (see footnote i)	
	1-Hour	0.25 ppm (655 µg/m <sup>3</sup> )		75 ppb (196 µg/m <sup>3</sup> ) (see footnote i)	–	



<b>Visibility-Reducing Particles</b>	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		<b>No Federal Standards</b>
<b>Sulfates</b>	24-Hour	25 $\mu\text{g}/\text{m}^3$	Ion Chromatography	
<b>Hydrogen Sulfide</b>	1-Hour	0.03 ppm (42 $\mu\text{g}/\text{m}^3$ )	Ultraviolet Fluorescence	
<b>Vinyl Chloride<sup>i</sup></b>	24-Hour	0.01 ppm (26 $\mu\text{g}/\text{m}^3$ )	Gas Chromatography	

Notes for Table 8-4:

<sup>a</sup> California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM<sub>10</sub>, PM<sub>2.5</sub>, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

<sup>b</sup> National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM<sub>10</sub>, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150  $\mu\text{g}/\text{m}^3$  is equal to or less than one. For PM<sub>2.5</sub>, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

<sup>c</sup> Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

<sup>d</sup> Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

<sup>e</sup> National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

<sup>f</sup> National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

<sup>g</sup> Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

<sup>h</sup> To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the EPA standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.

<sup>i</sup> On June 2, 2010, the EPA established a new 1-hour SO<sub>2</sub> standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. EPA also proposed a new automated Federal Reference Method (FRM) using ultraviolet technology, but will retain the older parasaniline methods until the new FRM have adequately permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO<sub>2</sub> standard of 0.14 ppm and the annual primary SO<sub>2</sub> standard of 0.30 ppm, effective August 23, 2010. The secondary SO<sub>2</sub> standard was not revised at that time; however, the secondary standard is undergoing a separate review by EPA. Note that the new standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the new primary national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

<sup>j</sup> 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: California ARB, 2010.

*Table 8-5. Health Effects of Criteria Air Pollutants*

Pollutant	Health Effects	Examples of Sources
Particulate matter (PM <sub>10</sub> and PM <sub>2.5</sub> )	Hospitalizations for worsened heart diseases, emergency room visits for asthma and premature death	Cars and trucks, fireplaces, woodstoves, windblown dust from roadways, agriculture and construction
Ozone (O <sub>3</sub> )	Cough, chest tightness, difficulty taking a deep breath, worsened asthma symptoms and lung inflammation	Precursor sources: motor vehicles, industrial emissions and other consumer products
Carbon monoxide (CO)	Chest pain in heart patients, headaches, nausea, reduced mental awareness and death at very high levels	Any source that burns fuel such as cars, trucks, construction and farming equipment and residential heaters and stoves
Nitrogen dioxide (NO <sub>2</sub> )	Increased response to allergens	See carbon monoxide sources
Toxic Air Contaminants	Cancer, chronic eye, lung or skin irritation, neurological and reproductive disorders	Cars, trucks, industrial sources, such as chrome platers, neighborhood businesses such as dry cleaners and service stations and building materials and products
Source: California Air Resources Board, 2010.		

The San Joaquin Valley Air Pollution Control District (the Valley Air District) is responsible for regulating air pollution emissions for every city and county in the Valley to achieve air quality that meets federal and state standards. Regulations are set for stationary sources and indirect sources, as well as for monitoring ambient pollutant concentrations. Indirect sources are facilities that do not directly emit a substantial amount of air pollution but that attract mobile

sources of pollution such as freeways, parking facilities, and education facilities. The California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (EPA) set standards to regulate mobile source emissions.

### **Federal**

The federal Clean Air Act (CAA) of 1970 set the National Ambient Air Quality Standards (NAAQS) which contain primary and secondary standards aimed to protect public health and welfare. The CAA requires states to develop and implement air pollution control plans designed to meet at minimum the NAAQS. In response, California has established the California Ambient Air Quality Standards (CAAQS). The CAA amendments of 1990 changed deadlines for attaining NAAQS as well as the remedial actions required of states that do not meet federal standards. Under the Clean Air Act, states that do not meet federal standards are designated as nonattainment. Areas in nonattainment are required to prepare the State Implementation Plan (SIP) which contains strategies and measures to attain NAAQS (SJVAPCD, 2005).

### **State**

The California Clean Air Act (CCAA) was established in 1988 and provides a planning framework for attainment of California Ambient Air Quality Standards (CAAQS). For all nonattainment categories, attainment plans are required to demonstrate a five percent per year reduction in nonattainment air pollutants or their precursors. The CCAA grants air districts the responsibility to monitor air basins that are in violation of CAAQS. Air basins in violation must prepare an air quality attainment plan (AQAP) that lays out a program to attain the CCAA mandates (SJVAPCD, 2005).

### **Regional**

The San Joaquin Valley Air Pollution Control District has jurisdiction over the San Joaquin Valley air basin. Under the federal CAA and CCAA amendments, air districts are required to implement transportation control measures and are encouraged to adopt indirect source control programs to reduce mobile emissions. In addition, the Valley Air District has adopted nonattainment plans for ozone, PM<sub>2.5</sub> and PM<sub>10</sub> because the air basin does not meet CAAQS for those pollutants (SJVAPCD, 2005).

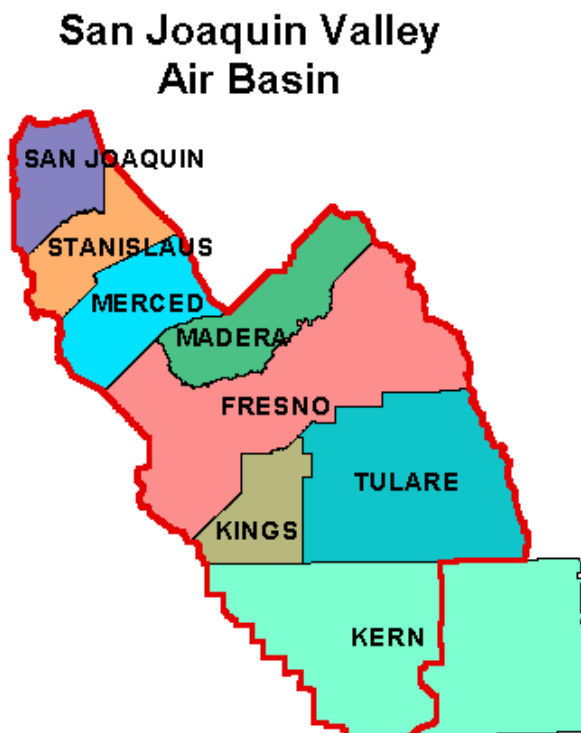
## **8.7.2. Attainment Status Designations**

The California Air Resources Board is required to designate areas of the State as “attainment”, “nonattainment” or “unclassified” for any State standard. An “attainment” designation for an area signifies that air pollutant levels did not violate the State standard for that pollutant. A “nonattainment” designation means that the State standard is not met for that pollutant. If the area is “unclassified”, there is not data to support either “attainment” or “nonattainment” status. Current state and federal designations in the San Joaquin Valley Air Basin for each criteria air pollutant are shown in Table 8-6.

*Table 8-6. San Joaquin Valley Attainment Status*

Pollutant	Designation/Classification	
	Federal Standards <sup>a</sup>	State Standards <sup>b</sup>
Ozone - One hour	No Federal Standard <sup>f</sup>	Nonattainment/Severe
Ozone - Eight hour	Nonattainment/Extreme <sup>e</sup>	Nonattainment
PM 10	Attainment <sup>c</sup>	Nonattainment
PM 2.5	Nonattainment <sup>d</sup>	Nonattainment
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead (Particulate)	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment
<sup>a</sup> See 40 CFR Part 81 <sup>b</sup> See CCR Title 17 Sections 60200-60210 <sup>c</sup> On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan. <sup>d</sup> The Valley is designated nonattainment for the 1997 PM2.5 NAAQS. EPA designated the Valley as nonattainment for the 2006 PM2.5 NAAQS on November 13, 2009 (effective December 14, 2009). <sup>e</sup> Though the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010). <sup>f</sup> Effective June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the federal 1-hour ozone standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB. Source: <i>San Joaquin Valley Air Pollution Control District, 2010.</i>		

Figure 8-14. Valley Air Basin



### 8.7.3. Existing Conditions

#### Regional Air Quality

The City is located in the San Joaquin Valley Air Basin (see Figure 8-14). The weather and terrain of the Valley, such as hot weather, surrounding mountain ranges and periods of stagnant air are ideal conditions for forming and trapping pollutants. In addition, the Valley is susceptible to inversion layers that trap polluted air over consecutive days (SJVAPCD, 2010).

The City is within the jurisdiction of the Valley Air District, which regulates air quality in the San Joaquin Valley. Air pollution in the San Joaquin Valley results from emissions generated in the Valley as well as from emissions and secondary pollutants transported into the Valley. The majority of the Valley's summer and winter air pollution is caused by locally generated emissions.

The Valley Air District develops plans and implements control measures in an effort to obtain the "attainment" designation for NAAQS and CAAQS. The District has developed plans to attain state and federal standards for ozone and particulate matter.

Though the Valley was initially classified as "serious nonattainment" for the 1997 eight-hour ozone federal standard, EPA approved Valley reclassification to "extreme nonattainment" in May 2010. In 2004, the District prepared the Extreme Ozone Attainment Demonstration Plan (OADP) that demonstrates attainment of the federal one-hour ozone standard and volatile

organic compounds (VOC) and NO<sub>x</sub> emission reductions. In March 2010, the EPA approved the San Joaquin Valley's 2004 OADP.

Currently, there are no exceedances of federal PM<sub>10</sub> standards in the region. In September 2008, the EPA redesignated the San Joaquin Valley to attainment for the PM<sub>10</sub> NAAQS and approved the 2006 PM<sub>10</sub> Maintenance Plan.

Levels of PM<sub>2.5</sub> in the Valley currently exceed State and federal standards. In 2008, the District adopted the 2008 PM<sub>2.5</sub> Plan. This plan assures that the Valley will attain all the PM<sub>2.5</sub> federal and state standards as soon as possible (SJVAPCD, 2010).

In 1996, the ARB approved the Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Areas as part of the SIP for carbon monoxide. Two years later, the EPA approved the revision (ARB, 2009). The Valley is currently considered a maintenance area for State and federal CO standards.

### **Local Climate and Air Quality**

Air quality is a result of both local climate and local sources of air pollution. Air quality is the balance of the natural dispersal capacity of the atmosphere and emissions of air pollutants from human uses of the environment. The City is located in the San Joaquin Valley air basin. The San Joaquin Valley Air Basin is defined by the Sierra Nevada in the east, the Coast Ranges in the west, and the Tehachapi mountains in the south. Due to the surrounding mountain ranges, a bowl-like topography is created in the southern end of the San Joaquin Valley.

The San Joaquin Valley Air Basin has an "inland Mediterranean" climate averaging over 260 sunny days per year. The valley floor is characterized by warm, dry summers and cooler winters. For the entire San Joaquin Valley, high daily temperature readings in summer average 95 degrees. Temperatures below freezing are unusual. Average high temperatures in the winter are in the 50s, but highs in the 30s and 40s can occur on days with persistent fog and low cloudiness. The average daily low temperature is 45 degrees (SJVAPCD, 2005).

During the summer, wind usually originates at the north end of the San Joaquin Valley and flows in a south-southeasterly direction through the San Joaquin Valley, through the Tehachapi pass, into the Southeast Desert Air Basin. The Altamont Pass also serves as a funnel for pollutant transport from the San Francisco Bay Area Air Basin into the region. During the winter, wind speed and direction usually originates from the south end of the Valley and flows in a north-northwesterly direction. Also during the winter months, the Valley experiences variable winds (less than 10 mph). Low wind speeds mixed with low inversion layers create a climate conducive to high CO and PM10 pollutant levels (SJVAPCD, 2005).

Precipitation and fog tend to reduce or limit some pollutant concentrations. Ozone needs sunlight for its formation, and clouds and fog block the required radiation. CO is slightly water-soluble, so precipitation and fog tends to "reduce" CO concentrations in the atmosphere. PM<sub>10</sub> is somewhat "washed from the atmosphere with precipitation" (SJVAPCD, 2005).

Pollutant monitoring results for the years 2007, 2008 and 2009 are shown in Table 8-7. The majority of the pollutant concentration data is from the Fresno-Drummond Street ambient air quality monitoring station. The Fresno-Drummond Street station was used because it is the nearest monitoring station with ample data collected. The station is approximately 30 miles from the City. Data from the Tranquility monitoring station and the Fresno-Hamilton and Winery station were used as well. The data presented in the table shows that air quality in the San Joaquin region has generally been good. According to the nearest monitoring stations to the City, air pollutants levels exceeded State and federal PM<sub>2.5</sub> and Ozone standards from 2007 to 2009. In addition, air pollutant levels exceeded State PM<sub>10</sub> standards from 2007 to 2009.

### Criteria Pollutants

This section provides further analysis of the criteria pollutants (shown in Table 8-7) as they apply to the San Joaquin Valley.

**Ozone (O<sub>3</sub>).** Ozone is generated from complex chemical reactions between reactive organic gases (ROG) and nitrogen oxide (NO<sub>x</sub>) that occur in the presence of sunlight. ROG and NO<sub>x</sub> generators in the San Joaquin Valley include fuel combustion, agricultural processes and industrial processes that are common in the Valley. Emissions of the ozone precursors are decreasing in the Valley Air Basin; however, despite these reductions the Valley is classified as “extreme nonattainment” for one-hour ozone standards and “serious nonattainment” for eight-hour ozone standards.

**Carbon monoxide (CO).** Carbon monoxide is an odorless, colorless gas that is highly toxic. The main source of CO in the San Joaquin Valley is motor vehicles. The emissions inventory for the San Joaquin Valley Air Basin shows that on-road motor vehicles contribute approximately 53 percent of total CO emissions. Other CO sources in the Valley include other mobile sources and fuel combustion from stationary sources. Furthermore, 44 percent of total CO emissions for the County of Fresno are from on-road motor vehicles (ARB, 2009).

**Nitrogen dioxide (NO<sub>2</sub>).** Nitrogen dioxide is a major component of nitrogen oxide (NO<sub>x</sub>), a precursor to ozone. NO<sub>x</sub> is the result of fossil fuel combustion under high temperature and pressure. On-road and off-road vehicles and fuel combustion are the major sources of this air pollutant, and they emit approximately 56 percent (on-road), 23 percent (off-road) and 10 percent (fuel combustion) of the total NO<sub>x</sub> released in the County (ARB, 2009).

**Respirable particulate matter (PM<sub>10</sub>).** PM<sub>10</sub> sources typically include combustion sources like vehicles, roads, farming activities, power generation, industrial processes and wood burning. Available PM<sub>10</sub> data varies due to meteorological effects. Long periods of stagnant air during winter months allow PM<sub>10</sub> to accumulate.

Table 8-7. Ambient Air Quality at the Fresno-Drummond Street Monitoring Station

Pollutant	Standard	2007	2008	2009
<b>Carbon Monoxide (CO)</b>				
Maximum 1 hour concentration (ppm)		ND	ND	ND
Number of days exceeded:	State: > 20 ppm	-	-	-
	Federal: > 35 ppm	-	-	-
Maximum 8 hour concentration (ppm)		2.37	2.14	1.95
Number of days exceeded:	State: > 9 ppm	0	0	0
	Federal: > 9 ppm	0	0	0
<b>Ozone (O<sub>3</sub>)<sup>a</sup></b>				
Maximum 1 hour concentration (ppm)		0.110	0.124	0.077
Number of days exceeded:	State: > 0.09 ppm	2	19	0
Maximum 8 hour concentration (ppm)		0.092	0.112	0.065
Number of days exceeded:	State: > 0.07 ppm	18	36	0
	Federal: > 0.075 ppm	9	20	0
<b>Coarse Particulates (PM<sub>10</sub>)</b>				
Maximum 24 hour concentration (µg/m <sup>3</sup> )		92.0	98.8	84.0
Number of days exceeded:	State: > 50 µg/m <sup>3</sup>	10	21	12
	Federal: > 150 µg/m <sup>3</sup>	0	0	0
Annual arithmetic average concentration (µg/m <sup>3</sup> )		38.0	40.0	ND
Exceeded for the year:	State: > 20 µg/m <sup>3</sup>	Yes	Yes	--
	Federal: > 50 µg/m <sup>3</sup>	No	No	--
<b>Fine Particulates (PM<sub>2.5</sub>)<sup>b</sup></b>				
Maximum 24 hour concentration (µg/m <sup>3</sup> )		65.1	46.6	59.6
Number of days exceeded:	Federal: > 35 µg/m <sup>3</sup>	1	1	1
Annual arithmetic average concentration (µg/m <sup>3</sup> )		16.8	16.5	14.6
Exceeded for the year:	State: > 12 µg/m <sup>3</sup>	Yes	Yes	Yes
	Federal: > 15 µg/m <sup>3</sup>	Yes	Yes	No
<b>Nitrogen Dioxide (NO<sub>2</sub>)</b>				
Maximum 1 hour concentration (ppm)		0.067	0.076	0.076
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.016	0.015	0.014
Exceeded for the year:	Federal: > 0.053 ppm	No	No	No
<b>Sulfur Dioxide (SO<sub>2</sub>)</b>				
Maximum 1 hour concentration (ppm)		ND	ND	ND
Number of days exceeded:	State: > 0.25 ppm	-	-	-
Maximum 3 hour concentration (ppm)		ND	ND	ND
Number of days exceeded:	Federal: > 0.5 ppm	-	-	-
Maximum 24 hour concentration (ppm)		ND	ND	ND
Number of days exceeded:	State: > 0.04 ppm	-	-	-
	Federal: > 0.14 ppm	-	-	-
Annual arithmetic average concentration (ppm)		ND	ND	ND
Exceeded for the year:	Federal: > 0.030 ppm	-	-	-
<sup>a</sup> 2009 O <sub>3</sub> levels are from the Tranquility-32650 West Adams Avenue Monitoring Station <sup>b</sup> PM <sub>2.5</sub> levels are from the Fresno-Hamilton & Winery Monitoring Station ppm = parts per million µg/m <sup>3</sup> = micrograms per cubic meter ND = No data. There was insufficient (or no) data to determine the value. Source: California ARB and U.S. EPA, 2010				



**Fine particulate matter (PM<sub>2.5</sub>).** Similar to PM<sub>10</sub>, PM<sub>2.5</sub> is generated from combustion sources like vehicles, power generation, industrial processes and wood burning. Regular monitoring of PM<sub>2.5</sub> in the atmosphere in California began in early 1999. The available data show that the highest 24-hour and annual average PM<sub>2.5</sub> concentration are found in the South Coast Air Basin and the San Joaquin Valley Air Basin. As stated in the previous section, the Valley Air Basin has been designated nonattainment for PM<sub>2.5</sub> for both the state and federal standards.

#### 8.7.4. Emerging Directions

Based on review of pertinent literature, four key air quality issues relevant to the City are discussed below.

#### Air Quality Issues

##### Vehicle Emissions

The total exhaust emissions from a vehicle trip are dependent upon the trip length, the speed of a trip, and the “time-in-mode” characteristics of the trip. The implication of this emissions pattern is that once a vehicle has been started and driven for a few minutes, much of the damage to air quality has already occurred. Therefore, reducing the overall number of trips generated is important to reducing mobile source emissions and improving air quality in the region. Although the rate of release drops over time, total emissions released over longer trips are still greater than total emissions for shorter trips. So if a region’s VMT rises, its overall vehicle emissions will rise as well. By reducing the number of trips generated in the City, air pollutant emissions will reduce. Proximity of services, accessibility to alternative modes of travel are key factors influencing trip length and total vehicle miles traveled (SJVAPCD, 2005). The Air District and the City will be responsible for seeking ways to minimize air quality impacts of local growth and development.

##### Construction

Construction activities cause combustion emissions from utility engines, heavy-duty construction vehicles, equipment hauling materials and motor vehicles transporting construction workers. Exhaust emissions from construction activities varies as construction activity levels change. The use of construction equipment results in localized exhaust emissions.

##### Fugitive Dust

Fugitive dust emissions are associated with demolition, land clearing, exposure of soils to the air and cut and fill operations. Dust generated by construction varies by project depending on specific operations and weather. The City is surrounded by a variety of agricultural operations therefore will continue to experience issues of fugitive dust.

##### Odors

Odors are an important factor in air quality conditions. Major sources of odors include restaurants, manufacturing plants and agricultural operations. While sources that generate odors must comply with air quality regulations, the public’s sensitivity to locally produced odors often exceed regulatory thresholds.

## 8.8. Greenhouse Gas Inventory

A Greenhouse Gas (GHG) Inventory is the systematic accounting and quantifying of GHG sources and the amount of emissions they put into the atmosphere in a given year. GHG inventories account for all greenhouse gasses including carbon dioxide, methane, fluorinated gasses, and nitrous oxide. As the 2007 IPCC background report notes, GHGs lead to climate change by absorbing and trapping the amount of radiation (heat) that reside in the Earth's atmosphere. The different GHGs have different levels of energy absorption and radiation, so for the sake of simplicity and clarity, emissions will be presented in CO<sub>2</sub> equivalency. Additionally, the international standard is to express greenhouse gases in CO<sub>2</sub> equivalents. Emissions of gases other than CO<sub>2</sub> are translated into CO<sub>2</sub> equivalents using global warming potentials. For a list of global warming potentials, see Table 8-8. The inventory accounts for anthropogenic, or human created, emissions including emissions from the built environment, energy use, vehicle use, and water use.

*Table 8-8. Greenhouse Gas Global Warning Potential.*

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	21
Nitrous Oxide (N <sub>2</sub> O)	310
Hydrofluorocarbon (HFC)-134a	1,300

*Source: EPA, 2009.*

### 8.8.1. Regulatory Framework

Executive Order S-3-05 of 2005 directed California to reduce GHG levels to:

- 2000 levels by 2010;
- 1990 levels by 2020; and,
- 80 percent below 1990 levels by 2050.

In order to implement EO S-3-05, California legislators enacted Assembly Bill 32, the California Global Warming Solution Act, which mandated state, counties, and cities to reduce GHG emissions to 1990 levels by 2020. While the implications of AB 32 on local planning aren't entirely clear, two court settlements suggest that it is the responsibility of local planning documents, especially the General Plan, to inventory GHG emissions as a first step towards achieving AB 32 goals.

#### San Bernardino Settlement

In 2006, the County of San Bernardino prepared a general plan update that had no specific GHG reduction measures. In March, 2007, the County certified the EIR for the general plan update. The General Attorney's Office of California sued the County of San Bernardino for non-compliance with AB 32. Specifically, the State of California claimed, "It is the Attorney General's position that the General Plan EIR did not adequately analyze the adverse effects of implementation of the General Plan Update on air quality and climate change and did not

adopt feasible mitigation measures to minimize the adverse effects of implementation of the General Plan Update on climate change and air quality” (The People of the State of California V. The County of San Bernardino, 2007, p. 1). In August 2007, the State dropped the lawsuit under several conditions. One major condition was that the County of San Bernardino had to produce a GHG Emissions Reduction Plan, which includes an inventory of all known emission sources in the County and a baseline inventory of the GHGs being emitted from those sources. The State also required the County to estimate its 1990 emissions and project its 2020 emissions assuming full build out of the general plan.

### **Stockton Agreement**

The City of Stockton released a draft Environmental Impact Report for its general plan update in 2007. The document suggested that the City would grow by nearly 50 percent by the year 2035. Noting that build out under the new general plan would exacerbate GHG emissions and air quality issues in the San Joaquin Valley, the Sierra Club sued the City of Stockton to block the general plan update. The Attorney General decided to support the Sierra Club’s position. Stockton settled the lawsuit out of court with an agreement to create a climate action plan to significantly reduce GHG emissions in the next 20 years. A central part of that climate action plan is the inventory of GHG emissions.

The San Bernardino Settlement and the Stockton Agreement suggests that the State expects general plans to help cities comply with AB 32. Because meaningful GHG reduction policies vary greatly depending on the types of emissions associated with a community, a thoughtful and comprehensive GHG inventory is critical for targeting policies to cut emissions in the City and increase the quality of life for its residents.

### **8.8.2. Existing Conditions**

Under AB 32 and the two aforementioned agreements, there are two types of GHG inventories that must occur. The first identifies sources of GHG emissions. The second inventories and forecasts the actual emissions. This report inventories the sources of GHG emissions. Once the sources are identified, the amount of energy required to operate these sources (i.e. electricity for streetlights or water pumping, gasoline for vehicles) must be estimated. Once the energy requirements have been found, there are multipliers available to calculate GHG emissions. Table 8-9 shows the multiplier for each energy source.

There are two categories of GHG emission sources in the City: municipal emission and private emissions.

Table 8-9. Emissions Multiplier by Utility.

Utility	Unit	CO <sub>2</sub> (lbs)	N <sub>2</sub> O (lbs)	CH <sub>4</sub> (lbs)	CO <sub>2</sub> e (lbs)	Metric Tons CO <sub>2</sub> e
Electricity	(kWh)	0.724	0.0000081	0.00000302	0.726467	0.00033
Natural Gas	(therms)	11.68	0.000022	0.001298	11.71637	0.00531
CA Gasoline	(gallons)	19.38	0	0	19.38	0.00879
CA Diesel	(gallons)	22.33	0	0	22.33	0.01013

Note: CO<sub>2</sub>e is Carbon Dioxide Equivalent.

Source: California Climate Action Registry, 2009, p.40.

## Municipal Emissions

Municipal emissions are all GHG emissions that occur from government buildings, vehicles, infrastructure, and related businesses. Sources include, but are not limited to:

### City Buildings

Energy associated with heating and cooling air and water for buildings produce a significant portion of GHG emissions in most cities.

*Schools.* There is one school in the City. San Joaquin Elementary School is run by The Golden Plains Unified School District (GPUSD). The Planning Team will work with the school district on behalf of the City to obtain average electricity, water use, and student bus system routes.

*Sheriff's Office.* Like the elementary school, the Sheriff's Department office is within city limits, but not run by the city. The City needs to work with the Department to obtain average electricity use, water use, and vehicle fleet information.

*Government Center.* City Hall is on the corner of Colorado and South 12th and is approximately 2,400 square feet. The City could identify emissions associated with energy and water use.

*Recreation Center.* The Recreation Center has emissions associated with energy and water use. If the City has records on energy and water bills, its emissions could be calculated.

### City infrastructure

*Streetlights.* There are approximately 120 traditional overhead streetlights in the City. There are an additional 16 lights on Main Street in the newly remodeled downtown area.

*Power for water delivery.* In 2009, the City consumed over 186 million gallons of water. The City needs to work with the Public Works Department to calculate the amount of energy it takes to pump this much water.

### City Fleet.

A City official disclosed that there are approximately ten vehicles in the City fleet. The ten vehicles range from brand-new to more than fifteen years old and range from medium-duty trucks to sedan-type cars. There are several additional old vehicles and large pieces of machinery that are no longer in operation. The City is currently in the process of finding more detailed records regarding their fleet including information on gasoline consumption and vehicle types/model years.

### **Private Emissions**

Private emissions are all GHG emissions that come from non-governmental operations within the city limit. Sources include, but are not limited to:

### Transportation.

Transportation often accounts for a significant portion of GHG emissions. There is no available data from Cal Trans regarding vehicle miles travelled (VMT). VMT needs to be calculated for the quantification of GHG emissions from the transportation sector. If VMT's cannot be calculated, they can be estimated by using the Council of Government's (COG) model or by sampling vehicle count data.

### Residential.

Residential emissions include GHGs caused by energy use from residential buildings. This includes electric use, electricity associated with water use, and natural gas use. To quantify the emissions, the City will need to find a data source of average energy bills for residential building.

### Commercial & Industry .

Commercial & Industry emissions come from the same sources as residential emissions, namely the consumption of energy. Additional GHG factors include CO<sub>2</sub> release from tilling, and the intense use of energy through processes such as manufacturing, refrigeration, field watering, and chemical processing. Chemical creation is particularly important given that a large chemical company is within the sphere of influence of the City.

## **8.8.3. Emerging Directions**

The existing conditions report identifies the sources of GHGs in the City. The next step is to obtain energy consumption data associated with each of the sources and convert that into GHG emissions. Once this inventory is complete, 1990 estimates and 2020 projections need to be calculated. These estimates and projections enable the City to consider General Plan policies to reduce GHGs and comply with AB 32. It also provides a foundation for the City to write a climate action plan.

## **8.9. References**

ARB. (1996). California State Implementation Plan (SIP) for Carbon Monoxide.  
<http://www.arb.ca.gov>. November 2010.

- AWS Truewind. (2010). "California Annual Average Wind Speed at 80 m." Retrieved November 29, 2010. [http://www.windpoweringamerica.gov/images/windmaps/ca\\_80m.jpg](http://www.windpoweringamerica.gov/images/windmaps/ca_80m.jpg).
- California Air Resources Board (2009). Emissions Inventory Data. <http://www.arb.ca.gov/ei/emissiondata.htm>. November 2010.
- California Building Standards Commission (2010). <http://www.bsc.ca.gov/CALGreen/default.htm>
- California Climate Action Registry. (2009). *California Climate Action Registry General Reporting Protocol*. Retrieved November 30, 2010. [http://www.climateregistry.org/resources/docs/protocols/grp/GRP\\_3.1\\_January2009.pdf](http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf)
- California Department of Fish and Game. (2010). <http://www.dfg.ca.gov/habcon/cesa/>. Retrieved November 2010.
- California Department of Water Resources. (2009). California Water Plan Update 2009: Integrated Water Management.
- California Department of Water Resources. (January 20, 2010). San Joaquin Valley Groundwater Basin: Kings Subbasin. California's Groundwater Bulletin 118.
- California Home Building Foundation. (2010). Water Use in the California Residential Home.
- California Native Plant Society. (2010). <http://www.cnps.org/cnps/rareplants/ranking.php>. Retrieved November 2010.
- California Natural Resources Agency. (2002). [http://ceres.ca.gov/wetlands/permitting/Porter\\_summary.html](http://ceres.ca.gov/wetlands/permitting/Porter_summary.html). Retrieved November 2010.
- California Urban Water Conservation Council. (2010). <http://www.cuwcc.org/2column.aspx?id=13738>
- California Water Education Foundation. (2006). Where Does My Water Come From? <http://www.watereducation.org/watersources/subpage.asp?rid=&page=382>.
- City of Los Angeles Department of Power and Water. (2008). Securing L.A.'s Water Supply. City of Los Angeles.
- City of San Joaquin and James Irrigation District. (2010). Draft Joint Groundwater Management Plan
- County of Fresno. (2000). General Plan Background Report. October.

- Environmental Protection Agency. (2009). Buildings and their Impact on the Environments: A Statistical Report. Retrieved November 1, 2010: <http://www.epa.gov/greenbuilding/pubs/gbstats.pdf>
- Environmental Protection Agency. (2010). [http://www.epa.gov/owow/wetlands/pdf/reg\\_authority\\_pr.pdf](http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf). Retrieved 2010.
- Environmental Protection Agency. (2010). <http://www.epa.gov/lawsregs/laws/esa.html>. Retrieved November 2010.
- Environmental protection Agency. (2009). "Emission Facts: Metrics for Expressing Greenhouse Gas Emissions: Carbon Equivalents and Carbon Dioxide Equivalents." Retrieved November 28, 2010. <http://www.epa.gov/oms/climate/420f05002.htm>.
- Gasparac, Christine. (2008). "Attorney General Brown Forges Greenhouse Gas Reduction Agreement With City of Stockton." Office of the Attorney General. Retrieved October 29, 2010: <http://ag.ca.gov/newsalerts/release.php?id=1608>
- Governor's Office of Planning and Research. (2003). General Plan Guidelines.
- Knier, Gil. (2002). "How Do Photovoltaics Work?" National Aeronautics and Space Administration. Retrieved November 5, 2010: <http://science.nasa.gov/science-news/science-at-nasa/2002/solarcells/>
- Mono Lake Committee. (2010). Water Conservation. <http://www.monolake.org/about/waterconservation>
- National Renewable Energy Lab. 2010 "Biomass Energy Basics." Retrieved November 10, 2010: [http://www.nrel.gov/learning/re\\_biomass.html](http://www.nrel.gov/learning/re_biomass.html).
- Pacific Institute. (2003) Waste Not, Want Not: The Potential for Urban Water Conservation in California. Appendix B [http://www.pacinst.org/reports/urban\\_usage/appendix\\_b.pdf](http://www.pacinst.org/reports/urban_usage/appendix_b.pdf).
- People of the State of California V. The County of San Bernardino. (2007). CIVSS 070039. Retrieved November 10, 2010. [http://ag.ca.gov/cms\\_pdfs/press/2007-08-21\\_San\\_Bernardino\\_settlement\\_agreement.pdf](http://ag.ca.gov/cms_pdfs/press/2007-08-21_San_Bernardino_settlement_agreement.pdf)
- Pitzer, Gary. (October 9, 2009). Salinity in the Central Valley: A critical problem. <http://aquaforia.com/archives/13578>. Aquaforia.
- San Joaquin Valley Air Pollution Control District (SJVAPCD). (2005). Air Quality General Plan Guidelines. Existing Air Quality and Regulatory Environment.
- SJVAPCD. (2010). Air Quality Information. <http://www.valleyair.org/aqinfo/aqdataidx.htm>. November 2010



SJVAPD. (2010). Air Quality Plans. <http://www.valleyair.org/aqinfo/aqdataidx.htm>. November 2010.

Solomon, S., D. Qin, M. Manning, Z. Chen, and H.L. Miller. (2007). Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. Cambridge University Press: New York.

SROeco Solar. (2010). "US Solar Radiation Map." Retrieved November 20, 2010. <http://sroeco.com/solar/calculate-solar-array-size#more-693>

United States Census Bureau. 2000. Summary File 3, Table H034 "Age of Housing Stock". Retrieved November 4, 2010.: [http://factfinder.census.gov/servlet/CTTable?\\_bm=y&-context=ct&-ds\\_name=DEC\\_2000\\_SF3\\_U&-mt\\_name=DEC\\_2000\\_SF3\\_U\\_H034&-tree\\_id=403&-all\\_geo\\_types=N&-geo\\_id=16000US0667126&-search\\_results=16000US0667126&-dataitem=DEC\\_2000\\_SF3\\_U\\_H034.H034001|DEC\\_2000\\_SF3\\_U\\_H034.H034002|DEC\\_2000\\_SF3\\_U\\_H034.H034003|DEC\\_2000\\_SF3\\_U\\_H034.H034004|DEC\\_2000\\_SF3\\_U\\_H034.H034005|DEC\\_2000\\_SF3\\_U\\_H034.H034006|DEC\\_2000\\_SF3\\_U\\_H034.H034007|DEC\\_2000\\_SF3\\_U\\_H034.H034008|DEC\\_2000\\_SF3\\_U\\_H034.H034009|DEC\\_2000\\_SF3\\_U\\_H034.H034010&-format=&-\\_lang=en](http://factfinder.census.gov/servlet/CTTable?_bm=y&-context=ct&-ds_name=DEC_2000_SF3_U&-mt_name=DEC_2000_SF3_U_H034&-tree_id=403&-all_geo_types=N&-geo_id=16000US0667126&-search_results=16000US0667126&-dataitem=DEC_2000_SF3_U_H034.H034001|DEC_2000_SF3_U_H034.H034002|DEC_2000_SF3_U_H034.H034003|DEC_2000_SF3_U_H034.H034004|DEC_2000_SF3_U_H034.H034005|DEC_2000_SF3_U_H034.H034006|DEC_2000_SF3_U_H034.H034007|DEC_2000_SF3_U_H034.H034008|DEC_2000_SF3_U_H034.H034009|DEC_2000_SF3_U_H034.H034010&-format=&-_lang=en)

United States Department of Energy. (2010). "Wind and Water Program." U.S. Department of Energy: Energy Efficiency & Renewable Energy. Retrieved November 3, 2010. <http://www1.eere.energy.gov/windandhydro/>

United States Green Building Council. (2009). Green Neighborhood Development. Retrieved November 7, 2010: <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>.

Urban Water Management Act (10610.4c).

U.S. Fish and Wildlife Service. (2010). <http://www.fws.gov/pacific/migratorybirds/mbta.htm>. Retrieved November 2010.

Water Conservation Act of 2009 (Senate Bill X7-7).

Williamson, A. K., D. E. Prudic, and L. A. Swain. (1989). Ground-Water Flow in the Central Valley, California. USGS. Professional Paper 1401-D. 127p.

World Wildlife. (2001). [http://www.worldwildlife.org/wildworld/profiles/terrestrial/na/na0801\\_full.html](http://www.worldwildlife.org/wildworld/profiles/terrestrial/na/na0801_full.html). November 2010.

## 9. OPEN SPACE

---

### 9.1. Introduction

The Open Space Element is a mandatory element of all General Plans in California, defined by Government Code §65302(e). The City's current General Plan (1994) combines the element of Open Space with the optional Recreation element, and the agricultural aspects of the Conservation element into a single category. It states that this is done since "policy and goal development for a community such as San Joaquin is clearly integrated" (p. 66).

This combination of elements addresses the wide variety of open space types defined by the Office of Planning and Research (OPR) in the General Plan Guidelines (2003), which states that open space can be utilized "for the preservation of natural resources" (p. 82), "for the managed production of resources" (p. 83), "for outdoor recreation" (p. 83), and "for public health and safety" (p. 84).

The current General Plan does not address any conservation issues. In this background report, they are discussed in Chapter 8, Conservation.

### 9.2. Existing Conditions

The City's open space consists of two categories: agricultural and recreational. The City's agricultural open space is of both local and statewide concern as this productive soil contributes to domestic food security as well as providing local revenue and employment. Its recreational open space increases quality of life by providing opportunities for gathering and social interaction, health benefits through relaxation and exercise, and general enjoyment.

#### 9.2.1. Agricultural Open Space

The preservation and sound management of agricultural land is of utmost importance to the City as it is located in the center of one of the most productive agricultural areas in the world (California Research Bureau, 1997), and the City's economy is based primarily upon agricultural production.

The City's existing general plan (1994) acknowledges the importance of this relationship, calling for "a continual respect for the interaction between urban growth issues and agricultural resource protection" (p. 66), "policies that ensure well planned and structured growth" (p. 66), and stating that "as the City grows to accommodate the housing and urban needs of the region's population, the City will ensure that land conversion to urban uses is based on preservation of agricultural lands, protecting the City from leap frog development, and delays development until urban development is needed" (p. 68).

---

### **Effects of Large Lot Housing on Open Space**

Large lot development (by residential standards) that takes place on the edge of a community and extending into farmland has multiple negative consequences. In these conditions, farmland is broken up into parcels not large enough to ensure viable farming practices, a large amount of agricultural land is needlessly converted, productivity is lost, and municipal resources are stretched (Arendt, 1996).

Within existing City limits, land to the northeast of existing development (shown in Figure 9-1) is currently divided into relatively high density parcels, consistent with existing design and policy. The proposed subdivisions to the southwest of existing development (shown in Figure 9-2) are also divided into compact parcels, consistent with existing design and policy.

Of concern is the area to the west of City limits. This area is divided into ten acre parcels (see Figure 9-3), which is the smallest viable size for agriculture. This area is the only land outside of the city limits designated as Residential Reserve, which indicates where local governments plan to annex land for city development in the future (see Figure 9-4). To preserve farmland, these parcels must either be kept at their current size to facilitate farming, or divided into small size high density lots to encourage smart growth with limited impact on overall acreage.

Figure 9-1. High Density Parcels within Northeast San Joaquin.

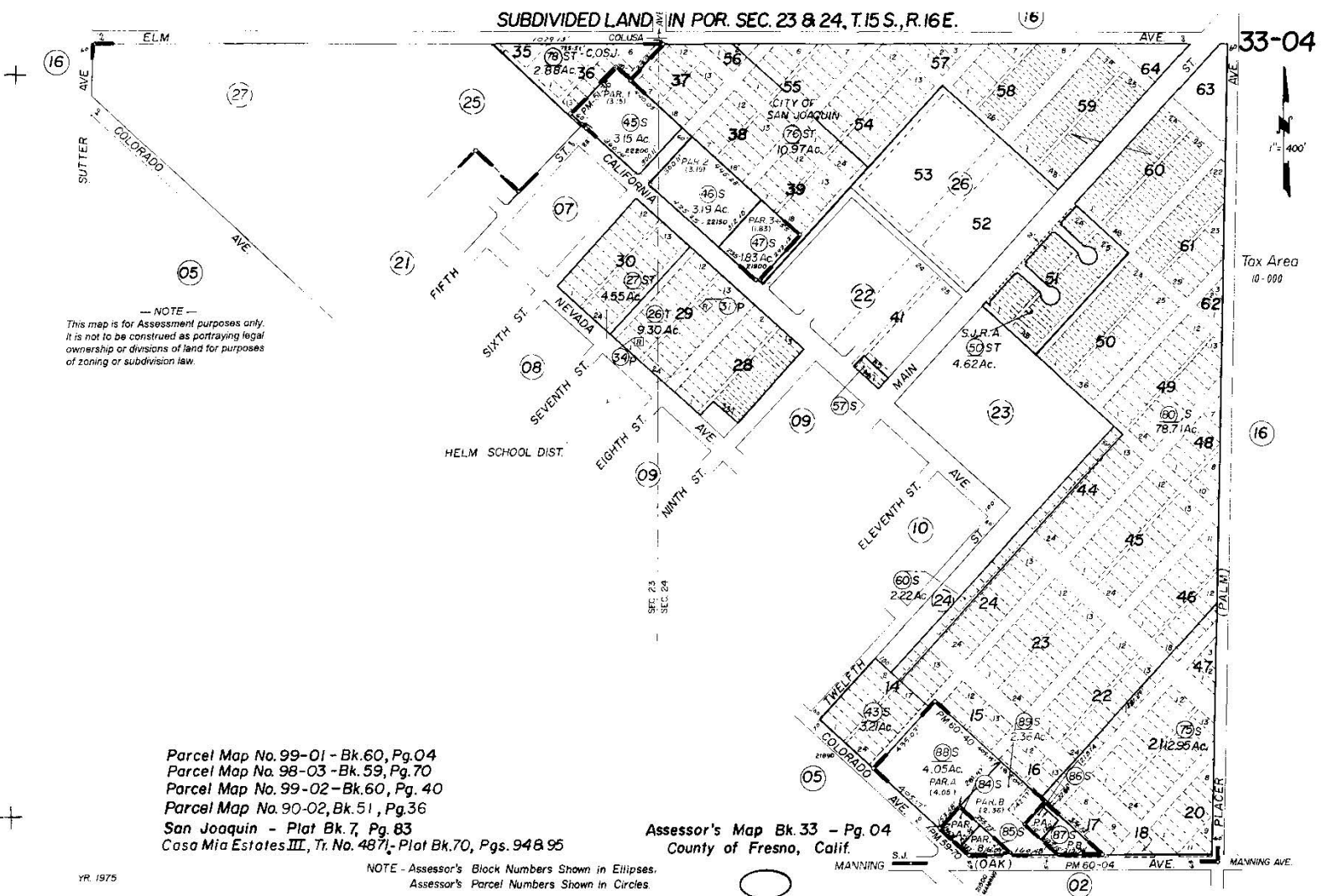




Figure 9-2. Tentative tracts for southwest San Joaquin.



Figure 9-3: Large acreage parcels for county land directly west of San Joaquin.

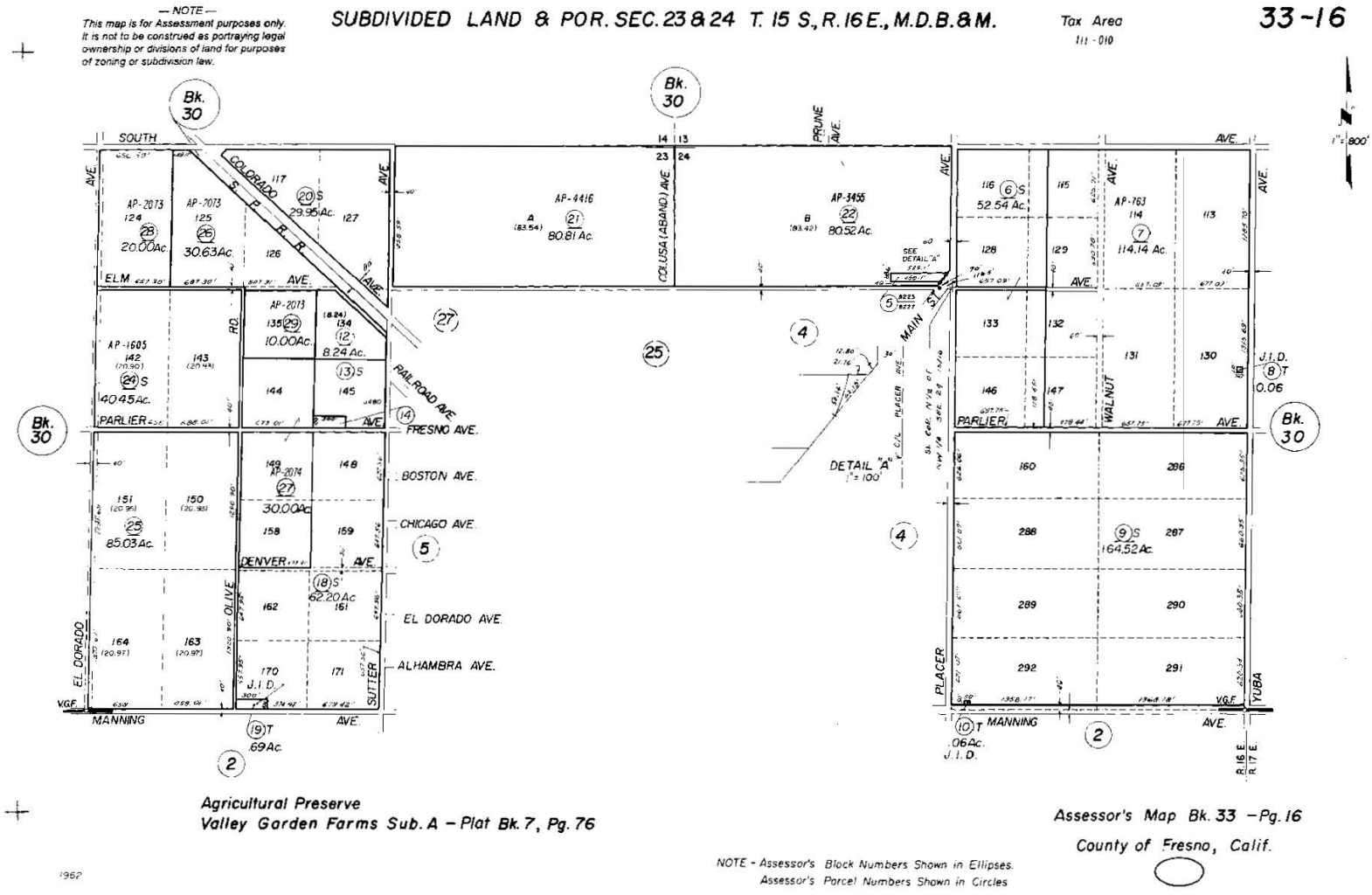
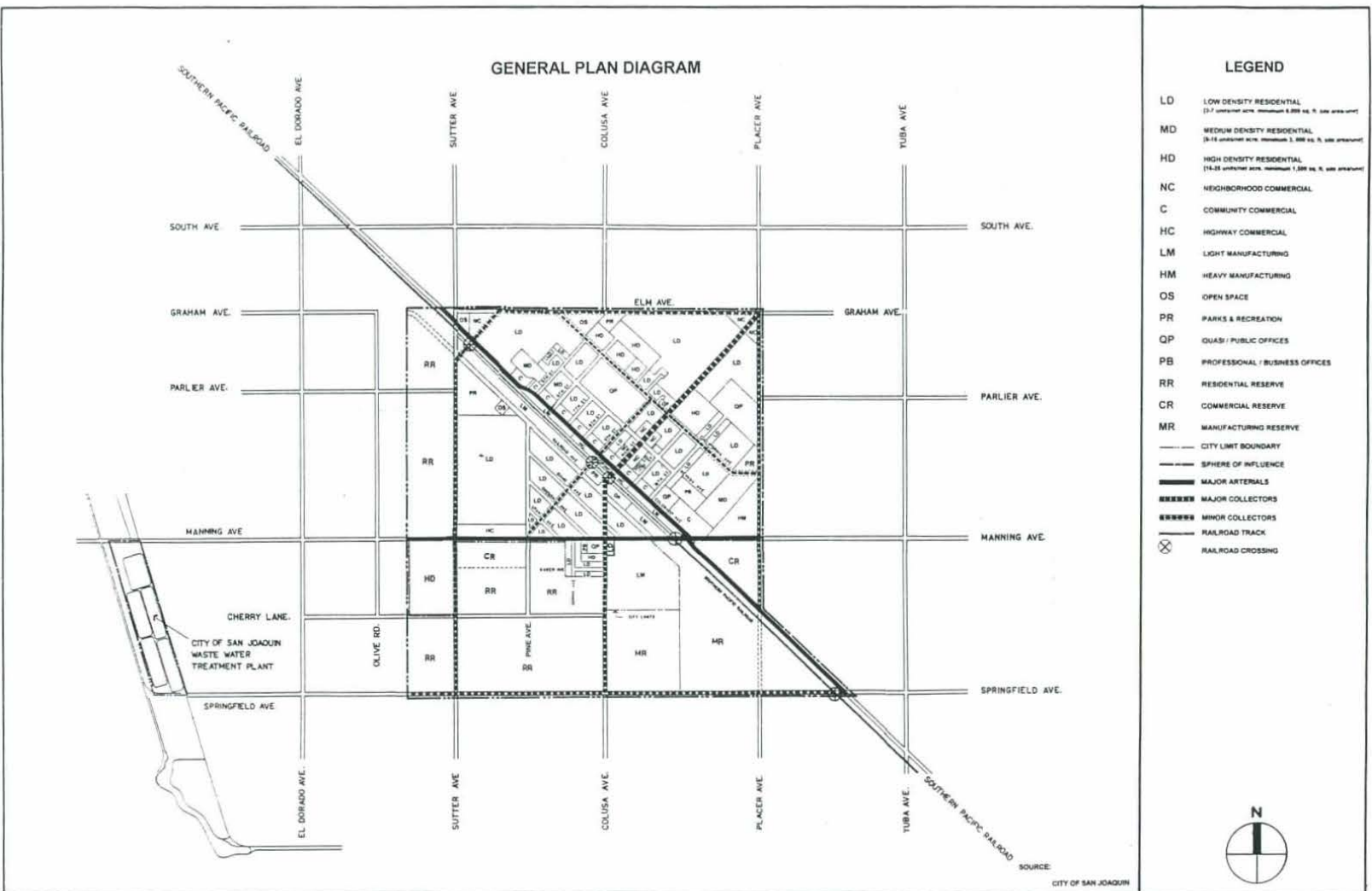


Figure 9-4. Existing zoning under General Plan.





### **Williamson Act & Prime Farmland**

The U.S. Department of Agriculture defines prime farmland as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops... It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks” (Soil Survey Division Staff, 1993, chapter 6 page 3).

Prime farmland is one of the nation’s most valuable resources, especially so in California, and it is also one of the most threatened. Development patterns over the last several decades have involved the conversion of ever greater amounts of farmland, with an increasing percentage of land converted being prime (American Farmland Trust, 2009).

The City is situated directly in the middle of a large zone of prime farmland (see Figure 9-5). An increase of outward growth in the City has the potential to fragment this land, reduce its farming viability, and in doing so deplete one of the City’s primary resources. Smart growth policies in the City are essential for this region’s agricultural future.

The California Land Conservation Act of 1965, better known as the Williamson Act, helps to sustain farming efforts by allowing farmers to enter into a voluntary contract with local governments that prohibits development for a period of ten years. In exchange, farmland is assessed for tax purposes at dramatically reduced levels (State of California Department of Conservation, 2007). While these contracts help sustain farming, they have not been effective at preventing the conversion of farmland once a pattern of low density expansive development is in place (Kovacs, 2008).

The current areas of proposed expansion in the City place new development directly adjacent to the two main patches of farmland adjacent to the City that are not currently under conservation easements (see Figure 9-6). Because of the potential impact of these developments, the City should consider pursuing contracts on these parcels. If the owners do not wish to enter Williamson Act contracts, indicating a desire to cease farming and begin development, the need for the use of Smart Growth principles in these newly developing areas is reinforced.

Figure 9-5. Map of soil quality for Fresno County.

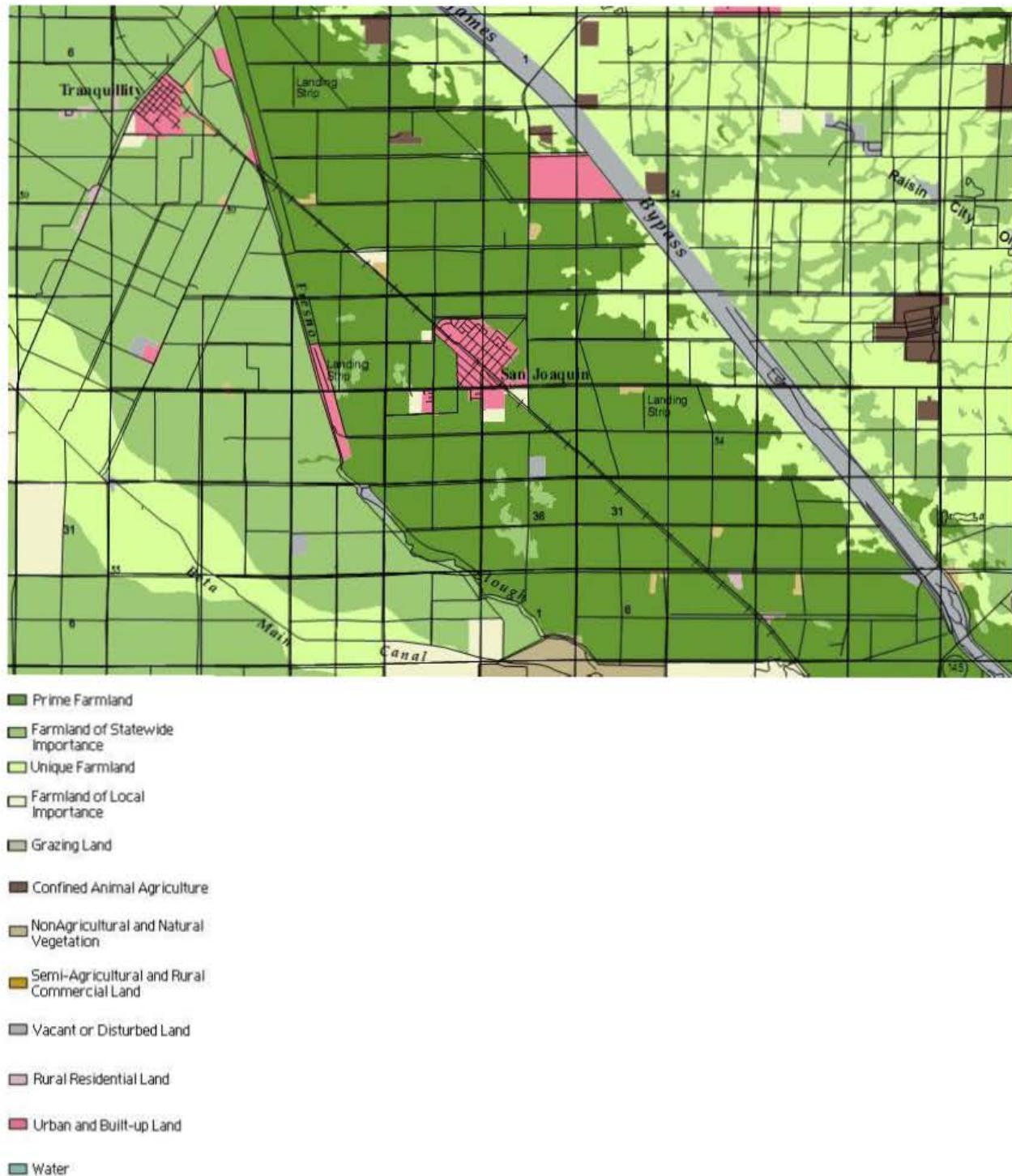
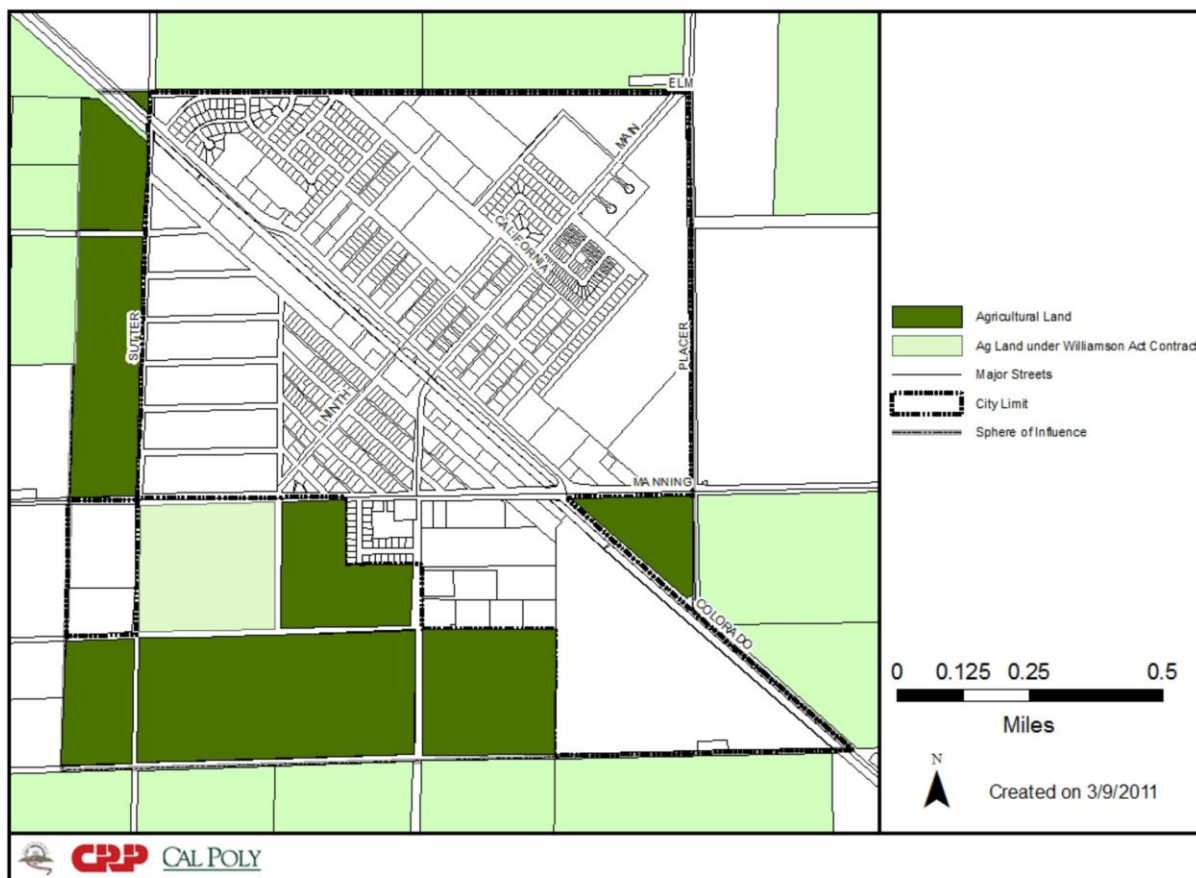


Figure 9-6. Map of parcels under Williamson Act contracts.



### 9.2.2. Recreation

All of the open spaces, within the City, not used for agricultural production are devoted to recreational uses. The City currently has three areas of open space within the city. The first is a 1.2 acre park which includes a young children's play area, a basketball court, a skate park, and a covered barbecue pit and picnic area. The second is the 8.6 acre Elementary School playground, composed primarily of four baseball diamonds, as well as four basketball courts and a kindergarten play area. The third is an area on the northeast edge of the City comprised of a .15 acre play structure and grass hillside with benches next to a 3.5 acre baseball diamond. The City's recreational spaces are analyzed next using national standards as well as a local needs assessment.

Table 9-1. NRPA Standards for Parks

NRPA Standards for Park Acreage					
Component	Use	Service Area	Desirable Size	Acres/1,000 Population	Desirable Size Characteristics
Mini-park	Specialized facilities that serve a concentrated or limited population or specific group, such as tots or senior citizens.	Less than 1/4 miles radius	1 acre or less	0.25 to 0.5 A	With neighborhoods and in close proximity to apartment complexes, townhouse development or housing for the elderly.
Neighborhood Park or Playground	Area for intense recreational activities, such as field games, crafts, playground apparatus areas, skating, picnicking, wading pools, etc.	1/4 to 1/2 mile radius to serve a population up to 5,000 (a neighborhood)	15+ acres	1.0 to 2.0 A	Suited for intense development. Easily accessible to neighborhood population (geographically centered for safe walking and biking access). May be developed as a school park facility.
Community Park	Area of diverse environmental quality. May include areas suited for intense recreation facilities, such as athletic complexes, large swimming pools. May be an area of natural quality for outdoor recreation, such as walking, viewing, sitting, picnicking. May be any combination of the above, depending upon site suitability and community need.	1 to 2 mile radius (several neighborhoods)	25+ acres	5.0 to 8.0 A	May include natural features, such as water bodies and areas suited for intense development. Easily accessible to neighborhood served.
Total Close-to-Home Space = 6.25 - 10.5 A/1,000					

Source: Lancaster, 1983, p. 56

## Park Standards

The most widely used set of standards are those provided by the National Recreation and Park Association (NRPA). A subset of the standards is given in Table 9-1. Overall at least 6.25 acres of open space are desired per thousand residents. With 4,000 residents, the City should have at least 25 acres of space. The current acreage of 13.46 falls short of these standards.

The NRPA standards, however, are based on studies taken nationwide, most frequently in metropolitan regions far larger than the City, and do not necessarily provide an appropriate measure of comparison to the City. With similar concerns, the Colorado Department of Smart Growth (State of Colorado, 2003) did a study of towns under 10,000 in population, and published a set of guidelines to give more specific guidance than the NRPA, shown in Table 9-2.



**Table 9-2. Small Communities Parks Standards**

Facility Category	Parks System Facility Types	Number of Facilities Needed per 1000 Residents (demand)	Acres required to accommodate 1 facility	Total acres required per 1000 Residents (park land standard)
Sports Fields	Soccer/Multi-Use Field	0.95	2.21	2.10
	Ball Field (Baseball/Softball)	0.61	3.77	2.30
Courts	Tennis Court	0.97	0.17	0.17
	Basketball Court	0.91	0.16	0.15
	Volleyball Court	0.13	0.10	0.01
Outdoor Recreation	Small Skatepark (7000 sq. ft. footprint)	0.16	0.18	0.03
	Full-Sized Skatepark (17,000+ sq. ft. footprint)	0.06	0.50	0.03
	BMX Track (Standard ABA Certified)	0.16	3.12	0.50
	Paved Multi-Use Trail (per mile)	1.04	2.43	2.53
	Dirt/Gravel Multi-Use Trail (per mile)	2.33	1.83	4.25
	Fishing Accessible Shoreline (per mile)	0.32	3.64	1.16
	River Put-In/Take-Out with Boat Ramp (per acre)	0.07	1.00	0.07
Leisure	Playground (per 3200 sq. ft. of fully developed area)	0.16	0.14	0.02
	Family Picnic Area	6.25	0.01	0.08
	Group Picnic Area (with shelter)	0.36	2.06	0.74
	Park Bench	7.69	0.00	0.00
Other Recreational Facilities	Swimming Pool (outdoor)	0.12	0.34	0.04
	Ice Hockey Rink (full-sized, refrigerated, covered)	0.1	0.90	0.09
	Outdoor Events Venue (per acre)	0.42	3.19	1.34

A brief comparison of the City's existing conditions to the small town standards show that while the City has plenty of baseball fields and basketball courts, it is lacking in variety of open space types. Although NRPA acreage totals do not apply directly to cities such as San Joaquin, the standards for distances are applicable. Mini-parks are currently the only park spaces that exist in the City. The NRPA standards state that the service area for a mini park is ¼ mile from a mini-park, as seen in Table 9-1 above. In Figure 9-7, all of the houses outside the circles are more than ¼ mile from a park, and are not being served by them. Of additional concern is the planned growth depicted in Figures 9-1 and 9-2, most of which take place outside of the existing circles, and do not include provisions for additional park space.

*Figure 9-7. Parcels within 1/4 mile of a park.*



While the use of national standards is useful for determining the general adequacy of the City's open space areas, the key resource for determining the emerging directions of future open space uses is community feedback. .

### **Quimby Act**

The Quimby Act was passed in 1975, and is defined by California Government Code §66477. The goal of this act is to allow cities, if they choose to enact Quimby ordinances, to require developers to set aside land for open space, create conservation easements, or pay fees that will be used by the city to provide new recreational space (Westrup, 2002). Based loosely on NRPA standards, jurisdictions would be allowed to require three to five acres of recreational space per 1,000 new residents.

Public backlash against the Quimby Act brought about Assembly Bill 1600 (California Government Code §66025). This bill requires agency accountability. Cities now must justify the concessions they require from developers, set up specific standards, and hold public hearings about the use of open space and funds (Westrup, 2002).

With the current lack of recreational open space within the City, and the large distances between proposed developments and existing open space, it should be easy for officials to justify concessions from developers. Effort should be made, however, to strike a balance between concessions that would discourage developers and the City's need for housing, especially affordable housing.

### 9.3. Emerging Directions

There are no new emerging directions for the City's agricultural land. Current practices and policies are encouraging conservation, and should be maintained.

Many lots within the City are currently vacant, as development has stalled with the recent economic downturn. This trend will reverse at some point; therefore it is essential for the City to enact long term policies regarding development.

In the survey administered at Community Meeting 1, many residents of the City were queried about what they would like their city to have. Many of their responses dealt with increases in recreational open space. The following were listed as desired for the City:

- More trees
- Plant flowers
- Small village feel
- More park facilities (bathrooms, water, lighting, benches, amenities, etc.)
- Swimming pool
- More shade in parks
- Centralized park and parks
- Running and hiking trails
- Develop a water park
- Places for kids 8-12 to play

It was also suggested that the vacant lots within the City be used for something productive. The valuable farmland surrounding the City and areas within the City are too far from any form of recreational space; therefore, intra-city vacant lots are ideal candidates for conversion into park open space to meet the community's needs. Further surveys and community outreach ask residents which services are the most desired, and what vacant areas should be targeted for future development. This data helps formulate goals for Quimby Act policies, should the City choose to adopt them.



At a community dinner in the City, community members who chose to participate selected the open space features they would like to see in the City, indicated by placing stickers on their two favorite options. A summary of collected data is given in Table 9-3.

*Table 9-3. Data Summary from Community Dinner Workshop.*

Open Space Feature	Number of Votes
Open Meadow	2
Community Garden	4
Promenade	7
Green Pathways	9
Skate Park	10
Baseball Diamond	11
Play Structure	11
Picnic Area	16
Soccer Fields	16

43 people gave feedback on the poster. Activities for families and children were chosen with the most frequency: a picnic area was chosen with the most frequency, followed by soccer fields, play structures, and baseball fields. The respondents were primarily elementary and high school aged children and their mothers. A majority of children chose soccer fields, the baseball diamond, the skate park, or some combination of these. Nearly all mothers chose the picnic area, and were more likely to choose green pathways than other groups. The baseball diamond was very popular with the few fathers who participated.

The enthusiasm respondents showed toward these different options, as well as the broad selection in popular choices, reinforce patterns seen in the earlier survey, and further shows the City's need for increased open space and increased variety. As San Joaquin develops, it is important that land is set aside for these uses.

## 9.4. References

American Farmland Trust. (2009). Farming on the Edge Report. Retrieved from <http://www.farmland.org/resources/fote/default.asp>

Arendt, R. (1996). Grower greener. Covelo, CA: Island Press.

Kovacs, Kent (2008), Farmland Conversion in California: Evidence from the Williamson Act Program, University of California: Giannini Foundation of Agricultural Economics, available at [http://www.agecon.ucdavis.edu/extension/update/articles/v11n5\\_2.pdf](http://www.agecon.ucdavis.edu/extension/update/articles/v11n5_2.pdf)

Lancaster, R.A., Ed. 1983. Recreation and Park Open Space Standards and Guidelines. Alexandria, Virginia

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

State of California Department of Conservation. (2007). Williamson Act Program - Basic Contract Provisions. Retrieved from [http://www.conservacion.ca.gov/dlrp/lca/basic\\_contract\\_provisions/Pages/Index.aspx#what%20is%20the%20california%20land%20conservation%20\(williamson\)%20act](http://www.conservacion.ca.gov/dlrp/lca/basic_contract_provisions/Pages/Index.aspx#what%20is%20the%20california%20land%20conservation%20(williamson)%20act)

State of Colorado. Colorado Department of Local Affairs, Office of Smart Growth. (2003). Small community park and recreation standard. Retrieved from <http://dola.colorado.gov/osg/docs/Park%20Standards%20Report.pdf>

Westrup, L. California State Parks, Planning Division. (2002). Quimby act 101: an abbreviated overview. Retrieved from [http://www.cprs.org/membersonly/Sum02\\_Quimby.htm](http://www.cprs.org/membersonly/Sum02_Quimby.htm)



# 10. SAFETY

---

## 10.1. Introduction

The Safety element is a required element in any general plan in the State of California according to General Plan Guidelines published by the Governor's Office of Planning and Research (OPR). In the safety element, the general plan addresses the protection of humans and property from natural and man-made hazards. Some of these hazards are naturally occurring, such as seismic, wildfire or geologic hazards. Others are related to human activity including risks related to developing in flood plains, increasing urban fire hazards through buildings and the storage, handling, and transport of hazardous materials. At a minimum, the safety element of a general plan must address seismic, fire, flood, and geologic hazards as outlined under California Government Code §65302(g).

An important aspect of ensuring community safety is identifying hazards in and around a jurisdiction. Hazards are defined by the California State Hazard Mitigation Plan (CSHMP) as “an event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural losses, damage to the environment, interruption of business, or other types of harm or loss” (2010, p. 98). Hazards related to the elements presented in the general plan have been identified in this background report and mapped when appropriate. Identifying hazards can help guide other sections of the general plan and ensure that humans and property are protected from the hazards. Hazard identification can also guide local decisions related to zoning, subdivisions and other permits.

This chapter covers the following broad areas:

- Seismic and geologic Hazards
- Flooding
- Wildfires
- Human Made Hazards
- Hazard Mitigation Planning

Each hazard is discussed in terms of standards, existing conditions in San Joaquin, assessment of conditions, and directions for the future in the City.

## 10.2. Existing Conditions

General plans are required to have safety elements, as outlined in California Government Code § 65302(g) which must include mapping of known seismic and geologic hazards, and address evacuation routes, peak water supply requirements and minimum road widths and clearances. Also included in the safety element is information related to earthquakes, such as dam failure, ground failure, landslides and liquefaction.

The City is located in the central San Joaquin Valley of California between the Sierra Nevada and Coast Range Mountain Ranges in Fresno County. The City's climate is semi-arid and the average precipitation is about nine inches annually. The City is at an approximate elevation of 170 feet and is located on flat terrain surrounded mainly by agricultural land (San Joaquin General Plan, 1995).

### 10.2.1. Seismic and Geologic Hazards

This section addresses hazards related to the seismic and geologic setting of the City. This includes discussion of earthquakes, faults, ground shaking, subsidence, surface fault ruptures, landslides, liquefaction and expansive soils.

#### Regulations

State and local regulations on development pertaining to seismic and geologic hazards are presented in this section. This includes fault location, liquefaction, fault rupture, landslides, subsidence and expansive soils.

##### Seismic Hazards Mapping Act (Public Resources Code 2690)

The Seismic Hazards Mapping Act of 1990 (SHMA) (Public Resources Code, Chapter 7.8, Section 2690-2699.6) requires the Department of Conservation, California Geological Survey (CGS) to identify and map areas at risk of liquefaction, earthquake-induced landslides and amplified ground shaking. Local jurisdictions are required to use information produced by the California Geological Survey in their land use and building permit process.

##### Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code 2621)

This act, passed in 1972, is used to prevent the construction of buildings used for human occupancy on active faults. While the Seismic Hazards Mapping Act (mentioned above) addresses non-surface fault hazards related to earthquakes, the Alquist-Priolo Earthquake Fault Zoning Act addresses only the hazard of surface fault rupture. The Act requires the State geologist to establish Earthquake Fault Zones around surface traces of active faults and identify these zones in maps. The Act also outlines further geologic investigation required when projects are proposed in an Earthquake Fault Zone (Seismic Safety Commission, 2007).

##### Unreinforced Masonry Law (Public Resources Code 8875)

Passed in 1986, this law requires jurisdictions located in the highest zone of seismicity, Zone 4, as identified in the Uniform Building Code to inventory their unreinforced masonry buildings and establish programs to reduce risk related to these buildings (Seismic Safety Commission).

##### California Building Code

The California Building Codes also regulate buildings in regard to seismic safety. The Uniform Building Code, a model building code adopted widely in the United States is also used in the California building code, with additional amendments necessary for California.

## **Current Setting**

This section discusses the seismic and geologic hazards that could threaten the City and surrounding area. This includes a discussion of the City's general geologic and seismologic character, as well as the locations of active faults and other areas of interest.

Information for this section was gathered from a variety of sources. Some documents consulted include: the County of Fresno Master Plan and Background Report, the County of Fresno Hazard Mitigation Report and the State of California's Hazard Mitigation Report. Other information was also gathered from the California Department of Conservation's Geological Survey.

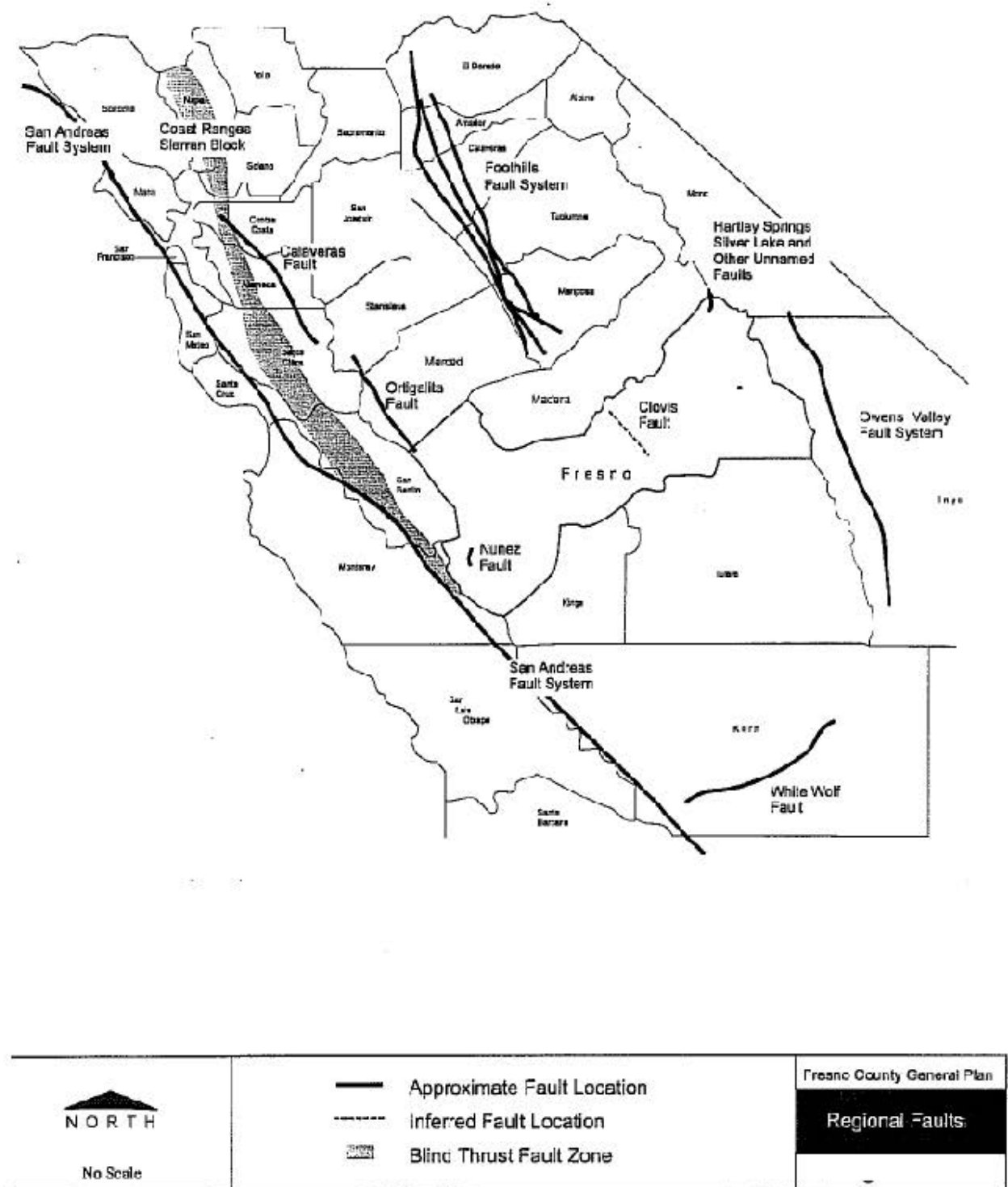
### **Faults, Earthquakes, and Ground Shaking**

Earthquakes are one of the main issues related to seismology in hazard planning in California. An earthquake occurs when there is a sudden slip on a fault that pushes the sides of the fault together, which releases built up energy. The energy is released in waves that travel through the earth's crust, which causes the shaking felt during an earthquake. According to the Fresno County Multi-Hazard Mitigation Plan (2010), seismic shaking is usually the greatest cause of losses to structures during earthquake events (p. 44).

There are no known active faults that run through the City. An active fault is defined by the California State Department of Conservation, Division of Mines and Geology as a fault that has had surface displacement within the last 11,000 years. This does not mean faults that have not shown evidence of displacement in this time period are inactive. Faults are only considered inactive if they have not shown displacement in the last 1.6 million years (Fresno County Hazard Mitigation Plan, 2010).

As illustrated in Figure 10-1, the nearest active fault, the Coalinga Fault, is approximately 40 miles west of the City. The San Andreas Fault is located 50 miles to the west, and the Owens Valley Fault is located approximately 100 miles to the east. The Clovis Fault is northwest-trending and about five miles east of the City of Clovis. It has been determined that the greatest potential for a significant earthquake would be from the San Andreas Fault.

Figure 10-1. Regional Earthquake Faults.



Source: Fresno County General Plan



The 2007 Uniform Building Code (UBC) indicates that the City is located within Seismic Risk Zone 3, as illustrated in Figure 10-2, although it is relatively close to Zone 4 located to the west. UBC states that buildings constructed in Zone 4 are subject to higher standards than other zone designation buildings. Places located on alluvial deposits, like the City, tend to experience more intense ground shaking than those located on solid rock. However, because the City is far from any active faults, it is relatively unlikely that ground shaking in the City would be more than minimal (San Joaquin General Plan, 1995). According to the Fresno County Multi-Hazard Mitigation Plan, the City has a 20 to 30 percent chance of shaking 10 percent in the next 50 years (2008, p. 53).

#### Surface Fault Rupture

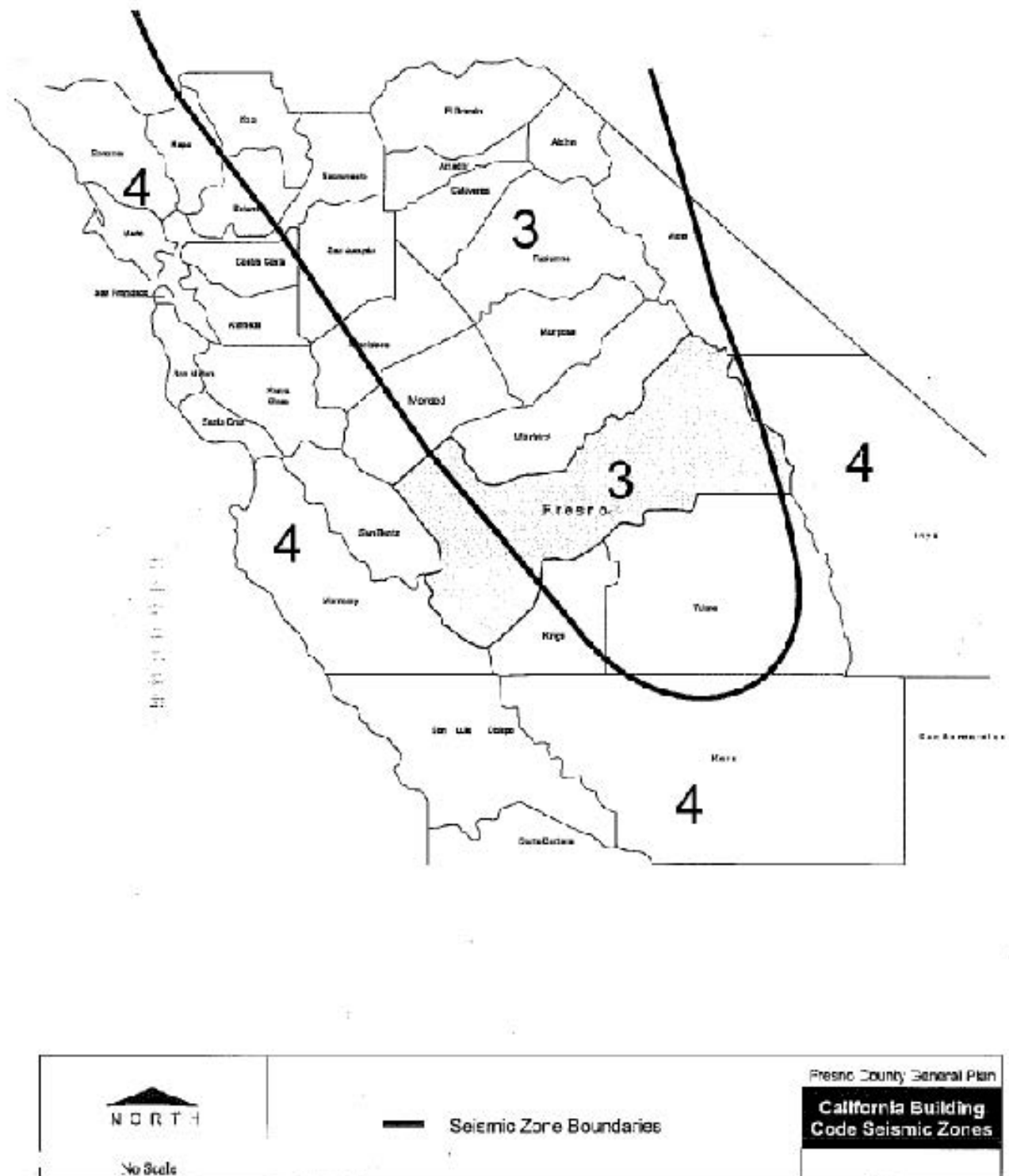
As described previously, the nearest active fault to the City is the Clovis fault, located approximately 40 miles away. The City is not crossed by the Alquist-Priolo Earthquake Fault Zone; thus, the risk of surface fault ruptures within the City is low.

Past earthquakes in Fresno County are presented in the County Multi-Hazard Mitigation Plan and include the 1983 earthquake in Coalinga along the Nunez fault, which is located near Coalinga. This earthquake measured 6.7 on the Richter scale and destroyed 800 buildings. In 1985, a magnitude 6 earthquake occurred about 10 kilometers east of Coalinga.

#### Liquefaction

Liquefaction can cause significant damage to structures on level ground during an earthquake. During liquefaction, soil temporarily acts like a fluid and loses its stability. The Fresno County Multi-Hazard Mitigation Plan (2008) states that locations where the water table is less than 30 feet below the surface are prone to liquefaction. This happens in the San Joaquin Valley, however the soils in these areas are often too coarse or too high in clay content to liquefy. Again, the distance of the City from the nearest active fault, reduces its probability of soil liquefaction.

Figure 10-2. Seismic Risk Zone Boundaries.



Source: California Code of Regulations Title 24

### Landslide

Figure 10-3 illustrates that the City is not located in an area at risk of landslides because topography is predominantly level.

### Subsidence

Land subsidence refers to the gradual settling or sudden sinking of the Earth's surface due to movement of material below the surface. Main causes of subsidence include aquifer system compaction, drainage of organic soils, underground mining, natural compaction, sinkholes, hydro compaction and thawing permafrost (USGS). Subsidence from ground water withdrawals can be classified as elastic or inelastic. Elastic subsidence is not permanent and can usually be reversed. Inelastic subsidence is permanent and happens when groundwater is extracted from a confined aquifer for the first time.

As seen in Figure 10-3, the City is located in an area of deep subsidence. The Joint Groundwater Management Plan (2010) discusses subsidence in the San Joaquin Valley in depth. It notes that subsidence in the San Joaquin Valley has been studied extensively, and has been a concern for several decades. Subsidence has been studied by both the USGS and the Department of Water Resources (DWR). These groups found that between 1950 and 1970, 5,200 square miles in the Valley had subsided more than one foot. According to the Joint Groundwater Management Plan, between the mid 1920s and 1980, the San Joaquin Valley experienced inelastic, non-reversible subsidence. It has been estimated that land in the San Joaquin Valley area has subsided as much as eight feet. According to the County Multi-Hazard Mitigation Plan, subsidence has stabilized in the County.

The County Multi-Hazard Mitigation Plan indicates that subsidence can be a significant issue as it can result in serious damage to structures, roads, canals and irrigation districts and underground utilities and pipelines.

### Expansive Soils

There are hazards related to the swelling of soils or soft bedrock as they expand when absorbing large quantities of water. The expansion of soil can exert pressure on foundations and other confining structures, causing significant structural damage. As described in the FCHMP (2008), soils are usually classified into three expansive soil classes with low, moderate and high potential for expansion. The City does not contain moderately-high or high expansive soil potential.

**Fresno County General Plan**  
**Landslide Hazards and Areas of Subsidence**  
**Figure 9-6**

**Legend:**

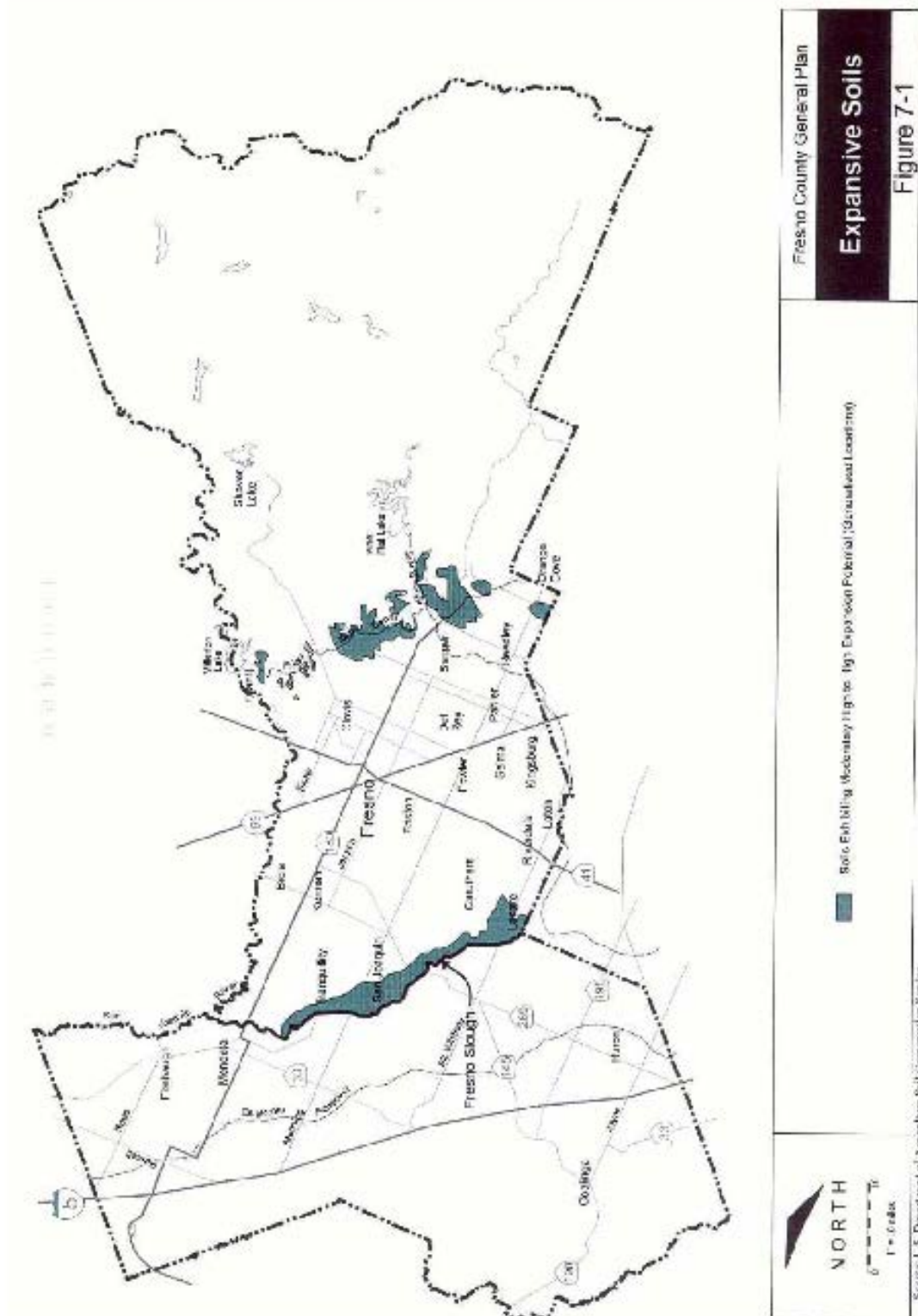
- Moderate Landslide Hazard
- High Landslide Hazard
- Chalkier Outcrops
- Areas of Subsidence

**Scale:** 0 10 Miles

**North Arrow:** NORTH

186

Figure 10-4. Expansive Soils.



Source: Fresno County General Plan

### 10.2.2. Flood

Flood events can cause significant damage to structures, landscapes and economies, and can severely impact human health as standing water and wet structures can facilitate the breeding of microorganisms causing sickness and death (FCHMP, 2008). This section presents relevant regulations regarding flood hazards and development as well as the existing flood risks in and around the City including risk of dam inundation. Information from this section was mainly gathered from the Fresno County Multi-Hazard Mitigation Plan, the Fresno County General Plan and Background Report and the Federal Emergency Management Agency (FEMA).

#### Regulations

##### Flood Insurance Act of 1968

This act created the National Flood Insurance Program and facilitates the identification of flood hazard zones for insurance and floodplain management purposes. In addition, it provides a statement of probability of future flood event occurrence. Regulations restrict development in Special Flood Hazard Areas, defined by FEMA as having a one percent or greater annual chance of flooding (also called the 100-year flood plain).

Specific construction requirements include the issuance of FEMA Elevation Certificates during construction projects permitting and review processes. Additionally, the code includes minimum floor elevations, and the prohibition of basements, wine cellars and other enclosed areas below grade.

##### 2007 California Flood Legislation

In 2007, California saw the advent of five acts pertaining to flood hazards and planning in the Central Valley. These acts include Senate Bills 5 and 17 and Assembly Bills 5, 70, and 156. A sixth bill, Assembly Bill 162, was signed separately and outlines additional regulations related to the consideration of flooding in local land use planning in the State. Together, these acts do several things to make flood hazards more important in planning documents and processes. First, they direct the California Department of Water Resources (DWR) and the Central Valley Flood Protection Board to prepare and adopt a Central Valley Flood Protection Plan by mid-2012. The 200-year flood event is established through this legislation as the minimum level of flood protection required in urban and urbanizing areas. This legislation also requires the DWR and Board to approve levee flood protection zone maps and send yearly notices to property owners in levee flood protected zones (2007 California Flood Legislation Summary, 2007). The bills also contain elements intended to address the chance of flooding as well as the consequences of flooding in the Central Valley.

##### Flood Hazard Areas (Title 15, Chapter 15.48)

Fresno County Ordinance Chapter 15.48, "Flood Hazard Areas," attempts to minimize loss of life and property due to flooding. It includes provisions to prevent the construction of flood barriers that may increase flood hazards in other areas, restrict and prohibit uses which are dangerous or result in increases in erosion or flood, and control the alteration of natural floodplains, stream channels and protective barriers, among other items.



Chapter 15.48.050 of the ordinance, as outlined in the FCHMP, appoints the director of the Department of Public Works and the Planning to administer and implement the regulations in the chapter and also addresses standards for construction in flood areas.

### **Current Setting**

Several types of floods can impact cities in Fresno County, as outlined in the FCHMP. These include localized flooding, which occurs from intense weather events; riverine flooding, which occurs when a watercourse exceeds its capacity; and dam failure flooding when a dam failure causes flooding in a waterway.

Flooding is a natural occurrence in the Central Valley because it serves as a drainage basin for watersheds in the Sierra Nevada and Coast Range mountains. There is a lack of data regarding flooding events on smaller streams; however the Fresno County General Plan Background Report indicates that there were a number of significant flood events since 1990, most related to increased rainfall.

Generally, areas adjacent to water channels are called floodplains. Floodplains are illustrated in maps created by FEMA in the National Flood Insurance Rate Program. In the past, FEMA has indicated that the City is not in a major flood zone; this was changed in 2007, however. As described in the Fresno County Multi-Hazard Mitigation Plan, the most recent Flood Insurance Rate Maps (FIRMs) produced by FEMA have reclassified areas designated as “X” zones or protected from a 100-year flood event by levees, to flood hazard “A”, as illustrated in Figure 10-5. This will directly impact the City, which is now located entirely within flood hazard zone “A”.

### **Dam Inundation**

As indicated by Figure 10-6, the City is at risk of dam inundation should a dam fail. The FCHMP states that dam failure is “likely” to happen and that vulnerability in the County in general is “very high” (2008, p. 176). Dam failure can be small or catastrophic in scale and would cause downstream flooding and could result in loss of life or property.

### **Localized Flooding**

Additionally, the City has identified several areas where localized flooding occurs. These are indicated in Figure 10-7 and include areas along Colorado Boulevard and the railroad tracks.



**FIRM FLOOD INSURANCE RATE MAP**  
**FRESNO COUNTY, CALIFORNIA**  
**PANEL 250 OF 2025**  
 (SEE PANEL 250 OF 2025 FOR PANEL LOCATION)  
 DATE: 10/10/2025  
 SCALE: 1" = 200'  
 MAP NUMBER: 82502500  
 MAP REVISED: FEBRUARY 18, 2009  
 Federal Insurance Management Agency

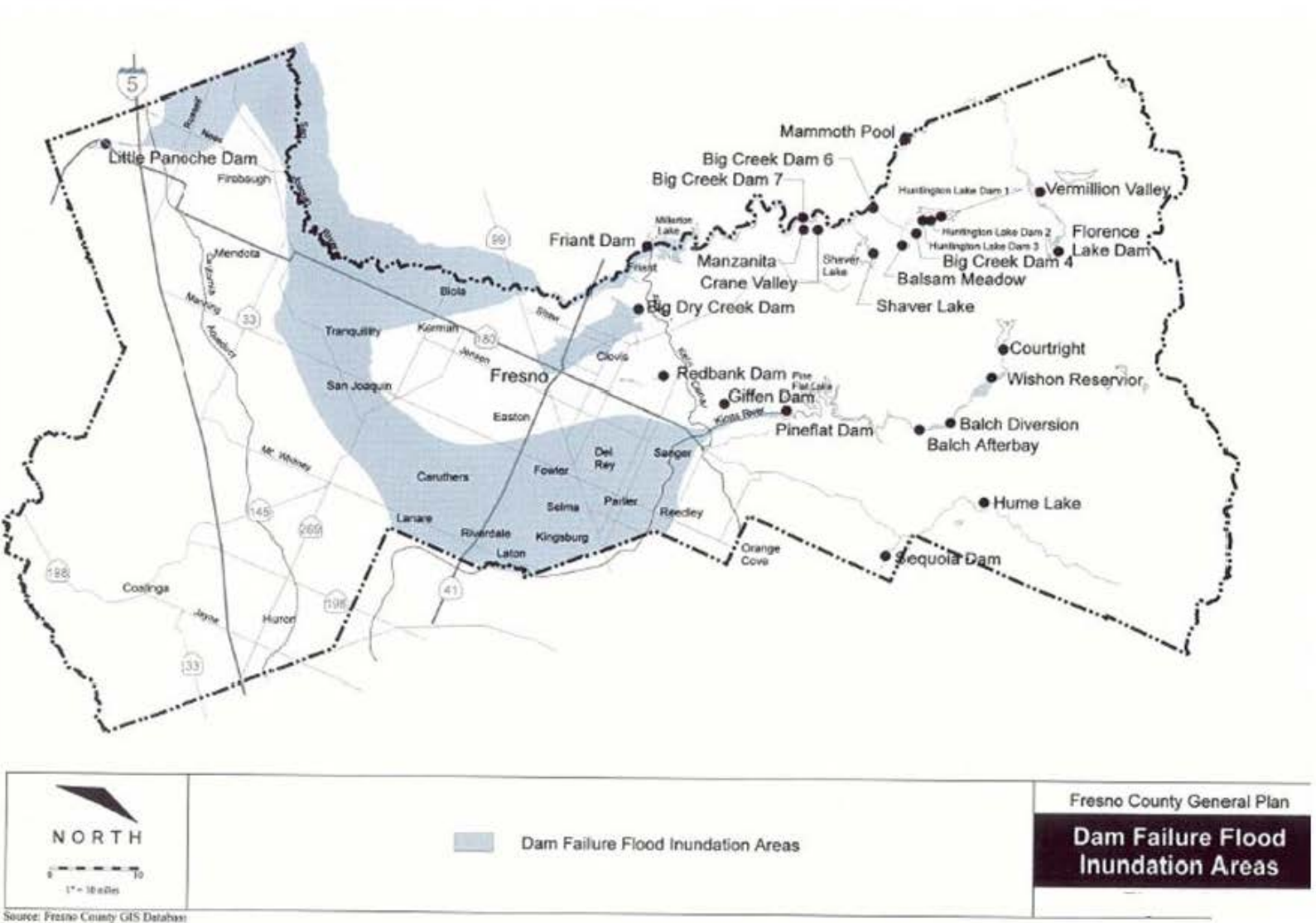
**City of San Joaquin 060055**  
**City of San Joaquin 060055**  
**City of San Joaquin 060055**

**Zone A**  
**Zone X**

**California Avenue**  
**Fresno Slough**  
**W. Manning Canals**  
**Top Duck**  
**OU1013**  
**OU1014**  
**OU1016**  
**OU1017**  
**OU1018**  
**OU1019**  
**OU1020**  
**OU1021**  
**OU1022**  
**OU1023**  
**OU1024**  
**OU1025**  
**OU1026**  
**OU1027**  
**OU1028**  
**OU1029**  
**OU1030**  
**OU1031**  
**OU1032**  
**OU1033**  
**OU1034**  
**OU1035**  
**OU1036**  
**OU1037**  
**OU1038**  
**OU1039**  
**OU1040**  
**OU1041**  
**OU1042**  
**OU1043**  
**OU1044**  
**OU1045**  
**OU1046**  
**OU1047**  
**OU1048**  
**OU1049**  
**OU1050**  
**OU1051**  
**OU1052**  
**OU1053**  
**OU1054**  
**OU1055**  
**OU1056**  
**OU1057**  
**OU1058**  
**OU1059**  
**OU1060**  
**OU1061**  
**OU1062**  
**OU1063**  
**OU1064**  
**OU1065**  
**OU1066**  
**OU1067**  
**OU1068**  
**OU1069**  
**OU1070**  
**OU1071**  
**OU1072**  
**OU1073**  
**OU1074**  
**OU1075**  
**OU1076**  
**OU1077**  
**OU1078**  
**OU1079**  
**OU1080**  
**OU1081**  
**OU1082**  
**OU1083**  
**OU1084**  
**OU1085**  
**OU1086**  
**OU1087**  
**OU1088**  
**OU1089**  
**OU1090**  
**OU1091**  
**OU1092**  
**OU1093**  
**OU1094**  
**OU1095**  
**OU1096**  
**OU1097**  
**OU1098**  
**OU1099**  
**OU1100**  
**OU1101**  
**OU1102**  
**OU1103**  
**OU1104**  
**OU1105**  
**OU1106**  
**OU1107**  
**OU1108**  
**OU1109**  
**OU1110**  
**OU1111**  
**OU1112**  
**OU1113**  
**OU1114**  
**OU1115**  
**OU1116**  
**OU1117**  
**OU1118**  
**OU1119**  
**OU1120**  
**OU1121**  
**OU1122**  
**OU1123**  
**OU1124**  
**OU1125**  
**OU1126**  
**OU1127**  
**OU1128**  
**OU1129**  
**OU1130**  
**OU1131**  
**OU1132**  
**OU1133**  
**OU1134**  
**OU1135**  
**OU1136**  
**OU1137**  
**OU1138**  
**OU1139**  
**OU1140**  
**OU1141**  
**OU1142**  
**OU1143**  
**OU1144**  
**OU1145**  
**OU1146**  
**OU1147**  
**OU1148**  
**OU1149**  
**OU1150**  
**OU1151**  
**OU1152**  
**OU1153**  
**OU1154**  
**OU1155**  
**OU1156**  
**OU1157**  
**OU1158**  
**OU1159**  
**OU1160**  
**OU1161**  
**OU1162**  
**OU1163**  
**OU1164**  
**OU1165**  
**OU1166**  
**OU1167**  
**OU1168**  
**OU1169**  
**OU1170**  
**OU1171**  
**OU1172**  
**OU1173**  
**OU1174**  
**OU1175**  
**OU1176**  
**OU1177**  
**OU1178**  
**OU1179**  
**OU1180**  
**OU1181**  
**OU1182**  
**OU1183**  
**OU1184**  
**OU1185**  
**OU1186**  
**OU1187**  
**OU1188**  
**OU1189**  
**OU1190**  
**OU1191**  
**OU1192**  
**OU1193**  
**OU1194**  
**OU1195**  
**OU1196**  
**OU1197**  
**OU1198**  
**OU1199**  
**OU1200**  
**OU1201**  
**OU1202**  
**OU1203**  
**OU1204**  
**OU1205**  
**OU1206**  
**OU1207**  
**OU1208**  
**OU1209**  
**OU1210**  
**OU1211**  
**OU1212**  
**OU1213**  
**OU1214**  
**OU1215**  
**OU1216**  
**OU1217**  
**OU1218**  
**OU1219**  
**OU1220**  
**OU1221**  
**OU1222**  
**OU1223**  
**OU1224**  
**OU1225**  
**OU1226**  
**OU1227**  
**OU1228**  
**OU1229**  
**OU1230**  
**OU1231**  
**OU1232**  
**OU1233**  
**OU1234**  
**OU1235**  
**OU1236**  
**OU1237**  
**OU1238**  
**OU1239**  
**OU1240**  
**OU1241**  
**OU1242**  
**OU1243**  
**OU1244**  
**OU1245**  
**OU1246**  
**OU1247**  
**OU1248**  
**OU1249**  
**OU1250**  
**OU1251**  
**OU1252**  
**OU1253**  
**OU1254**  
**OU1255**  
**OU1256**  
**OU1257**  
**OU1258**  
**OU1259**  
**OU1260**  
**OU1261**  
**OU1262**  
**OU1263**  
**OU1264**  
**OU1265**  
**OU1266**  
**OU1267**  
**OU1268**  
**OU1269**  
**OU1270**  
**OU1271**  
**OU1272**  
**OU1273**  
**OU1274**  
**OU1275**  
**OU1276**  
**OU1277**  
**OU1278**  
**OU1279**  
**OU1280**  
**OU1281**  
**OU1282**  
**OU1283**  
**OU1284**  
**OU1285**  
**OU1286**  
**OU1287**  
**OU1288**  
**OU1289**  
**OU1290**  
**OU1291**  
**OU1292**  
**OU1293**  
**OU1294**

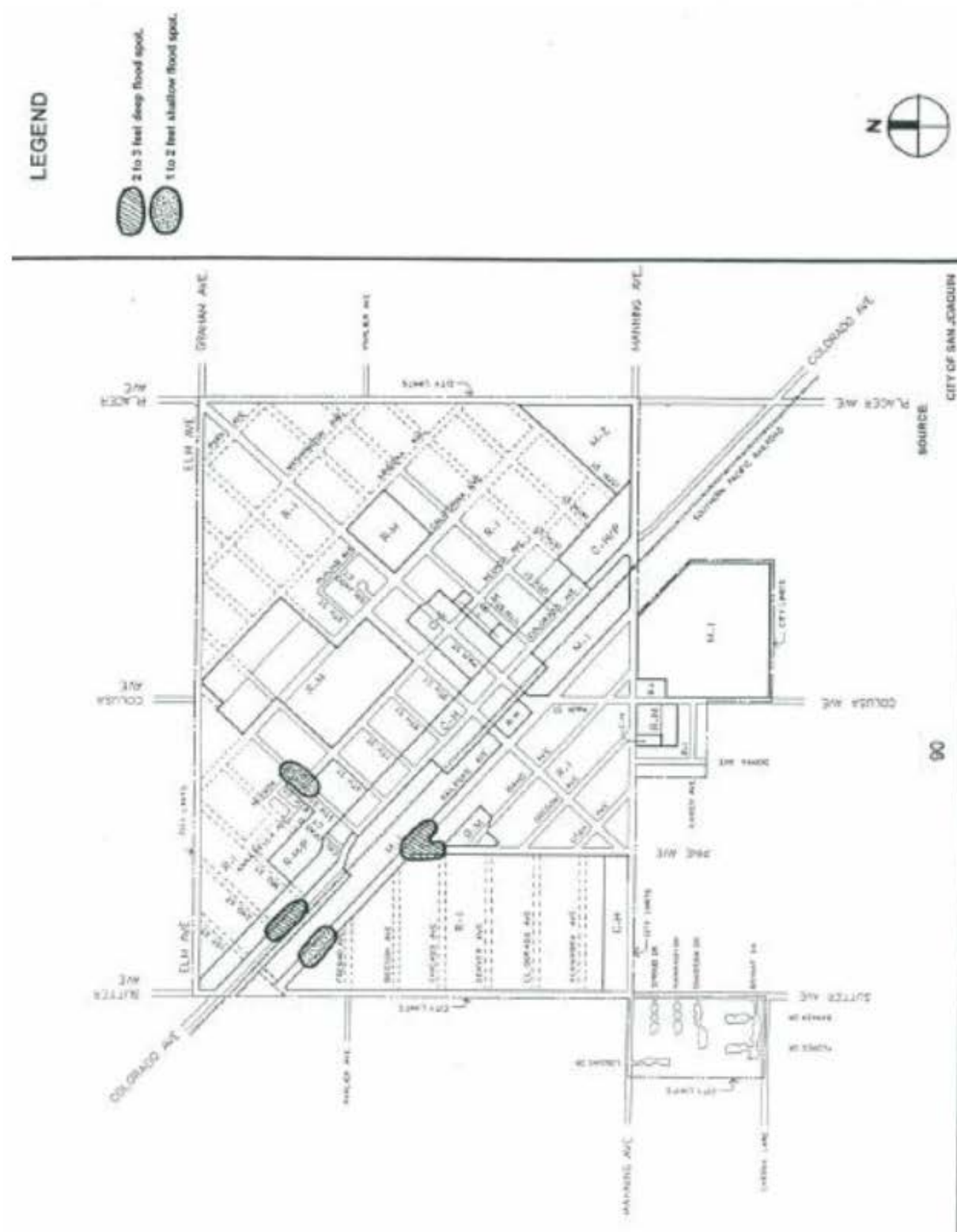
190

Figure 10-6. Dam Failure Flood Inundation Areas.



Source: Fresno County GIS Database

Figure 10-7. Potential Local Flood Zones.



### 10.2.3. Fire

As noted in the FCHMP (2008), wildfires are an ongoing hazard concern in the County. The season for wildfires runs from June through October each year. Wildfires can be destructive to human life, structures and infrastructure and natural and cultural resources. This background section identifies the hazards that may impact the City and the surrounding area in the future. This section discusses the City's potential for fires; response capabilities related to these threats are discussed in Chapter 7, Public Facilities and Services. Information presented in this section was obtained primarily from California Department of Forestry and Fire Protection (CAL FIRE). Other sources include the State of California and County of Fresno Hazard Mitigation Plans, as well as the Fresno County Master Plan and Background Report.

### Regulations

#### 2010 Strategic Fire Plan for California

This document, produced by the State Board of Forestry and Fire Protection and the California Department of Forestry and Fire Protection, provides an overview of fire risk and state activities to reduce risk. The plan discusses statewide firesafe regulations including road and signage standards, minimum water supply reserves for emergency fire use and requirements for fuel breaks.

#### Bates Bill (Government Code § 51175)

This statute requires the CAL FIRE director to evaluate fire hazard severities in Local Responsibility Areas (LRAs) and make recommendations to local jurisdictions based on High Fire Hazard Severity Zone locations. LRAs include incorporated cities, cultivated agriculture lands, and some desert lands that receive fire protection from city fire departments, fire protection districts, counties or by CAL FIRE under contract to local governments.

#### State of California Fire Code and Fresno County Fire Code

Chapter 15.10 of the Fresno County Fire Code indicates that the County has adopted the 2007 State of California Fire Code.

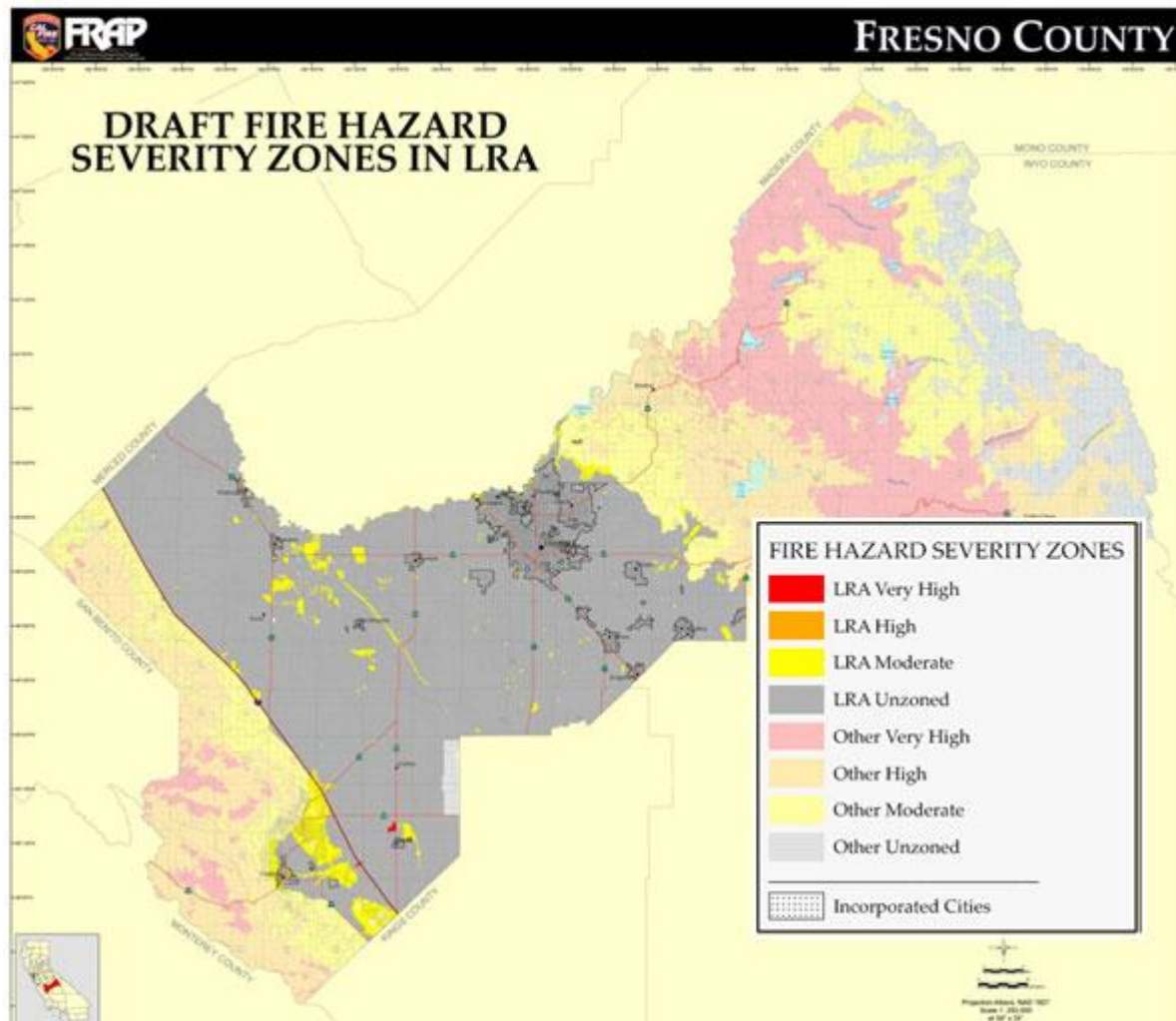
#### California Fire Code, Title 21, Part 9

The California Fire Code contains regulations regarding many aspects of wildfire and urban fire safety. This code specifies roadways and driveway design, access, building identification, water, and vegetation modification standards as well as defensible space requirements. The Fresno County Development Services division has adopted the same codes. Section D103 specifies road width and accessibility standards for emergency response vehicles. These include standards setting maximum road grade (not to exceed 10%), turning radii and signage related to fire lanes and fire equipment.

### Current Setting

Fire protection is provided in the City by the Fresno County Fire Protection District, which covers 2,655 square miles of Fresno County. The District has 13 staffed fire station and five district paid call firefighter stations. Through a partnership with CAL FIRE, they provide 48 firefighters

Figure 10-8. Fire Hazard Severity Zones



on duty daily for emergency medical service, rescue, fire suppression and fire prevention services to approximately 240,000 people (California Department of Forestry, 2009).

CAL FIRE is required by California law to classify fire hazard throughout the State, based on factors such as fuel, slope and fire weather. CAL FIRE uses three zones for this classification: “medium”, “high” and “very high”. CAL FIRE also considers an area’s fire history, terrain, and the likelihood of buildings burning. The Fire and Resource Assessment Program provides information regarding the fire zones and their locations in the state.

The City is located in a Non-Wildland Non-Urban area as defined in the Fresno-Kings Pre-Fire Management Plan (2009). The majority of the land surrounding the City is used for agricultural purposes, therefore is not wild. The map also indicates that the City is not near any areas of high or very high fire hazard. CAL FIRE has determined that Fresno County as a whole has no “Very High Fire Hazard Severity Zones” in Local Responsible Areas. Figure 10-8 illustrates the Fire Hazard Severity Zones around the City.



There have been no notable wildfires near the City in the past as identified in the FCHMP.

#### Urban Fire Risk and Protection

The Environmental Impact Report for the City's existing general plan notes that the City currently has an Insurance Service Office fire protection rating of six on a scale of one to ten. This rating takes into account water availability, fire fighting capacity, building safety and communication ability. The City currently does not have the water capacity to meet firefighting demands during an emergency situation. Water supply is discussed in more detail in Chapter 7, Public Facilities and Services.

#### **10.2.4. Human Made Hazards**

This section discusses human made hazards in the City, including hazardous material storage and transportation. Hazardous materials are defined by the FCHMP as being "substances that are flammable or combustible, explosive, toxic, noxious, corrosive, reactive, an oxidizer, an irritant, carcinogenic, or radioactive" (2008, p. 181). Release of hazardous materials can result in loss of health or life as well as pose concern for air and water quality. Hazardous materials can be a concern when they are created, stored or transported. This section also discusses planning for hazardous materials.

#### **Regulation**

Monitoring and regulation of hazardous materials is conducted by a number of organizations at various levels.

#### Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA)

At the federal level, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and the Resource Conservation and Recovery Act of 1976 address environmental contamination and management of hazardous waste on EPA Superfund sites, which are abandoned or uncontrolled hazardous waste sites. Additionally, the Clean Air and Clean Water Acts regulate hazardous materials. The Superfund Amendments and Reauthorization Act of 1986 (SARA) built upon this legislation.

State laws and regulations also impact hazardous waste creation, storage and transport. The DTSC, State Water Resources Control Board, Regional Water Quality Control Boards, California Air Resources Board and California Integrated Waste Management Board all provide regulatory oversight of hazardous materials. Additionally, the California Occupational Health and Safety Administration is responsible for enforcing laws and regulations related to workplace contamination and safety (California Department of Transportation, 2010).

Federal law regulates storage tanks in 40 Code of Federal Regulations Part 280 and 40 Code of Federal Regulations Part 281. Titles 8, 17, 22, 23, 26 and 27 of the California State Regulations also relate to hazardous materials (California Department of Transportation, 2009). Other laws related to storage tanks include Chapter 6.7 of the California Health and Safety Code "Underground Storage of Hazardous Substances" and Title 23, Division 3, Chapter 16 of the

California Code of Regulations “Underground Tank Regulations”. These regulations address design, use and monitoring of underground storage tanks.

#### Hazardous Materials Transport Regulations

The transportation of hazardous materials is also an important aspect to consider when evaluating risks within communities. In order to transport hazardous waste, a transporter must be registered with the State of California and meet the specific requirements as outlined in the California Health and Safety Code Division 20, Chapter 6.5. Rail transport of hazardous waste is regulated by the United States Department of Transportation. These regulations are located in the Code of Federal Regulations, Title 49. Past hazardous materials incidents reported in the County of Fresno were not near the City.

#### Hazardous Waste Management Plan

California Assembly Bill 2948, passed in 1986, requires that counties create Hazardous Waste Management Plans which serve as the primary documents for hazardous waste management through goals, policies and recommended programs. The California Department of Health Services must approve each plan before adoption. Fresno County developed a Hazardous Waste Management Plan in 1988. This plan establishes goals, policies and programs which attempt to encourage the safe handling, storage and transportation of hazardous materials in the County. This plan is administered by the County Environmental Health Department (FCHMP, 2008).

### **Current Setting**

This section discusses the current state of hazard mitigation planning and hazardous sites and transportation of hazardous materials in and around the City.

#### Hazard Mitigation Planning

The Federal Disaster Mitigation Act of 2000 (DMA2K) requires every municipality that wishes to be eligible for pre-disaster mitigation grants or post-disaster recovery assistance from the federal government to develop a Local Hazard Mitigation Plan (LHMP) or participate in a multi-jurisdictional LHMP. These plans must be approved by FEMA every five years in order for the jurisdiction to remain eligible. Additionally, with the passage of Assembly Bill 2140 by the California State Legislature in 2006, local governments can integrate the LHMP into the safety element of the general plan. If LHMPs are not integrated into the general plan, the State will only fund 75 percent of hazard mitigation and recovery projects, and the rest would be funded by the local government.

The City is currently not part of the Fresno County Multijurisdictional Hazard Mitigation Plan. It will need to address this in the future if it wishes to receive hazard fiscal support from the federal government.

#### Hazardous Materials Sites

Table 10-1 shows the sites in the City that handle or store hazardous materials as identified by the State Water Quality Control Board.



*Table 10-1. Hazardous Materials/Hazardous Waste Facilities in San Joaquin.*

Site Name	Type	Cleanup Status	Address
Agri Pro	Leaking Underground Tank Cleanup Site	Closed	22300 Railroad Ave
D's Mini Mart	Leaking Underground Tank Cleanup Site	Open	22023 Colorado S
Union 76	Leaking Underground Tank Cleanup Site	Open	Colorado and Main
West Hills Oil Company	Other Cleanup Site	Open	22050 W. Colorado Ave.
West Side Pump Company	Leaking Underground Tank Cleanup Site	Open	21500 Manning
Agrico	Leaking Underground Tank Cleanup Site	Closed	8105 Lassen St.
Grouleff Aviation	Cleanup Program Site	Open	23600 W. Manning Ave.
Circle K #3608	Permitted Underground Storage Tank	NA	21998 Colorado Rd.
ABS Connection Inc.	Cleanup Program Site	Open	22050 W. Colorado Ave.
Suburban Propane	Leaking Underground Tank Cleanup Site	Open	22125 Colorado Ave.

*Source: United States Water Resource Control Board Geotracker*

Seven sites in and around the City are classified by the EPA as “open”, meaning that they have not yet been deemed clean enough to close. Leaking underground storage tanks have the potential to negatively impact the community through soil and water contamination. The sites are identified in Figure 10-9.

Figure 10-9. San Joaquin Hazard Areas.



### Hazardous Materials Transportation

Also of interest when considering the existing conditions in the City is identifying thoroughfares along which hazardous materials are transported. The FCHMP identifies Manning and Colorado Avenues as major transportation corridors through the City. Major transportation corridors are the main paths along which hazardous materials are transported through the County. Additionally, rail lines are also used to transport hazardous materials.

## 10.3. Emerging Directions

After review of existing conditions, standards and community input, future directions for the City are evident. These future directions guide the general plan as it sets the groundwork for improving safety in the City. Overall, public education and outreach could be expanded in the City to ensure that every resident is aware of hazards, and prepared to deal with them accordingly. Ensuring that the public is well informed will help the City recover economically and socially when a disaster strikes.

### **10.3.1. Seismic and Geologic Hazards**

Considering the severity of the issue of subsidence in the San Joaquin Valley, the City should monitor and plan for potential impacts related to subsidence in the area.

### **10.3.2. Flood**

The City is at risk for flooding hazards. It is located within a dam inundation area, and has recently been classified by FEMA as FIRM Special Flood Zone “A” placing it in the 100 year flood plain. There is great potential for the City to create an emergency plan with evacuation routes and identification of critical facilities for all emergency situations, and especially for flooding events, as the City is at risk of flooding.

### **10.3.3. Fire**

The City is not at a high risk of wildfires; however, the City should continue to work closely with the Fresno County Fire Department to ensure that there is adequate protection from urban fires.

### **10.3.4. Human Made Hazards**

Further attention should be given to identifying ways to address hazardous material sites and transportation corridors in the City to ensure public health and safety. At a minimum, the City should increase public education related to existing sites and explore policies to encourage site cleanup and rehabilitation.

### **10.3.5. Hazard Mitigation**

The City should consider becoming part of a multi-jurisdictional hazard mitigation plan (like the existing Fresno County Multi-Hazard Mitigation Plan) or creating a Local Hazard Mitigation plan of its own in order to be eligible for federal funding in the event of a disaster.

## **10.4. References**

California Department of Forestry and Fire Protection. <[www.fire.ca.gov](http://www.fire.ca.gov)>.

California Department of Forestry and Fire Protection. (2009) Fresno-Kings Unit & Fresno County Fire Protection District. Pre-Fire Management Plan Fresno and Kings County.

California Department of Transportation. (2009) Environmental Handbook, Volume I: Guidance for Compliance, Chapter 10: Hazardous Materials, Hazardous Waste, and Contamination.  
<[http://www.dot.ca.gov/ser/vol1/sec3/physical/ch10haz/chap10.htm#fed\\_laws\\_reg](http://www.dot.ca.gov/ser/vol1/sec3/physical/ch10haz/chap10.htm#fed_laws_reg)>.

California Department of Water Resources, 2007 California Flood Legislation Summary, retrieved from <<http://www.water.ca.gov/legislation/2007-summary.pdf>>.

California Emergency Management Agency, California State Hazard Mitigation Plan, Public Review Draft, 2010. Available at [hazardmitigation.calema.gov](http://hazardmitigation.calema.gov)

California Emergency Management Agency, <oes.ca.gov>.

California Geological Survey, <conservation.ca.gov>.

California Seismic Safety Commission. <Seismic.safety.gov>.

County of Fresno, Health and Safety Element, Fresno County General Plan (2010) Public Review Draft

Division of Flood Management, California Department of Water Resources,  
<water.ca.gov/floodmgmt>.

Federal Emergency Management Agency. <fema.gov>.

Fire and Resource Assessment Program, California Department of Forestry and Fire Protection.  
Located at <http://frap.cdf.gov>.

Fresno County Multi-jurisdictional Hazard Mitigation Plan, Public Review Draft, April 2008

Fresno County, Municipal Code Fresno County. Retrieved from <library.municode.com>.

General Plan Consultant Team & Fresno County Staff, Fresno County General Plan  
Background Report (2000), found at  
<www.co.fresno.ca.us/departmentspage.aspx?id=19705>.

Natural Hazards, United States Geological Survey. www.usgs.gov/natural\_hazards. Retrieved  
October 20, 2010.

Seismic Safety Commission, (2003) Status of Unreinforced Masonry Building Law, 2000 report  
to the Legislature. Retrieved from  
<http://www.seismic.ca.gov/pub/URM\_Report\_June26\_2003.pdf>.

San Joaquin General Plan (19XX)

State Board of Forestry and Fire Protection & California Department of Forestry and Fire  
Protection. (2010) Strategic Fire Plan for California. Retrieved from  
<http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fpppdf668.pdf>.

State Water Resources Control Board, Geotracker. <Geotracker.swrcb.ca.gov>.

# 11. NOISE

## 11.1. Introduction

The Noise Element is required by the State of California. The first guidelines for a noise element were created in the Health and Safety Code §46050.1; subsequent changes to general plan guidelines in 1984 (Chapter 1009, Statutes of 1984) outline the current noise element procedures. The State requires local governments to analyze and quantify community noise levels expressed in Community Noise Equivalent Levels (CNEL) or day-night average levels (Ldn) sound weighting scales (see Table 11-1). The findings must be included in the general plan and used to guide future land use decisions, implementation measures for noise control and policies to aid in limiting the community's noise exposure.

*Table 11-1. Noise Descriptors.*

Term	Definition
Decibel, dB	A unit of measurement describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
dBA	The "A-weighted" scale for measuring sound in decibels; weighs or reduces the effects of low and high frequencies in order to simulate human hearing. Every increase of 10 dBA doubles the perceived loudness though the noise is actually ten times more intense.
CNEL	Community Noise Equivalent Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7 p.m. to 10 p.m. and after addition of 10 decibels to sound levels in the night from 10 p.m. to 7 a.m.
Ldn	Day-Night Average Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of 10 decibels to sound levels in the night after 10 p.m. and before 7 a.m. (Note: CNEL and Ldn represent daily levels of noise exposure averaged on an annual or daily basis, while Leq represents the equivalent energy noise exposure for a shorter time period, typically one hour.)
A-Weighted Level	The sound level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.
Noise Contours	Lines drawn about a noise source indicating equal levels of noise exposure. CNEL and Ldn are the metrics utilized herein to describe annoyance due to noise and to establish land use planning criteria for noise.

Source: "General Plan Guidelines," by Governor's Office of Planning and Research, p. 244. The State of California 2003

Both mobile and stationary sources must be evaluated through modeling or noise data gathering. Sources to be studied include some of the most common such as roads and transit facilities, construction and industry. Other noise generators such as airports, mining and agricultural activities must be evaluated as well. Particular attention must be paid in areas where residential uses have encroached on noise emitting land uses (Office of Planning Research [OPR], 2003).

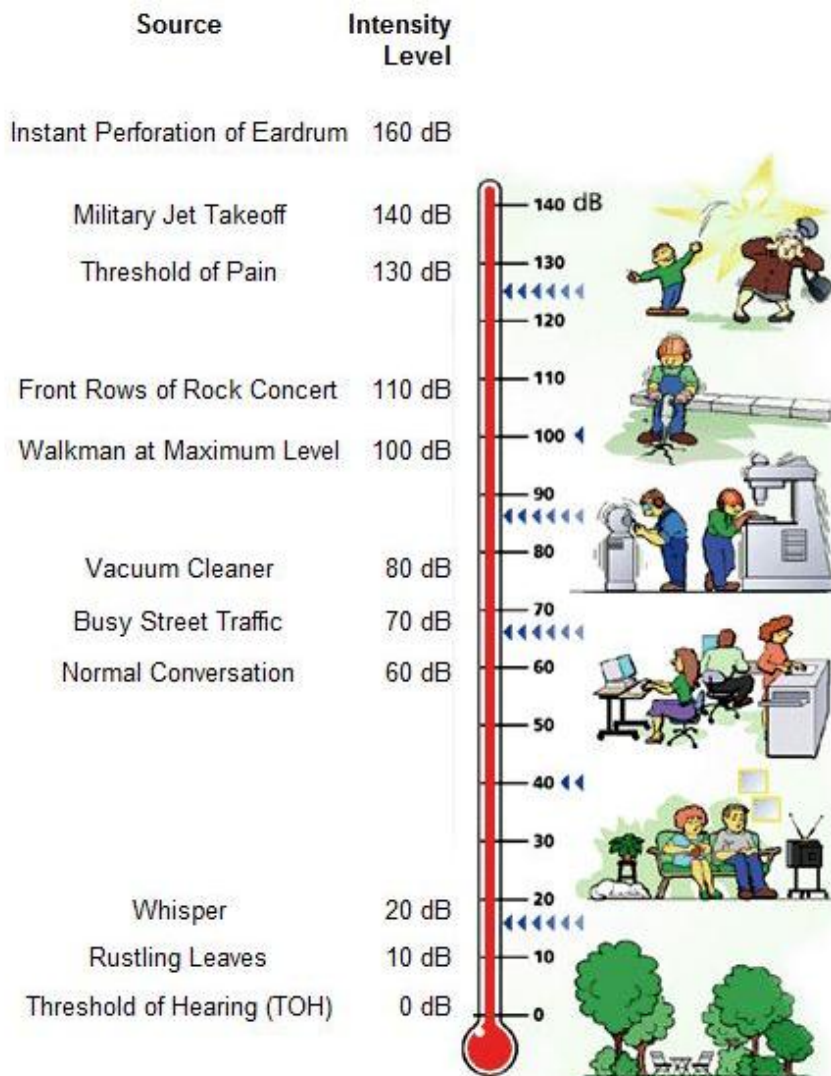
The Noise Element must include noise contours for existing and projected noise levels and their current and projected impact on the community. In addition, existing and projected land uses should be evaluated in the context of current and future noise conditions and proximity of sensitive noise receptors to major noise sources. The noise contour and sensitive land use maps are used to guide land use decisions by determining locations in the community where there is a potential for noise issues. Methods of noise abatement and protection of sensitive users should be identified (OPR, 2003).

Noise is defined as unwanted sound. There is a difference in impact to human beings based on the intensity of the noise, measured in decibels (dB). The scale upon which decibels is measured is logarithmic, meaning that an increase in ten decibels of noise is perceived as a doubling of loudness (Victoria Transport Policy Institute, 2009). The intensity and other qualities of the noise against the already existing ambient noise environment are factors in individuals' perceptions of noise. Figure 11-1 depicts common noises and their placement on the decibel scale, effect on humans and the decibel values associated with the noise.

The rate at which noise diminishes depends on characteristics of the noise source itself, as well as attributes of the environmental setting through which the noise passes. Berms, walls, vegetation and other buildings are all examples of environmental features which can lessen noise exposure levels. Normally there is approximately a 6 dB reduction for each doubling of distance from the source (New York State Department of Environmental Conservation, 2001).

The Noise element is important to address in the general plan because certain noise exposures can cause permanent damage to a person's ability to hear. The effects of noise to humans can range from being minor annoyances to substantial human health threats. While some noises can have an instant impact, many noises will not, but that does not mean that exposure to these sources is safe. Some noises, over the course of a lifetime, can adversely affect a person's ability to hear. The purpose of a noise element is to limit the exposure of community members to harmful noises and is related to land use, housing, and circulation elements.

Figure 11-1. Intensity and the Decibel Scale.



## 11.2. Existing Conditions

This section includes a discussion of existing conditions in the City and noise sensitive land uses. It also identifies the location of major noise sources and sensitive noise receptors in the City. Noise contour and noise sensitive land use maps are included to illustrate the proximity of sensitive receptors to major noise sources. The section is divided into sub-sections discussing noise sources, noise sensitive land uses and state standards applicable to noise.

### 11.2.1. Noise Sources

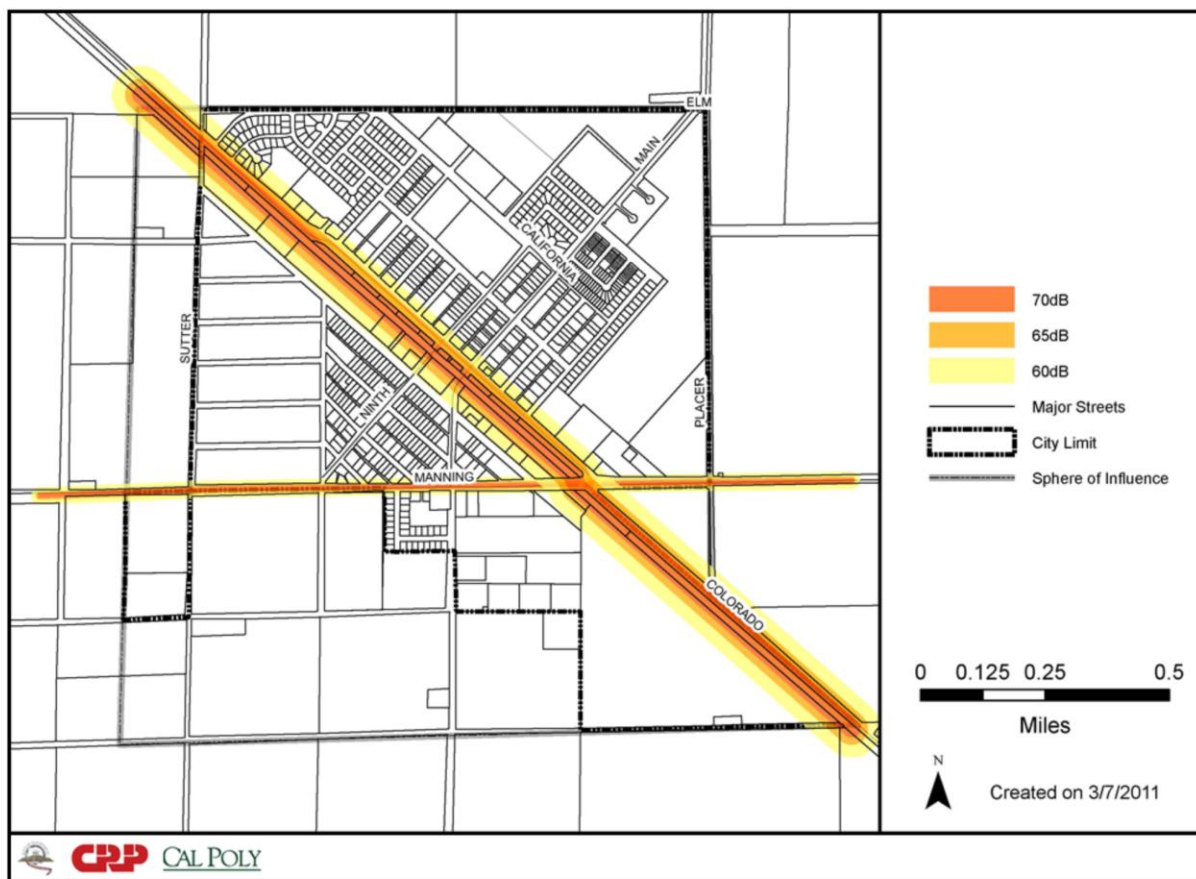
Noise comes from a variety of sources in the City and ranges in intensity from relatively quiet, such as birds chirping or neighbors conversing, to traffic along Manning Avenue. This



subsection covers noise, which has the potential to have adverse affects on the well being of community members.

The main noise sources in the City are Colorado and Manning Avenues, and the railroad. Both roadways have a daily volume of about 1,100 vehicles per day. More information on traffic volume is contained in Chapter 5, Circulation. The noise contours are based on traffic volume, percentage of trucks and the frequency of trains passing through the City. Figure 11-2 shows noise contours around the railroad and Manning and Colorado Avenues based on traffic volume and speed.

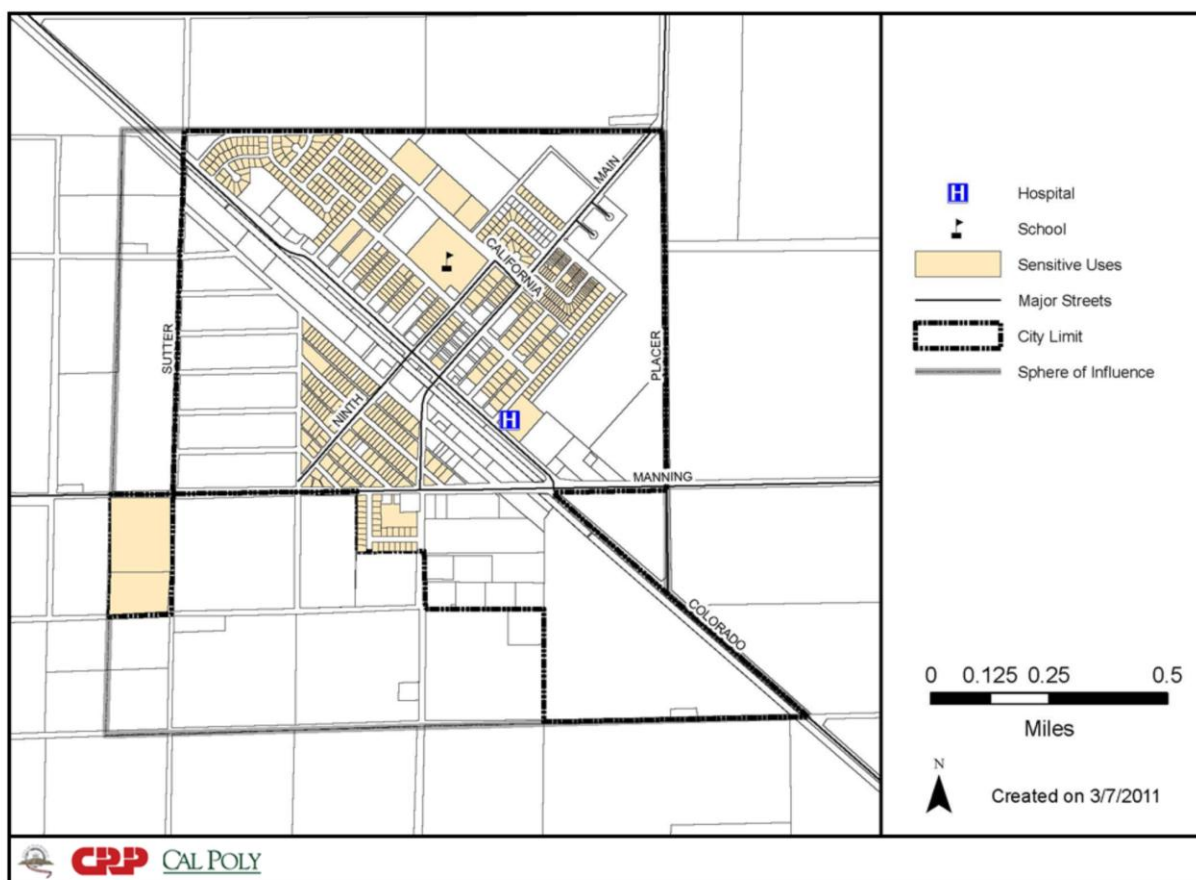
*Figure 11-2. Key Noise Sources and Levels.*



### 11.2.2. Noise-Sensitive Land Use

The State of California defines sensitive uses to include residential, some parks and some public facilities, such as hospitals (OPR, 2003). Using this definition, these uses are represented in Figure 11-3. Most residential homes are located in neighborhoods away from major noise generators; however, there are some noise sensitive land uses located on both sides of Colorado and Manning Avenues. Along Colorado Avenue, there are some areas where non-noise sensitive uses are adjacent to the roadway. These buildings serve as a noise buffer for the sensitive uses beyond. There are residential neighborhoods adjacent to Manning Avenue on the west side of the City with no noise control structures

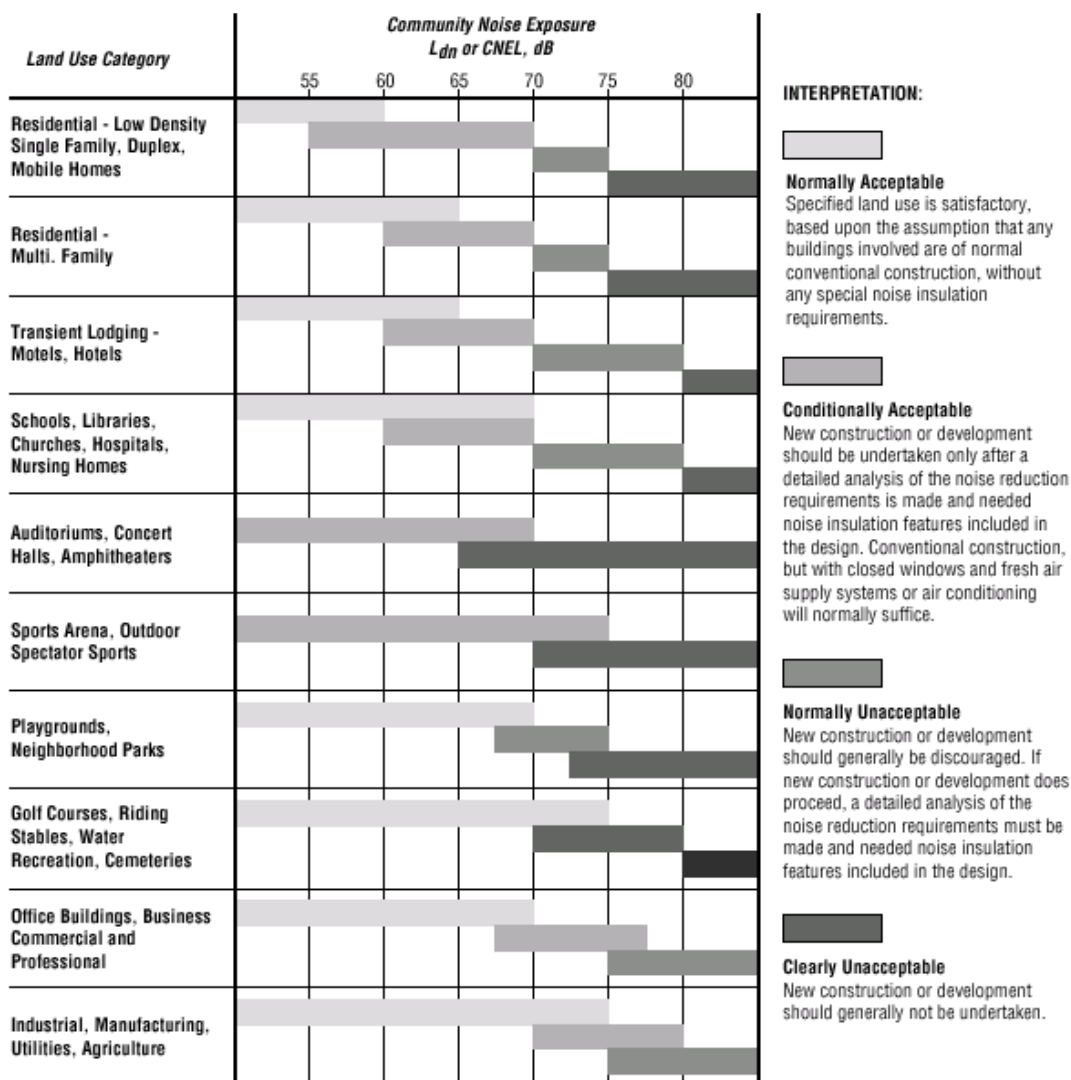
Figure 11-3. Noise-Sensitive Uses.



### 11.2.3. State Standards

The State of California has established standards for acceptable levels of noise according to different land uses. For sensitive uses such as residential, the limit which is normally acceptable is 60 dBA CNEL to 65 dBA CNEL, depending on housing density. Normally acceptable noise levels for other sensitive land uses such as schools and churches do not surpass 70 dBA CNEL. Noise levels between 60 dBA CNEL, and 70 dBA CNEL are conditionally acceptable for new construction in some sensitive use areas only after a detailed analysis of noise exposure to projects has been completed and noise insulation features are included in plans. Figure 11-4 depicts noise standards for various land uses. In general, State standards are met in the City for noise sensitive users, but there are a few residences that are subjected to conditionally acceptable levels.

Figure 11-4. Acceptable Noise Exposure Levels by Land Use.



### 11.3. Emerging Directions

Directions for future policy making have emerged through the information gathering process for this Background Report. These policies should target noise mitigation and abatement strategies. This section is based on information gathered from two community meetings, noise contour mapping and the City's noise complaint file. Residents had the opportunity to share their thoughts and ideas with respect to noise in the City at two community meetings.

Based on community input, the greatest noise sources are temporary annoyances. During the first community meeting, there were very few comments about noise issues.. Community feedback included: "There is a sense of calm in the community," "Calm town," "good environment," and "it's mellow." The second meeting allowed another opportunity for community members to voice their concerns about noise.. Residents were asked to pinpoint map locations where noise is an issue in the City, or to select a box entitled "noise is not a problem in San Joaquin." Again there was very little feedback related to noise, but residents noted that noise was not a problem in the City. A question included on a survey administered at the meeting asked what were the major sources of noise in the City. Responses indicated that no areas were problematic and that the areas through which the train passes are the noisiest. The City's noise complaint file indicates that there were 43 noise complaints during the period from January 1, 2010 through October 31, 2010. All 43 complaints on file were called in due to loud parties.

Noise contour mapping reveals that there is conflict between noise sources and sensitive receptors, particularly along parts of Colorado and Manning Avenues. Using this information, the City may write noise abatement policies and mitigation measures specific to those areas. The City may also work with State and federal transportation agencies in efforts to minimize traffic-generated noise.

For areas where there is no conflict between noise sensitive uses and noise generators, monitoring and maintaining compatibility is recommended. The goal is to preserve any existing noise-compatible land use configurations to ensure ongoing compatibility among uses. Compatibility can be achieved through establishing a noise-control program and zoning or other land-use controls. Other strategies include enforcing restrictions on noise sources, prohibiting noise emitters from locating near sensitive receptors and preventing expansion of noise sensitive users into already existing noisy areas.

### 11.4. References

Victoria Transport Policy Institute. (2009, January 2). *Transportation cost and benefit analysis II – Noise costs*. Retrieved November 9, 2010, from <http://www.vtpi.org/tca/tca0511.pdf>

New York State Department of Environmental Conservation. (2001, February 2). *Assessing and mitigating noise impacts*. Retrieved November 9, 2010, from [http://www.dec.ny.gov/docs/permits\\_ej\\_operations\\_pdf/noise2000.pdf](http://www.dec.ny.gov/docs/permits_ej_operations_pdf/noise2000.pdf)

Health and Safety Code §46050.1 (1976).

# 12. COMMUNITY DESIGN

---

## 12.1. Introduction

The purpose of the Community Design Element is to identify the positive characteristics of the built environment, and identify the means to protect and enhance the characteristics of the built environment that contribute to the City's sense of place and contribute towards a high quality of life for its residents. The Community Design Element extends the two-dimensional Land Use Element by specifying how new development and land uses should look, feel and function. The Community Design Element includes important concepts and guidelines that apply to the type, location and character of both private and public development projects for new and existing areas of the City. This element also includes policies and actions that will guide the decisions of individuals, developers and government in preserving and enhancing the physical character of the City.

This chapter identifies guidelines and standards that provide information on the development of design guidelines, historic preservation and cultural resources. The existing conditions section of this chapter provides a brief overview of the existing urban design characteristics of the City. In addition, this section discusses urban design principles that are intended to guide and shape new public and private partnerships.

## 12.2. Guidelines and Standards

Various documents guide development and provide direction for design. These documents address a wide range of design elements including site planning, parking and circulation, signage, landscape and infill development, as well as architectural features of commercial, residential and historical buildings. The current City General Plan has guidelines referring to ornamental fencing, walls and landscaping, however they are not enough to implement community design effectively.

### 12.2.1. Historic Preservation

In June 2005, the California Office of Historical Preservation released a revised version of "Drafting Effective Historic Preservation Ordinances: A Manual for California's Local Governments." This document provides useful information for local governments about historic preservation, including procedures and criteria for designation of historical resources. Designation procedures include notification, hearing requirements, and ownership. Designation criteria can be diverse. In California, there are a variety of places designated as historic, including residential subdivisions, commercial buildings, and trailer parks.

Since there are numerous reasons to designate historical sites, it is important that local governments include clear criteria in their preservation ordinances. In addition to clarity, it is important that designation criteria are flexible so that worthy historical resources are not excluded from protection. For example, some ordinances are based solely on the age of a

building, but some worthy resources are less than fifty years old (California Office of Historic Preservation, 2005).

As of 2010, no historic sites or buildings in the City were listed on the National register of Historic Places, the California Landmark Series, or List of State Points of Historical Interest. In the future certain buildings may be historically significant, especially as the threshold for historical significance is fifty years old. Thus, protection and conservation of such resources should be considered.

### 12.2.2. Cultural Resources

The California Department of Transportation (Caltrans) has developed procedures on dealing with cultural resources in the State of California. Any capital project undertaken must adhere to the standards provided. Caltrans defines cultural resources in the following manner: “Cultural resources are physical or observable traces of past human activity, *regardless of significance*, in direct association with a geographic location, including tangible properties possessing intangible traditional cultural values.” (Cal Trans, 2007)

Cultural standards are also identified throughout every section of the National Historic Preservation Act (NHPA) as an overall targeted standard. Cultural preservation is a key component when enacting NHPA standards and the amended Act of 2000 makes this a top priority. Cultural significance of properties is left to professional consultants depending on the geographic region and/or historical lineages representing a specific race, religion, or tribe.

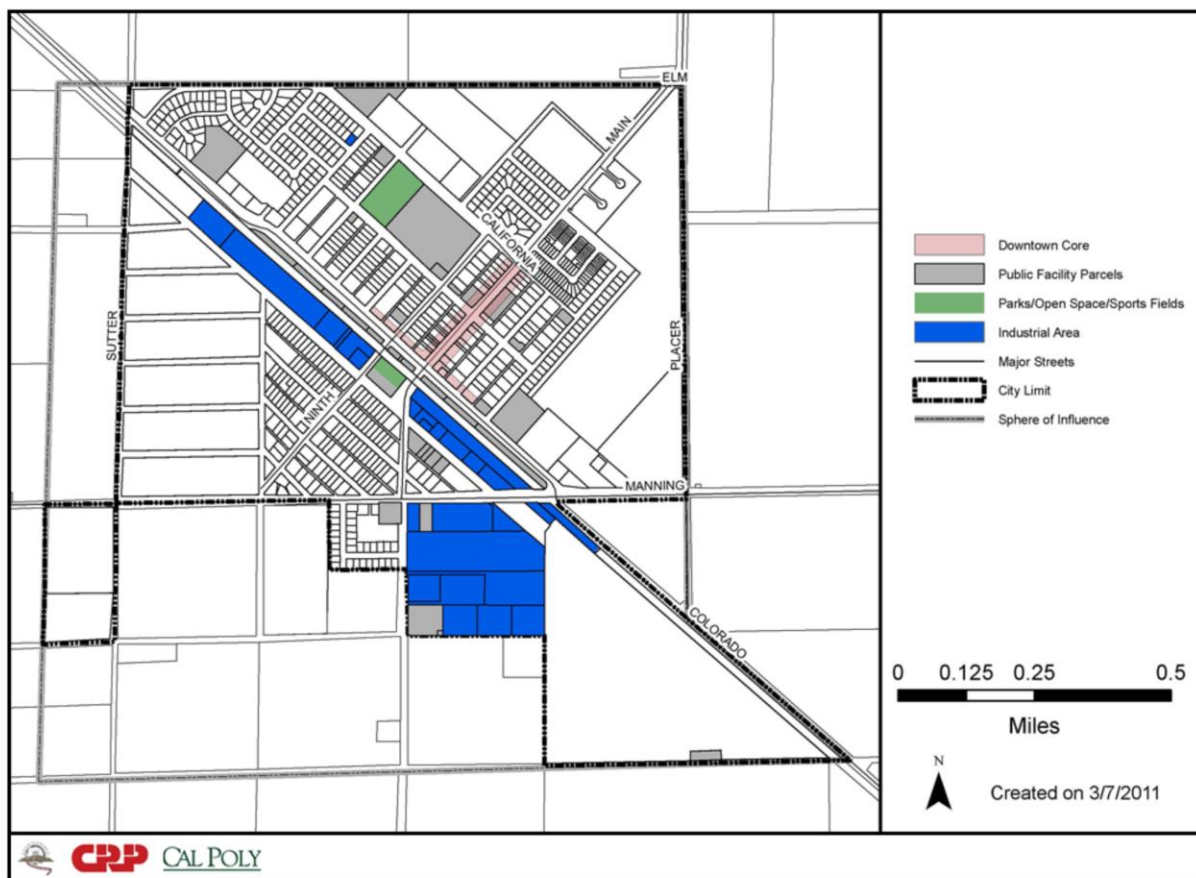
The National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) both have provisions for cultural preservation within each respective act. The guidelines are somewhat ambiguous as each act accounts for cultural significant areas and still allow leeway for municipal entities to further define standards. No published document was found for the City that defines cultural resource standards.

## 12.3. Existing Conditions

This section provides an overview of the urban design characteristics of the City’s various areas and neighborhoods. The existing conditions were compiled through site visits and community meetings. Figure 12-1 highlights the downtown core, public facilities and Industrial areas within City limits. The site visits provided the opportunity to examine and document the existing urban design characteristics of the built environment. The community meetings provided valuable information on the residents’ perspectives of existing conditions in the City.



Figure 12-1. Existing Conditions.



### 12.3.1. Existing Urban Design Characteristics

The City consists of distinct neighborhoods and areas, which often have different urban design characteristics that reflect the era in which the given area was built. For example, the historic core, which was developed largely in the early part of the 20th century, has design characteristics typical of that period that are distinct from the characteristics of neighborhoods built after the Second World War or the characteristics of subdivisions that were built more recently.

The sections below highlight the design characteristics of the City's various residential neighborhoods, its non-residential districts including the downtown and the industrial areas, Manning Avenue and Colorado Avenue, the main thoroughfares through the City.

*Figure 12-2. Downtown.*



## **Downtown**

The City's downtown is a small grid of approximately two blocks by two blocks as shown in Figure 12-2. The downtown contains a vibrant commercial core. The grid street pattern of the City was established in response to the produce packing sheds and the Southern Pacific railroad, which marks its western edge. Colorado Avenue parallels the railroad, and is the main route to and through the city. The rest of the downtown street grid is also either parallel or perpendicular to Colorado Avenue and the railroad. This grid, which is slightly tilted off a true north-south axis, intersects with surrounding residential and rural roadways at a distinct angle, which further emphasizes the sense of downtown as a cohesive whole.

The primary retail and civic corridor is Main Street, generally between Colorado Avenue and California Street. These blocks contain restaurants, shops, and offices. It is a well-kept and attractive street with street trees, decorative crosswalks, street banners, and ample sidewalks. Buildings along Main Street are one to two stories in height. The buildings and streetscape features are designed for and oriented towards pedestrians. On-street diagonal parking is provided on Main Street, as well as both parallel and diagonal on-street parking along nearby blocks, as shown in Figure 12-3. Slow traffic speeds, well-marked crosswalks and bulb-outs facilitate safety for pedestrians crossing the two-lane street, as shown in Figure 12-4. Although Main Street is the prominent corridor in the district the secondary and tertiary streets and alleys are also important to the overall character of downtown.

*Figure 12-3. Downtown Streetscape*



*Figure 12-4. Downtown Gateway.*



Downtown's outer area is distinguished by older homes, mature street trees, and two large parks, the Community Park and the San Joaquin Elementary School Park. Many of the homes date from the mid-20th century. Sidewalks line most Downtown streets and there is a high level of pedestrian activity, particularly in the afternoons as children walk and ride bicycles home from school, skateboard, play basketball in the driveways, or head to a team practice at the Community Park. While not directly downtown, the proximity of the school to the downtown grid helps maintain the compact, small-town character.

### **Mature Residential Neighborhoods**

The City's older neighborhoods were mostly constructed during the 1940s through the 1970s. In general, the streets within these neighborhoods follow a grid pattern. The houses and lots tend to be larger than many newer residences and amenities such as sidewalks, street trees and parks are provided more consistently. Homes in the City's older neighborhoods are generally well-maintained and the age of these neighborhoods has allowed for more mature landscaping.

### **New Residential Neighborhoods**

The City's newer residential neighborhoods were developed since the 1980s and are primarily located on the City's outer edges. These areas generally share curvilinear street patterns that distinguish them from the grid pattern in the downtown core and older neighborhoods. Furthermore, there are not as many trees in the newer residential areas.

### **Commercial Areas**

Commercial areas outside Downtown are limited to a strip of service commercial uses, convenience stores and gas stations along Colorado Avenue and the Marketplace at the southern edge of town. The Marketplace includes typical local-serving uses such as a supermarket restaurant and a drug store arranged around a large central parking lot. The shopping center, set back from the road and arranged around a large parking lot, is oriented



towards automobiles rather than pedestrians, although pedestrian access is available via Colorado Avenue.

### **Industrial Zone**

The City's industrial zone is focused on the area west of Colorado Avenue, roughly from the north edge of town, along the railroad and Colorado Avenue, south to Manning Avenue. This area hosts a wide range of industrial uses, from the large produce sheds to the towering elevator silo. Similarly, some of the industrial uses have new and modern facilities while others are older, not as well maintained and some are vacant. In general, the large parcels, lack of sidewalks and potential for noise and traffic within the industrial zone make it an unfriendly area for pedestrians.

### **Rural and Suburban Transition Areas**

Several distinct areas southwest and west of the City, along Colorado Road and the railroad tracks could be considered transitional areas between higher-density residential subdivisions and the large agricultural parcels. These areas include a mix of agricultural produce packing sheds, old barns and farmhouses shown in Figure 12-5. Although the transition between these areas and the newer subdivisions can be abrupt, these agricultural and industrial areas can reflect the rural character of the community.

*Figure 12-5. Agricultural uses.*



*Figure 12-6. Example of a gateway from Temecula, California*



### **Gateways**

Gateways of a city are the locations, which “announce” to a visitor or resident that they are entering the city, or a unique neighborhood within that city (Figure 12-6). In the downtown, informal gateways include the beginning and end of the retail corridor on Main Street. The traffic calming pedestrian crossing in the middle of Downtown could be emphasized as a gateway or landmark in the City, shown above in Figure 12-4. There are also informal gateways marking the transition from rural to urban.

### **Manning Avenue**

Manning Avenue is an important route into and through the City. Traffic from the east, from Fresno and from Interstate 5, enters the City on Manning Avenue. Manning Avenue does not have an overall streetscape design concept and lacks sidewalks and street trees. The importance of Manning Avenue is that it provides many visitors and through travelers with a first, if sometimes only, impression of the City.

### **Colorado Avenue**

Colorado Avenue is the main route into the City and carries most of the local traffic through town. Colorado Avenue is parallel to the Southern Pacific Railroad line and contains a mix of industrial properties, many underutilized lots and some vacant buildings. Colorado Avenue does not have an overall streetscape design concept and lacks sidewalks and street trees. It is also important as it provides many visitors and through travelers with a first impression of the City’s character.

## 12.4. Emerging Directions and Urban Design Principles

The City has not developed standards for community design, historic preservation, or cultural resources. It is recommended that Design Guidelines be created to address architectural standards and design elements for the Downtown area. These standards should include the following items: (1) site planning, (2) parking and circulation, (3) signage, (4) landscaping, (5) commercial development, (6) residential development, (7) park and plaza design and (8) underutilized lot and infill development.

The emerging directions discussed below were compiled through separate site visits and community meetings. The site visits provided the opportunity to explore and envision the future urban design characteristics of the built environment. The community meetings provided valuable information on the residents' perspectives of the future directions for the City.

### 12.4.1. Community Feedback

In order to gather the opinions of City residents, two community meetings were held. In addition to the initial land use survey and public participation feedback gathered at the Dia De Los Muertos festival, the Community Design team developed visual preference surveys using images of possible design elements. The team then gave residents stickers, which were meant to indicate which style of urban design feature they most preferred. Based on the amount of stickers placed on each image we determined which features most residents favored.

Two visual preference posters were created to facilitate community feedback. The posters focused on architectural elements and street elements. Under the architectural elements, residents favored a small town feel with quaint features. They want architectural and ornamental details, and they favored Spanish colonial revival architectural styles for homes as well as single-family detached residences.

Feedback from the street elements poster, residents favored safer pedestrian crosswalks, which were clearly marked, yet did not impede traffic. They favored wide sidewalks with interesting pavement patterns and textures. They liked benches that were colorful, simple, and yet elegant. They favored solar powered streetlamps, showing their desire to implement innovative technologies into their community.

It is the intent of these design guidelines to create a framework that simultaneously maintains the character and identity of the City and fosters a sustainable, vibrant rural economy. It is important for each site and building to simultaneously enhance the individuality of the business and strengthen the collective vision of the community. These design guidelines are not intended to restrict the innovation for new buildings in the City, but should be used to promote design features that relate to the streetscape and the community's vision for a sustainable future.

### Historic and Cultural Resources

Cultural and Historic resources should be officially surveyed and compiled into a list of contributing cultural and historic resources catalog.

## **Downtown**

This area could be enhanced by improving pedestrian friendliness by incorporating arcades, landscaping and trees. Decorative features on storefronts could also enhance the aesthetic appeal. Implementing a guideline for signage could increase the aesthetic appeal, improve navigation and encourage community cohesion and identity.

## **Mature Residential Neighborhoods**

There was discussion that these neighborhoods have underutilized alleys (see Figure 12-7) that could be improved and made into safer zones for children, as well as, provide the opportunity for adding bike lanes and green infrastructure such as bio-swales and permeable pavers. Bioswales are landscape elements designed to remove silt and pollution from surface runoff water. They consist of a swaled drainage course with gently sloped sides (less than six percent) and filled with vegetation.

Emphasizing the vision for water and energy conservation, it is recommended that the City institutes a program which will encourage the use of water conserving landscaping such as xeriscaping. Xeriscaping refers to landscaping and gardening in ways that reduce or eliminate the need for supplemental water from irrigation. It is promoted in regions that do not have easily accessible, plentiful, or reliable supplies of fresh water, and is gaining acceptance in other areas as climate patterns shift.

*Figure 12-7. Existing Alley in San Joaquin*





### **New Residential Neighborhoods**

Trees and landscaping could be added to increase the aesthetic quality of these neighborhoods. There has been an expressed need for adding additional lighting, speed bumps, and stop signs in these areas to improve the pedestrian safety.

### **Commercial Areas**

This area should be improved and made more pedestrian friendly by adding urban design features such as street lamps, pedestrian crosswalks, bulb-outs, benches, public art, trees and landscaping.

### **Industrial Zone**

This area should be improved and made more pedestrian friendly by adding urban design features such as sidewalks, bike lanes, trees and landscaping.

### **Rural and Suburban Transition Areas**

These agricultural and industrial areas can reflect the rural character of the community by emphasizing the importance of the agriculture industry through branding and marketing of the City as the “Onion Capital” of California. The areas between residential and agricultural and industrial could be softened with the addition of “buffer zones.” Buffer zones are designated pieces of land planted with trees and landscaping which physically shield the sight of the industry while decreasing the likelihood of pesticide and fertilizer overspray. Buffer zones also soften the perceived amount of noise that transmits from such industrial and agricultural activities.

### **Gateways**

Manning Avenue and Colorado Avenue should be designated as potential areas for future gateways. It is recommended that these gateways should be used to enhance the attractiveness of the community and raising the awareness of the agricultural community as a cultural resource. The “Onion Capital” theme was suggested as the City’s slogan and community identity.

### **Manning Avenue**

Enhancing this corridor with improved street amenities with the emphasis on gateways could encourage the sense of place and identity of the City.

### **Colorado Avenue**

Enhancing this corridor with improved street amenities with the emphasis on gateways could encourage the sense of place and identity of San Joaquin.

## **12.5. References**

California Governor’s Office of Planning and Research. (2003). General Plan Guidelines. Retrieved October 2010 from [http://www.opr.ca.gov/planning/publications/General\\_Plan\\_Guidelines\\_2003.pdf](http://www.opr.ca.gov/planning/publications/General_Plan_Guidelines_2003.pdf)

California Department of Transportation (Caltrans) (2007). Standard Environmental Reference, Vol.2, Exhibit 1.2 Retrieved October 2010 from [http://www.dot.ca.gov/ser/vol2/exhibits/exhibit\\_1\\_2\\_Definitions.htm](http://www.dot.ca.gov/ser/vol2/exhibits/exhibit_1_2_Definitions.htm)

California Office of Historic Preservation, 2005