CHAPTER 1 • HUMAN ENVIRONMENT

A. HISTORY

The site of Kerman was first established by the Southern Pacific Railroad Company as a way station with a pump and watering tank in 1891. The site was originally named Collis in honor of the president of the railroad Collis P. Huntington. It was at this site in 1892 that the famous Sontag and Evans gang held up the San Francisco-Los Angeles passenger train, one of the last train robberies in the country and perhaps the most historical event to occur in Kerman.

Settlement and cultivation of the Kerman area began and continued through the turn of the century as irrigation projects brought water to the area, primarily from the Kings River, to the south. In 1900, William G. Kerckhoff and Jacob Mansar purchased some 3,027 acres of land from the Bank of California. These men formed the Fresno Irrigated Farms Company. In 1906, Collis was renamed Kerman from the men's names Kerckhoff and Mansar. At this time, the Company began promoting land sales near Kerman across the country. The Company also filed the original townsite subdivision map with Fresno County, establishing the street grid encompassed by California Avenue, "G" Street, First Street and Ninth Street.

By 1914 Kerman had an estimated population of 400 persons surrounded by 29,000 acres of producing crop land. The Kerman Creamery was producing about 1,600 pounds of butter daily. In 1921, Madera Avenue was paved from the Southern Pacific railroad tracks north to the San Joaquin River and streetlights were installed from the tracks to Whitesbridge Road. By 1936 development of Kerckhoff Park had begun.

Oil and gas exploration was being conducted several miles south of town and in 1941 culminated with (at the time) the development of the largest gas well in the state. In 1946, the residents of Kerman voted to incorporate, and the City of Kerman was born, with a population of 1,050 residents. In the 1950's new subdivisions began to develop, expanding the urban area outward from the original townsite.

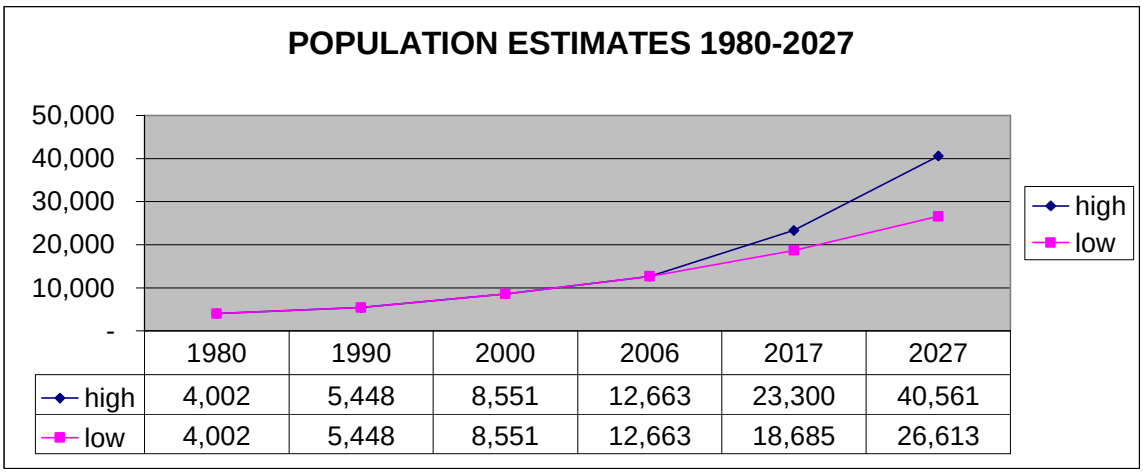
New development and subdivision activity has continued to the present time. In the last ten years (1995-2005), Kerman has witnessed the development of 1,457 single family homes and 211 multi-family units. In the last year alone, Kerman has approved 578 single family homes, 82 multi-family units and 67 duplexes on approximately 150 acres

for development, much of which is currently under construction. Kerman has also developed over 25 acres of park space and opened its first Teen and Community center campus in 2004 which includes a public library, community recreation center and the United Health Center on a central community site in downtown Kerman. Kerman continued to see commercial development with the opening of the Cross Roads Shopping Center in 2007. Central Valley Community Bank will open its doors in downtown Kerman in 2007 while the Kerman Unified School District has continued to expand its campuses with the addition of Liberty Intermediate School in 2002 and 2 library/media centers, 2 multi purpose rooms and 16 classrooms which are currently under construction. On the Industrial end, Kerman has welcomed the development of the Industrial Park with the addition of Panoche Creek Packing Co. in 2003 and Kerman Agricultural Resources in 2007. With highway and rail access, several industrial operations have chosen to locate at this site and the City has plans (referred to as the Southwest Annexation) to create ample space for the development of large industrial uses.

B. POPULATION

Kerman's population has shown a steady increase during the last ten years. The population in 2000 stood at 8,551 persons, compared to 5,448 persons in 1990, an increase of 56.9 percent over ten years, or an annual average of 5.69 percent per year. Population growth is perhaps the central factor for establishing policies and determining new areas for development. For the purposes of the General Plan, population projections were developed representing low and high estimates. In ten years (2017) the estimates forecast a low population estimate of 18,685, and a high population estimate of 23,300 persons. By the year 2027, the estimates forecast a low population estimate of 26,613, and a high population estimate of 40,561 persons.

TABLE 1
POPULATION ESTIMATES 1980-2027



	1980	1990	2000	2006	2017	2027
high	4,002	5,448	8,551	12,663	23,300	40,561
low	4,002	5,448	8,551	12,663	18,685	26,613

Source: U.S. Census Bureau, California Department of Finance, Collins & Schoettler, 2007.

C. SOCIOECONOMIC CONDITIONS

Income

The 2000 Census showed Kerman's household median income at $31,188. This compares to a median household income of $35,725 for Fresno County and $47,493 for the State of California.

Retail Sales

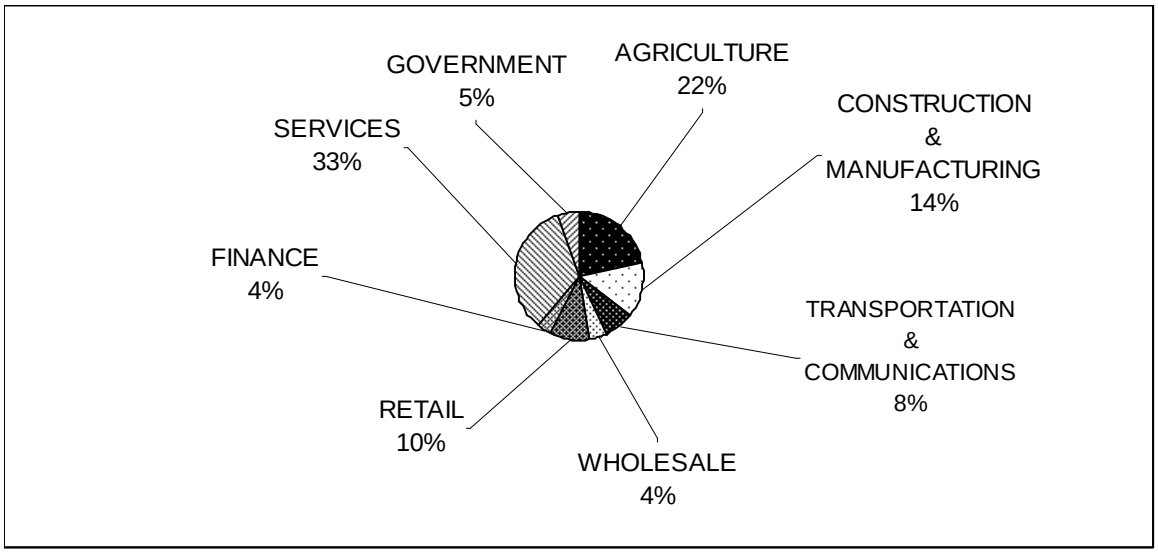
Taxable retail sales in a city are a measure of that community's economic vitality. Studies have shown that one percentage point of the six percent sales tax is retained by the City in which the sale takes place. In other words, from the tax charged to every one hundred dollars of goods sold in a city, six cents goes to the local government of that community. According to the California State Board of Equalization, Kerman has maintained a per capita sales rate over the last fifteen years of just below $70 in comparison to other neighboring cities, such as Madera ($107 per capita).

Employment

Despite Kerman's location in the center of a highly productive agricultural area, agriculture is not the dominant employer in the community. This position is occupied by the Services category, employing 33.7 percent of the city's work force. This category includes business and repair services, personal services, entertainment and recreation

services, professional services, health services, educational services and other services. Agriculture is the next largest employer, with 21.7% of the city's work force. In contrast to some other cities in the region, Kerman does not have extensive packing houses and agricultural processing facilities in its industrial area.

TABLE 2
EMPLOYMENT



Source: U.S. Census Bureau, 2000

In terms of individual employers in Kerman, the Kerman Unified School District is the single largest employer. Table 3 identifies the city's major employers.

TABLE 3
MAJOR KERMAN EMPLOYERS

NAME OF BUSINESS	PRODUCT / SERVICE	EMPLOYEES
KERMAN UNIFIED SCHOOL DIST.	Education	425
PANOCHE CREEK PACKAGING	Paper Boxes	100
KERMAN TELEPHONE	Communications	70
CITY OF KERMAN	Municipal Government	60
HELENA CHEMICAL	Chemical	50
BAKER COMMODITIES	Rendering Plant	35
H & J CHEVROLET	Auto Sales	25
HALL AG. ENTERPRISE	Labor Contractor	40
PERKO'S CAFÉ	Restaurant	23
KERMAN AG. RESOURCES	Agricultural Chemicals	27
SUN EMPIRE FOODS	Candy	15

Source: City of Kerman, 2007

Ethnicity

Kerman's population is divided fairly evenly between the white and Hispanic groups. Table 4 shows the ethnic breakdown of the community's population.

The percentage of Kerman's Hispanic population has dropped from 51 percent in 1990 to 42.4 percent in 2000. Correspondingly, the white population has increased slightly from 41 percent in 1990 to 42.5 percent in 2000.

TABLE 4
ETHNICITY

	White	Hispanic	Asian	Black	Other
Number	3,634	3,624	709	31	547
Percent	42.50%	42.40%	8.30%	0.40%	6.40%

Source: U.S. Census Bureau, 2000

D. HOUSING

Type

The number of housing units in Kerman has increased by 709 units from 1990 to 2000. The number of single family dwellings decreased as a percentage of all dwellings while

the number of multiple family dwellings increased. This parallels a trend being observed statewide. In 1990, single family dwellings accounted for about 63% and multiple family units about 29% of the total dwelling units. In 2000, these numbers increased with single dwellings accounting for 71% and multiple family 24 %. Mobile homes have decreased from about 8% in 1990 to 4.7% in 2000. Specific information on the growth of dwelling units is shown in Table 5.

TABLE 5
DWELLING UNITS BY TYPE

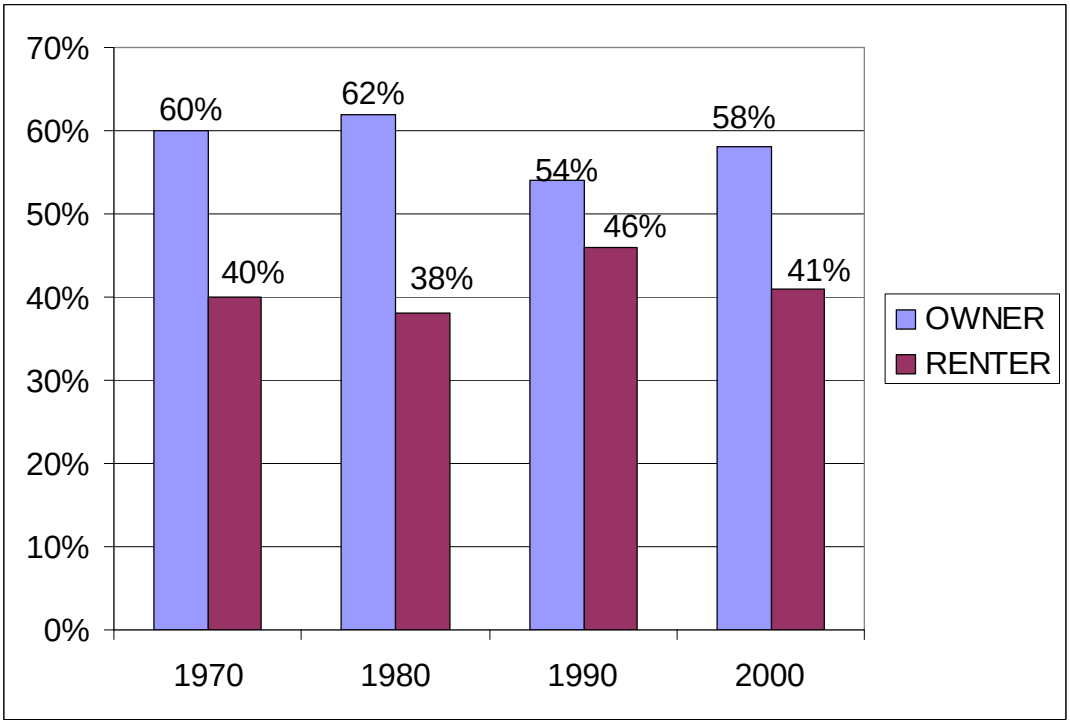
	1970		1980		1990		2000	
Dwelling Type	**# Units**	**% of Total**	**# Units**	**% of Total**	**# Units**	**% of Total**	**# Units**	**% of Total**
Single-Family	719	87.3%	983	69.6%	1108	63.4%	1756	71.5%
Multi-Family	103	12.5%	278	19.7%	506	28.9%	585	23.8%
Mobile Homes	2	0.2%	152	10.8%	134	7.7%	116	4.7%
Total	**824**		**1413**		**1748**		**2457**	

Source: California State Department of Finance, 1980, 1990, 2000.

Tenure

Tenure refers to whether a dwelling is occupied by its owner or is rented out to another party. Knowledge of housing tenure is important for planning purposes so that a community can appropriately plan for adequate areas for owner and renter-occupied housing. In Kerman, the percentage of owner-occupied dwellings increased from 54% to 58% of all dwellings from the period 1990 to 2000. Correspondingly, the number of renter-occupied units decreased from 46% to 42% of all occupied units. Table 6 illustrates the change in tenure from 1980 to 2000.

TABLE 6
HOUSING TENURE



Source: U.S. Census 1980, 1990, and 2000.

Vacancy

The 2000 Census showed that Kerman had a vacancy rate of 1.1 for owner-occupied units and 2.6 for renter occupied units. The State of California has established target vacancy rates of two percent for owner-occupied households and five percent for renter-occupied households. Table 7 shows the vacancy rates for Kerman and surrounding cities as well as Fresno County.

TABLE 7
VACANCY RATES

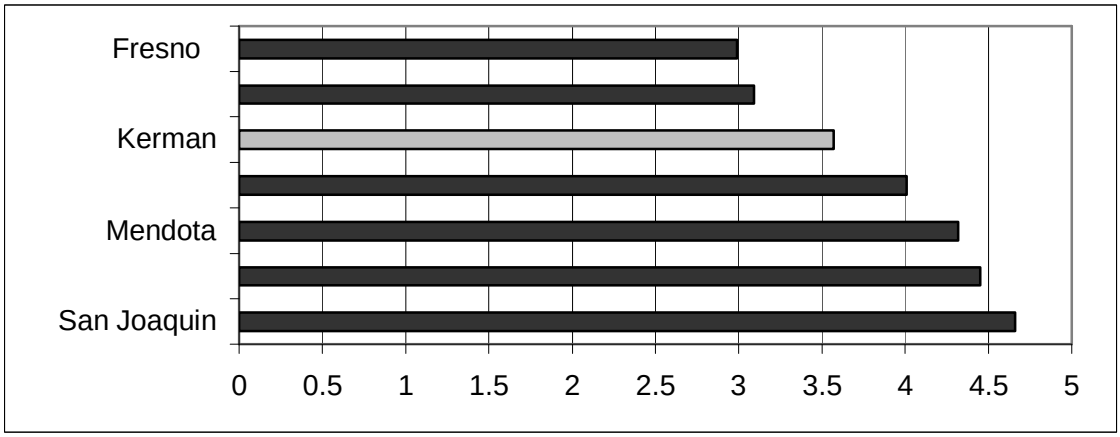
City	Owner Occupied	Renter Occupied
Clovis	1.5	4
Coalinga	2	3.3
Firebaugh	0.8	4.3
Fowler	0.8	2.1
Fresno	1.9	6.4
Fresno County	1.6	5.5
Huron	0	1.8
KERMAN	***1.1***	***2.6***
Madera	1.5	3.8
Mendota	0	1.5
San Joaquin	2.5	1.1

Source: U.S. Census Bureau, 2000.

Overcrowding

The 2000 Census shows that 31.7 percent of Kerman's dwelling units are overcrowded—a considerable increase from 18 percent in 1990. An overcrowded unit is defined as a unit with more than one person per room, excluding closets, bathrooms, hallways, etc. There was an average of 3.57 persons per unit in 2000. This compares with an average of 3.09 persons for Fresno County as a whole. Table 8 shows how Kerman compares with other cities in the region.

TABLE 8
PERSONS PER OCCUPIED DWELLING UNIT



Source: U.S. Census Bureau, 2000

Housing Starts

Table 9 shows the number of housing additions from 1995 through 2005. The average number of new single family homes has grown drastically since the mid 1990's. Production of new multiple family dwellings and mobile homes has been more erratic.

TABLE 9
HOUSING STARTS

Year	Single Family	Multiple Family	Mobilehomes
1995	70	2	0
1996	120	8	0
1997	72	0	0
1998	49	0	0
1999	143	0	23
2000	53	0	0
2001	206	1	0
2002	104	0	0
2003	166	0	0
2004	216	113	0
2005	258	87	0
TOTAL	**1457**	**211**	**23**

Source: City of Kerman, 2007, California Department of Finance, 1995-2005.

E. PUBLIC SERVICES

Fire Protection

Kerman is located within the North Central Fire Protection District. The district headquarters and main station are located on the west side of Kerman along the north side of Kearney Boulevard, west of Del Norte Avenue. The station is staffed by two full-time personnel and two medical personnel. Two firefighters are on duty at any given time. One of these is a licensed paramedic, another is an Emergency Medical Technician (EMT). This staff is complemented by ten volunteer firefighters. The station is equipped with two 1,250 gpm (gallons per minute) fire engines, a 65 foot aerial ladder (750 gpm) as well as a paramedic rescue vehicle.

The district is able to respond to emergency calls in Kerman within two to three minutes. Backup assistance is provided by the Kearney Park Station located on Kearney Boulevard about eight miles east of Kerman. The Biola Station (about nine miles to the northeast) may also respond to emergency events in Kerman.

Interviews with fire district personnel indicate that all developed areas of the city are connected to the city's water system and water pressure is sufficient in all areas for fire fighting purposes. Pressure in most areas is about 40-55 pounds per square inch. The Insurance Service Office (ISO) rating for Kerman is 4. Areas immediately outside of city limits have a rating of four, ranging to eight further out from the urban area. In 1992, the Kerman City Council approved an ordinance requiring fire sprinklers to be installed in new and remodeled structures larger than 5,000 square feet. Recent funding cuts have caused the North Central Fire Protection District to downsize their Kerman operations.

Police Protection

Police protection is provided by the Kerman Police Department, with offices behind City Hall. The Department is staffed by a chief, four sergeants, one detective, thirteen full-time sworn officers, and three Community Services Officers (CSO). The department is also complemented by ten reserve officer positions. The City aims to maintain an officer-to-citizen ratio of 1: 700. At a minimum, there are two units on patrol at any given time; with a standard of three (3). In addition to and in consonance with patrol services, the department operates within the design of the Community Oriented Policing and Problem Solving (COPPS) concept and uses the Problem Oriented Policing and Crime Free Multi-Family Housing (CFMFH) elements of COPPS, along with the DARE (Drug Abuse Resistance Education) program.

The Kerman police department facility maintains a state of the art Temporary Holding Facility (THF) that houses two holding cells which are used for holding arrested persons prior to transporting them to the Fresno County Jail in Fresno. Kerman has a mutual aid agreement with the Fresno County Sheriff's Department. The Sheriff’s Department has a

substation located in the city of San Joaquin. The Sheriff's Department also handles dispatch duties for Kerman.

Total calls for service in 2005 were 16,183. This represents an increase of 34 percent over a seven year period. Table 10 identifies activity in the Department since 1989.

TABLE 10
POLICE ACTIVITY AND CALLS FOR SERVICE

Adult Arrests

1999	2000	2001	2002	2003	2004	2005
545	465	457	451	501	394	619

Juvenile Arrests

1999	2000	2001	2002	2003	2004	2005
105	110	117	56	94	85	101

Auto Theft

1999	2000	2001	2002	2003	2004	2005
37	70	71	94	134	81	69

Burglary

1999	2000	2001	2002	2003	2004	2005
144	119	135	178	268	190	144

Vandalism

1999	2000	2001	2002	2003	2004	2005
144	119	135	178	268	190	144

Crimes Against Persons

	1999	2000	2001	2002	2003	2004	2005	
Murder		0	0	0	0	0	0	0
Manslaughter	0	0	0	0	0	0	0	
Rape	4	0	5	2	1	3	5	
Robbery	6	1	9	4	6	2	5	
Assault	126	85	99	131	133	107	109	

Source: Kerman Police Department, 2007.

Medical Facilities

Kerman currently has no hospital. The closest hospitals to Kerman is Community Hospital in Fresno, about seventeen miles east of Kerman and Madera Community

Hospital fifteen miles to the north Fresno County also operates a public hospital in Fresno, Valley Medical Center. There are several health care professionals operating in Kerman, including (incorrect) general practitioners, two physician's assistants, one dentist, one optometrist, one part-time chiropractor, one part-time podiatrist, one part-time cardiologist and one dentist. You need to contact United Health Centers . They have staff you do not mention including dentist. As mentioned in the discussion on fire protection, emergency medical response is provided by North Central Fire District, operating out of the Kerman station. Two medical personnel are on duty 24 hours per day at the station.

Solid Waste

Kerman contracts with Allied Waste Management Systems (formerly BFI) for solid waste collection. Collection is provided twice a week to residential, commercial and industrial customers. Allied Waste hauls the solid waste to the American Avenue Landfill, about 6 miles southwest of Kerman. Green Waste and Recyclables are taken to other locations through contract arrangements with Allied. .

Policies regarding solid waste and recycling are contained in the Kerman Source Reduction and Recycling Element (SRRE). The Element estimated that in 2000, the City of Kerman generated 9,055 tons of solid waste, or 5.8 pounds per person per day compared to 5.22 pounds that was generated per person per day in 1990. The increase of .6 pounds per person per results an additional 1000 tons of solid waste per year.

Allied also operates a recycling program in Kerman. The program was begun in the fall of 1991 and provides curbside pickup for newspaper, glass, plastic, aluminum. In May 2007 the City introduced a new residential curbside recycling program and made available larger 96-gal carts for residents which allowed for curbside co-mingled recyclables. Residential recycling has increased by 50% Hazardous waste disposal is coordinated through a County wide program in conjunction with the County wide committee The City in conjunction with it hauler established a Green Waste program in 1998.. .In 2004, the State Integrated Waste Management Board indicated that Kerman was diverting about 34% of its waste stream. The city continues to work towards the State mandated goal of a 50% diversion rate with strategies such as the split containers that have recently been implemented to make recycling more user-friendly for community members.

Further information regarding solid waste and recycling is available in the Kerman Source Reduction and Recycling Element.

Schools

The Kerman Unified School District is composed of a high school, a continuation high school, one junior high school, one intermediate school and two elementary schools. Map 13 provides the boundaries of the District which encompasses a 146 square mile

area. Primary education services within the planning area are provided by Kerman-Floyd Elementary School which has an enrollment of 969 students. Sun Empire Elementary is also operated by the District; however, it is not located within the City of Kerman, and there are no students from within the city limits that attend it. Student enrollment figures are provided in Table 11.

TABLE 11
KERMAN UNIFIED SCHOOL DISTRICT ENROLLMENT

SCHOOL	GRADES	# OF STUDENTS
Kerman-Floyd Elementary	K-6TH	969
Sun Empire Elementary	K-6TH	620
Liberty Intermediate School	4TH-6TH	630
Kerman Middle School	7TH-8TH	625
Kerman High School	9TH-12TH	1020
	TOTAL	***3864***

Source: Kerman Unified School District, 2007

Students within the district have a choice of attending any of three junior colleges in the area. Fresno City College is approximately 17 miles from Kerman while the new Madera Community College Center is within 15 miles and would be the likely choice for most Kerman residents.

Two four-year colleges are located in nearby Fresno. California State University at Fresno provides students with a four-year degree, as well as many graduate programs. Fresno Pacific University is a four-year private college that is also conveniently located for residents of Kerman.

The ethnic background of students within the District varies somewhat from the ethnic background found city-wide. Within the District, 78.1 percent of the students are Hispanic and 14.75 percent are White. The City of Kerman has a Hispanic population of 42.4 percent. Table 12 illustrates the ethnic composition of the School District.

Kerman Unified School District operates five schools within the planning area, Kerman-Floyd Elementary (Pre-school, K-4), Sun Empire Elementary (K-4)Liberty Intermediate School (5-6), Kerman Middle School (7-8), Kerman High School (9-12), and Nova High School (continuation).

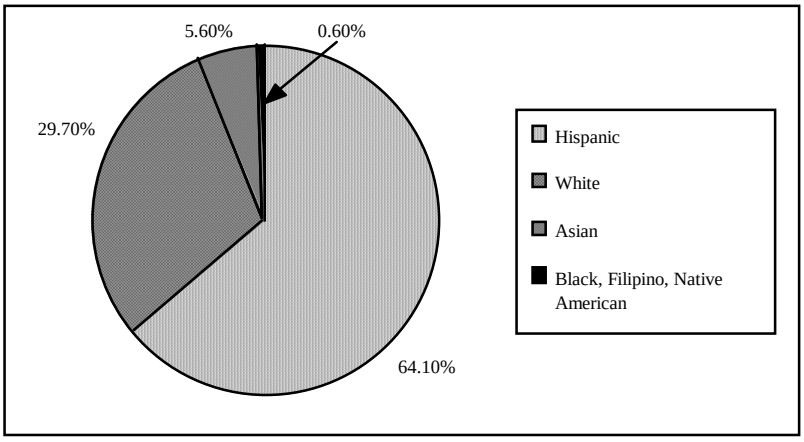
Sun Empire school is located northwest of Kerman, outside of the planning area. The 2007 enrollment was 620 students with an average class size of 28. The campus contains 40 classrooms and has a capacity for 650 students.

Kerman-Floyd Elementary is located in the east side of the community. The 2007 enrollment was 969 students. Capacity of the school is 989 students. Average class size is 28 students. The campus contains 51 classrooms. The school is currently considered to be overcrowded.

Liberty Intermediate School is located in the southwest corner of Siskiyou Avenue and E Street. Enrollment at the intermediate school in 2007 was 630 students. The school has a capacity of 728 students. The campus contains 24 classrooms and recently completed the construction of a multi-purpose room.

Kerman Middle School is located on First Street south of Kearney Boulevard. Enrollment at the middle school in 2007 was 625 students. The school has a capacity of 837 students. The 26-acre campus contains 26 classrooms and has an average class size of 30 students. Average class size is 26 students. Kerman Middle School is considered to be overcrowded.

TABLE 12
SCHOOL DISTRICT ETHNICITY



Source: Kerman Unified School District, 2007

Kerman High School is located on First Street, south of Whitesbridge Road. The 2007 enrollment at the high school is 1020 students. The capacity of the school is 1080 students. The 37-acre campus contains 45 classrooms, a stadium, baseball diamonds, tennis courts, basketball courts, a gym, volleyball courts, and recently completed the construction of a new multi-purpose room. The campus is near capacity.

The consultant has extended the enrollment figures to 2027. These projections are shown in the following tables. The combined enrollment for 2027 is 8,386 students. The projections provided by the District reflect existing and future enrollments for each class.

A recent study quantified the difference between student enrollment as of October 2005 and the student capacity of existing schools within the District. Table 17 illustrates the study's findings.

As can be seen from this table, the capacity of the District's schools exceeds its enrollment by 420 students. The District has recently added multi-purpose rooms at both Kerman High School and Kerman Middle School, while the construction of 16 additional classrooms (4 at Liberty Intermediate, 5 at Sun Empire Elementary, 7 at Kerman High School) will begin in 2007 to accommodate the growing student population. At the writing of this, KUSD has recently received approval from the State for new library media centers at Kerman-Floyd Elementary and Sun Empire Elementary.

Fees

The School District currently charges $4.38 per square foot on residential construction and 0.42 cents per square foot for commercial construction. At this time, under California State Law, $ 4.82 is the maximum amount that can be charged on residential development. The School District has continually increase their fees to accommodate new students generated by new development and pay for new facilities in addition to Bond issue Measure K that was passed by district voters in 2004

TABLE 13
GRADES K-6 ENROLLMENT PROJECTION

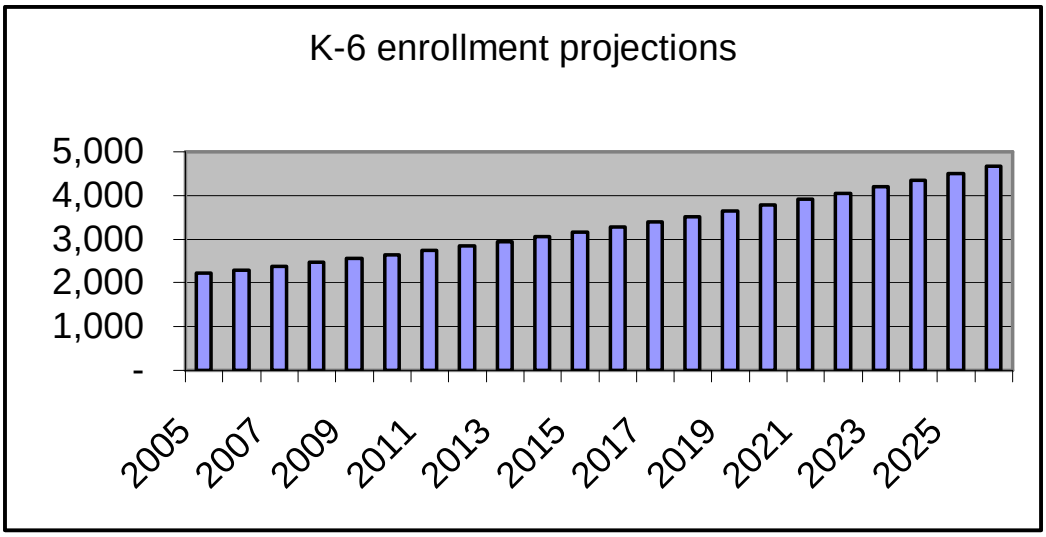


TABLE 14
GRADES 7-8 ENROLLMENT PROJECTION

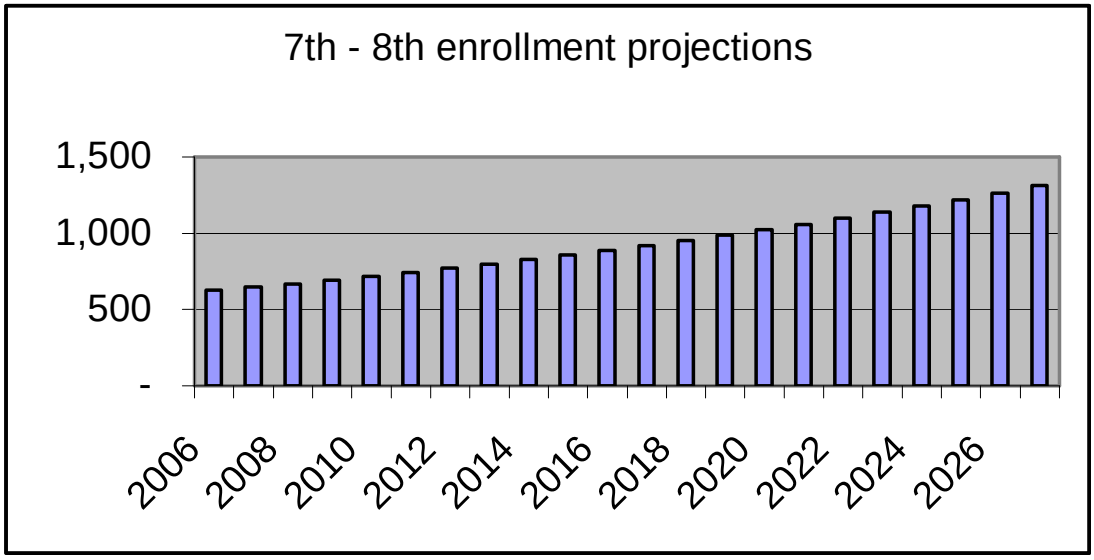
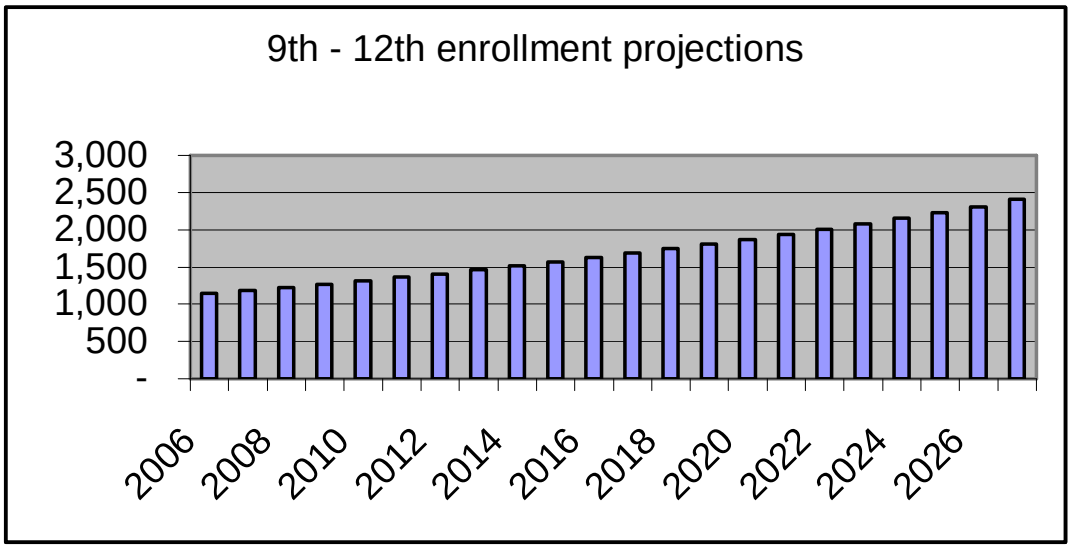


TABLE 15
GRADES 9 - 12 ENROLLMENT PROJECTION



Future Plans

The expected continued growth, along with the near-capacity enrollment within the District, show a need for new facilities within the District. The School District has purchased a twenty (20) acre elementary school site located on the northwest corner of Goldenrod Avenue and Kearney Boulevard. The School District is currently designing the site to accommodate 31 classrooms, office, and a multi-use building. In addition to the new elementary school, the District is projecting a need to build a new high school within the next six to ten years. As the district's school impact fees were recently decrease, the funding for these plans may need to be placed "on hold" until funding can be secured.

Conclusions

The enrollment projections presented in Tables 14 - 16 indicate a need for additional facilities during the lifetime of the General Plan update. By 2027, Elementary school enrollment will have increased by about 2,446 students over existing enrollment. Given that the district's two elementary schools are currently operating near capacity, at least one additional elementary school will be required.

Middle school enrollment will increase to about 1,316 students, an increase of 691 students over the existing enrollment of 625 students. Existing middle school capacity is currently 837 students. This points to the need for another middle school during the plan period.

High school enrollment is projected to increase to about 2,405 students, an increase of 1,385 students over the existing enrollment of 1020 students. Existing high school capacity is currently 1,080 students. This also points to the need for another high school during the plan period.

TABLE 16
ENROLLMENT CAPACITY

School	**Enrollment by Grade Level**					
	K-3rd	*5th-6th*	*7th - 8th*	*9th - 12th*	*Cont'd.*	***Total***
Kerman-Floyd Elementary	969					969
Sun Empire Elementary	620					620
Liberty Intermediate School		630				630
Kerman Middle School			625			625
Kerman Unified High School				1020		1020
Nova Continuation School					75	75
Total Student Capacity	1639	650	837	1080	75	4281
October 2005 Enrollment	1589	630	625	1020	75	3864
Remaining Capacity	**50**	**20**	**212**	**60**	**0**	**417**

Source: Kerman Unified School District, 2007

In all cases, expansion of existing campuses through the addition of classrooms (as is planned) could serve to delay the construction of new schools. Other methods such as year round classes and increases in student/teacher ratios could help to delay expensive new construction.

F. LAND USE

The original Kerman township was laid out within the area bounded by California Avenue, "G" Street, First Street and Ninth Street. The township was plotted in the early 1900's. Madera Avenue was designed to serve as Kerman's "main street". Originally, it had a right of way that ranged from 100 to 200 feet in width, with 30 x 140 foot commercial lots fronting onto it. At the southern end of Madera Avenue, a 100 foot landscaped plaza was constructed. It still exists today and contains a mature grove of palm, magnolia and ash trees surrounded by lawn.

Residential lots, which were located east and west of Madera Avenue, were 50 x 140 feet. They fronted onto local streets that had a right of way of 60 feet. Separating each residential block was a 20 foot alley, which bisected each block north and south.

The City has grown primarily north, east and west since that time. Today, the urban area is centered roughly on Kearney Boulevard and Madera Avenue. The intersection of these two streets divides the city into four quadrants which provides a convenient setting for the discussion of land use in Kerman.

The urbanized portion of the city extends from Church Avenue on the south to north of Whitesbridge Road, and from east of Goldenrod Avenue to Siskiyou Avenue on the west. Commercial and office uses are clustered along Madera Avenue from California Avenue to north of Whitesbridge, and along Whitesbridge Avenue on both sides of Madera Avenue. Two large shopping centers are located on the northwest and southwest corners of the Madera and Whitesbridge intersection. Single family residential areas are located in all four quadrants of the city (see Map 11). Multiple family development is also found in all quadrants of the city--four large complexes are found at California and Vineland Avenue, Whitesbridge and First Street, Whitesbridge Road, east of Madera Avenue and the southwest corner of California and Del Norte Avenues. Almost all mobile homes within Kerman are located at the 106 unit Golden West Mobile home Park on Madera Avenue, south of Whitesbridge. In 2007, Kearney Palms was built on Kearney Boulevard east of Madera Avenue, which provides 81 units for low-income seniors.

Industrial uses are primarily located in the southern one-third of the city. Smaller operations are clustered along California Avenue, adjacent to the Southern Pacific Railroad tracks. Larger industrial developments are located south of the tracks, within the Kerman Industrial Park.

Public uses are scattered throughout the community. These mainly include schools, parks, city hall and other city buildings, and the wastewater treatment plant. Table 18 includes a breakdown of land use categories and their acreages within the Kerman city limits and within the Sphere of Influence.

TABLE 17
EXISTING LAND USE ACREAGE
IN CITY LIMITS & SPHERE OF INFLUENCE

Land Use	City Limits	*2013 Growth Boundary*	*Sphere of Influence*
	Acres	Acres	*Acres*
Single Family	813	1076.8	
Multiple Family	91.6	98.8	
Retail Commercial	125.2	128.65	
Service Commercial	98.7	109.6	
Office	21.3	21.3	
Industrial	275.7	558.6	
Mixed Use	17	17	
Public	7.9	7.9	
Quasi-Public	18.8	18.8	
Schools	98.5	98.5	
Parks	49.2	49.2	
Undesignated	0	0	926.85
Total	1616.9	2185.15	3112

Source: Collins & Associates, 2007.

Table 18 shows the totals for all land uses within the planning area.

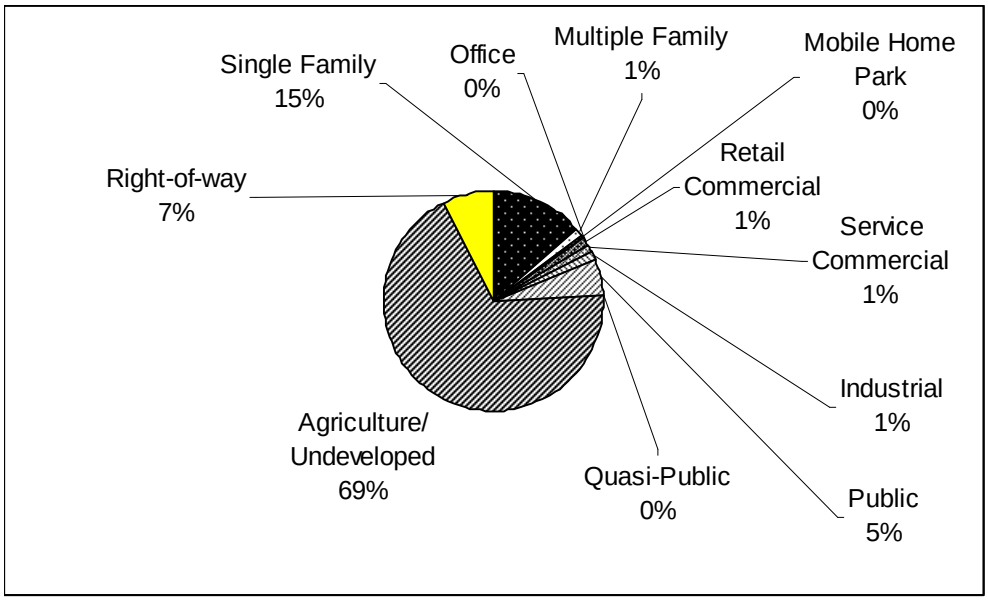
TABLE 18
PLANNING AREA LAND USE

Land Use	**Acres**
Single Family	1794
Multiple Family	85
Office	9
Retail Commercial	282
Service Commercial	203
Schools	201
Mixed Use	14
Industrial	680
Public	184
Quasi-Public	14
Agriculture/ Undeveloped	1954
Parks	114
Total	***5534***

Source: Collins & Associates, 2007

Table 19 shows a breakdown of the major land use categories within the planning area.

TABLE 19
EXISTING ZONING



Source: Collins & Associates, 2007

Map 20 shows Kerman's zone districts.

Williamson Act Lands

The Williamson Act, passed by the state legislature in the early 1970's, was designed to prevent the premature urbanization of agricultural land. The act authorizes owners of agricultural land to enter into a contract with the County, which results in a reduced property tax rate in exchange for the land being maintained in agriculture. Upon approval, the contract runs for a period of ten years. The contract can be terminated in one of two ways. The owner of the property can file a Notice of Non-Renewal, which means that the owner will not renew the contract at the end of the ten year period, or the owner can remove the land immediately from the Williamson Act, however, the owner must pay taxes they were exempted from during the contract.

Termination of agricultural preserve contracts must be approved by the County Board of Supervisors and can be challenged by the State, City, State Department of Conservation or any other group or person.
The location of Williamson Act Lands is important in land planning. Typically, new development is steered away from these lands. There are no properties within the City of

Kerman currently under an agricultural preserve contract. However, there are approximately 410 acres under contract within the City's planning area or Sphere of Influence. The location of these parcels is shown in Map 1.

G. INFRASTRUCTURE

SANITARY SEWER SYSTEM

The City of Kerman provides sewer service to the community. The City's existing service area encompasses the developed portions of Kerman. Kerman's sewer system is composed of a collection system and waste water treatment plant.

Collection System

The sewage collection system consists of a network of 6-inch and 8-inch diameter "collection" lines that connect to larger "mains". Sewage from most of the southern half of Kerman flows into an 18-inch trunk line in Madera Avenue from California Avenue to Church Avenue, and then in a 27-inch trunk line in Church Avenue from Madera Avenue to the Wastewater Treatment Plant (WWTP). The remainder of the city flows into an 18-inch trunk line in Del Norte Avenue from Whitesbridge Road to Church Avenue and then in Church Avenue from the Del Norte Avenue alignment to the WWTP.

Kerman's collection system operates with one permanent lift station that is located at the intersection of Siskiyou and Kearney. This facility currently receives flows from the area generally west and north of that location and discharges into the Del Norte Avenue line. A second temporary lift station is located on Goldenrod Avenue north of the Union Pacific Railroad tracks. This station serves the area north and east of its location and discharges into the Madera Avenue trunk line. Once the sewer main is extended in Goldenrod Avenue to Church Avenue and then in Church Avenue to Madera Avenue, this station will be abandoned. This station has limited capacity due to the limitations of the downstream system.

Treatment Plant

The City's wastewater treatment plant (WWTP), which provides a secondary level of treatment, is located south of Church Avenue on the Del Norte Avenue alignment. The existing plant was designed with a hydraulic capacity of approximately 1.34 million gallons per day (mgd). Treated effluent from the plant is discharged into disposal ponds where it is allowed to evaporate and percolate. The city purchased 80 acres of property adjacent to the WWTP to provide additional space for disposal ponds.

The flows at the treatment plant exhibit very little seasonal variation. This condition occurs because the flows are predominately from residential uses since there are not significant industrial, agriculture-related or seasonally operated industries within the City.

The average daily flow for 2005 was 1.11 mgd. If the past growth rates continue, the plan will reach capacity in 2008. The average rate of sewage generation for the last five years is 97 gallons per person per day. Rounding that figure up to 100 gallons per person per day, and assuming a high population figure of 23,300 for the year 2017, the sewage flow in that year will reach 2.33 mgd. The City is beginning the process to increase the capacity of the WWTP to 2.0 mgd. Provost and Pritchard Engineering Group complete a "Wastewater Treatment Plant Master Plan" in January 2007, which proposed two options for the plant expansion. The preferred option involves the construction of a fine bubble system with integral clarifiers. The city has begun the design process to implement that alternative.

Master Plan

As part of the General Plan Update, the City is revising its Sewer Master Plan. The plan will cover an area larger than the proposed Sphere of Influence. This is necessary since the WWTP is located on the south side of the City and growth is projected North, West and East of the current service area. By looking at a larger study area, the City will insure that adequately sized trunk lines and lift stations will be installed to meet the needs of the City, even beyond the current planning horizon.
by an additional expansion to 3.5 or 4mgd in the year 2021.

WATER SUPPLY SYSTEM

The City provides water service to the community. The City withdraws groundwater from five deep wells. The wells penetrate underlying aquifers, located at depths from 300 to 900 feet.

The total production capacity of these wells is approximately 5,700 gallons per minute (gpm). The current static water level in the wells is 85 to 90 feet. According to city staff, the depth to groundwater in Kerman has remained fairly stable over the past 10 to 15 years. The upper aquifer is contaminated with Uranium. The City recently completed a major water project to drill three new wells much deeper than the previous wells. The replenishment of the deeper aquifer is unknown. The City is exploring the possibility of supplementing its groundwater supply with treated surface water supplied by Fresno Irrigation District (FID). FID supplies irrigation water to surrounding agricultural users. As the City develops and the agricultural uses are replaced by urban development, the water that was once used to irrigate crops could now be used to meet the municipal needs.

One concept which may help the city make better use of its resources is a dual water system. The primary system would provide potable water for domestic uses from deep wells. The secondary system would carry non-potable water for landscaping, industrial

and fire protection from surface water and/or shallow ground-water. The secondary system would have its own mains, services, pumps, wells and storage tanks.

Variations of this concept are being used in areas throughout the western United States. Some systems use treated waste water for the secondary system, while in other areas an irrigation district or a private water company not only supplies the water, but also operates the secondary system for profit. Some cities require the installation of the non-potable system for future use of irrigation water, and then connect to the existing potable system.

It might be helpful to look at the water usage for a hypothetical 10-acre subdivision:

Area	=	10	acres
Lot density	=	3.8	lots per acre
Total number of homes	=	38	
Population Density	=	3	people per home
Total Population	=	114	people
Annual Water use Rate	=	261	gallons per person per day
Total annual water Use	=	10.86	mg per year
Waste water (38%)	=	4.3	mg per year
Landscape Irrigation (62%)	=	6.73	mg per year
F.I.D. Allotment	=	3.9	a-f per month
Irrigation Season	=	6	months
Total F.I.D. Delivery	=	23.4	a-f
	=	7.63	mg

Conceptually, F.I.D. surface water could meet the landscape irrigation needs. However, for short water seasons, or times when F.I.D. water is not available, the secondary system would be augmented by shallow wells.

There will be additional costs associated with a dual water system in two areas: initial construction will be paid for by developers and added to the cost of the home or building. A review of four recent subdivisions shows that the average cost of the water system is $2,600 per lot. If one assumes that: 1) The cost of the secondary water distribution system would equal the cost of the current water system, since main sizes will be similar, and 2) The cost of the primary water system will be less, since smaller mains can carry the domestic-only flows, then the secondary water system would cost less than an additional $2,600 per lot.

Additional impact fees will be needed to pay for the major facilities to operate the secondary system, such as shallow wells, storage tanks and booster pumps, but should be less than the current $1,400 per lot. The major facilities fees for the primary water system should also be less than the current fees, since fewer deep wells will be needed.

In summary, the cost of the secondary water system would not be twice as much as the current cost for construction and impact fees. The second area of increased costs will be the higher maintenance costs, which would be passed on to the users in monthly fees.

Distribution System

Kerman's water distribution system consists of a network of water lines located in the streets and alleys of the community. To date, there are approximately 2,900 connections to the City's water system; 2,700 of the connections are residential uses.

Kerman's water lines range in diameter from 4 to 12 inches in diameter. The City's minimum standard for water lines is 6 inches. The mains are usually placed in a grid pattern with 12-inch mains every half-mile and 8-inch mains at the quarter-mile locations. Depending on the number of units served, the intervening mains are either 6 or 8-inch diameters.

The distribution system is adequate to satisfy current demands and provide the required Uniform Fire Code fire flows. The City operates the system with a pressure that ranges from 50 to 60 pounds per square inch (psi). The distribution system also has a 750,000-gallon ground level storage tank with booster pumps that can deliver up to 4,000 gpm. A second tank of the same size is under construction, and will be completed by May 2007.

Demand

The annual water demand for 2005 was 1,168 million gallons, or 2,222 gpm. The maximum day demand is twice that or 4,444 gpm. With a 2005 population of 11,455, the average daily demand per person is 279 gallons per day. There are no industries in the city which have a high water demand. The major water users in Kerman include the three schools operated by Kerman Unified School District, the City parks. The current production and distribution system is capable of meeting the water demands of the city. As new development occurs, additional wells and storage facilities will be needed.

Master Plan

The City's existing Water Distribution System Master Plan, which was adopted in 1980 (see Exhibit 6), is based on the projected demand for water that will be required under the 1979 General Plan. The Master Plan identified the improvements that would be needed to serve the planned land uses within the area delineated within the 1979 Sphere of Influence. The City is currently updating the water master plan for the 2017 growth boundary.

STORM DRAINAGE SYSTEM

Storm drainage service in Kerman is provided by the City, and is composed of a system of collection, transmission, and disposal facilities. The City's Storm Drainage Master Plan (see Exhibit 7), adopted in 1981, divided the area within Kerman's Sphere of Influence into nine "drainage zones".

The most prominent drainage zone encompasses much of the developed area between Whitesbridge and California. This zone is served by a 30-inch line in First Street that connects to a 42-inch line at California. The 42-inch line extends south to Church Avenue and discharges into an open channel that conveys stormwater to a basin south of the City's Wastewater Treatment Plant.

North of "G" Street, most of the runoff from this drainage zone surface flows along gutters to a drop inlet at Madera and Sunset, which connects with a 24-inch line in Sunset. South of "G" Street, runoff surface flows along gutters to drop inlets in California, which connect to the line in California and the First Street line. Because moderate street flooding can occur at drop inlets when the lines in Sunset and California are overloaded, the Master Plan recommends the installation of parallel lines in these streets.

The other eight designated drainage zones generally serve more recent development and areas that will be developed in the future. Each of these drainage zones has existing or planned stormwater disposal basins. Two of the existing basins also serve as landscaped, recreational facilities, while the remainder of the existing basins are un-landscaped, single-use facilities.

Many of the deficiencies in the existing drainage system that were identified in the Master Plan have been corrected by the City. Master planned lines that were installed by the City to correct existing deficiencies include parallel lines in Middleton (west of First), First (between Middleton and Kearney), and Madera (north of Sunset). The capacity of the pump station at the "buffer" basin at First and Kearney was increased, and the pump station at First and California was abandoned.

Other master planned facilities have been installed to serve new development, including a 24-inch line in Kearney between Siskiyou and Park and a 42-inch line in Park south of Kearney. These lines serve the residential uses that have developed south of Kearney and west of Del Norte. The 42-inch line discharges into an existing basin south of "E" Street and east of Park.

The City also installed a 24-inch line in Madera Avenue north of Church Avenue and a 54-inch line in Church, which connects with the Madera line and drains to the open channel near the City's treatment plant. These lines receive runoff from Madera Avenue and the industrial uses along Madera.

Deficiencies in the existing drainage system that have not been corrected by the City include the lines in Sunset and California, and the 30-inch line in First Street between Kearney and California. The City intends to install new lines parallel to these deficient lines as funds become available.

H. CIRCULATION SYSTEM

Kerman is served by a network of collectors, local streets, alleys and two major regional transportation routes: State Routes 180 and 145 (see Exhibit 8).

State Routes

State Route (SR) 180, which is designated as a "Federal Aid Primary" highway by Caltrans, is an east-west roadway that connects with Highway 33 near Mendota and extends east through Kerman and Fresno. East of Fresno, SR 180 continues into Sequoia National Forest.

In and around Kerman, SR 180 is referred to as Whitesbridge Road and is designated as an "Expressway" by the City. In a segment that begins 800 feet west of Madera and crosses through the intersection with Madera and extends 2,200 feet east of Madera, Whitesbridge is constructed with two travel lanes in each direction and curb and gutter. Outside of this segment, it is constructed with one travel lane in each direction generally without curb and gutter.

Within Kerman, the roadway has a standard design (curb-to-curb) width of 60 feet within an 80-foot right-of-way. In the vicinity of Kerman, the only control on SR 180 is a four-way flashing red light at the intersection with SR 145. The posted speed limit in the City is 35 mph.

SR 145, which also is a designated "Federal Aid Primary" highway, is a north-south roadway that connects with Interstate 5 near Coalinga and extends north through Kerman and Madera. North of Madera, it connects with SR 41.

In and around Kerman, SR 145 is referred to as Madera Avenue and designated as an "Expressway" by the City. From Church Avenue through the intersection with Whitesbridge, the Madera cross-section includes two travel lanes in each direction, parallel parking lanes, and curb and gutter. North of Whitesbridge and south of Church, Madera is constructed with one travel lane in each direction without curb and gutter. Within Kerman, the roadway has a standard design (curb-to-curb) width of 76 feet within a 100-foot right-of-way. In Kerman, SR 145 is controlled by a traffic signals at "E" Street, Kearney Boulevard and Whitesbridge Road, SR 180. The posted speed limit in the City is 35 mph north of Kearney and 30 mph south of Kearney.

City Streets

The street system in Kerman consists of a grid in which most of the streets are oriented north and south or east and west. The existing Kerman Circulation Element designates Madera Avenue (SR 145) and Whitesbridge Road (SR 180) as "arterials"; Del Norte, Siskiyou, Vineland, and Goldenrod as north-south "collectors", Park, First, and Eighth streets as north-south "local collectors", Church, California, and Kearney as east-west "collectors" and "C" and "E" streets and the Middleton-Stanislaus couplet as east-west "local collectors". The collectors, located at half-mile intervals, are regional roadways that extend beyond Kerman into the surrounding rural lands. Through Kerman, these roadways are striped for one lane travel in each direction. Based on current city improvement standards, collector roadways generally have a design (curb-to-curb) width of 60 feet within an 80 foot right-of-way.

The Circulation Element designates Whitesbridge Road (SR180) as an east-west “expressway”, Madera Avenue (SR145) as a north-south “expressway”, Jensen Avenue as an east-west “arterial”, Nielson, Kearney, California, and Church (Modoc to Siskiyou and Vineland to Sycamore) as east-west “collectors”, Church Avenue (Siskiyou to Vineland) as an east-west “industrial collector”, Modoc, Siskiyou, Del Norte, Vineland, Goldenrod, and Sycamore as north-south “collectors.

Trip Generation

The significant generators of local and regional traffic in Kerman include Pacific Coast Packaging on south Madera, Kerman High School at First and Middleton, and the City offices on Madera between "B" and "C".

Traffic Volumes

Average daily traffic volumes in the vicinity of Kerman were obtained from Caltrans and the Fresno County Public Works Department. These traffic volumes are presented in Table 22 an displayed in Exhibit 9.

Caltrans collected traffic counts on SR 180 (west of SR 145) and SR 145 (north of SR 180) over a period of seven consecutive days in April and June of 2005. The counts indicate that the average weekday daily (two-way) traffic volume on SR 180 was 7,248 vehicles. The highest single day volume of 7,531 vehicles occurred on a Friday.

The weekday peak-hour on SR 180 typically occurred between 11:00 a.m. and noon with an average weekday volume of 446 vehicles. The maximum morning hourly volume of 546 vehicles occurred on a Sunday between 11:00 a.m. and noon. The maximum hourly volume occurred most frequently between 4:00 and 5:00 p.m. with an average of 559 vehicles. The maximum afternoon hourly volume of 587 vehicles occurred on a Sunday between noon and 1:00 p.m.

The average weekday daily (two-way) traffic volume on SR 145 (north of SR 180) was 10,240 vehicles. The highest single day volume of 10,877 vehicles occurred on a Friday.

The weekday maximum hourly generally occurred between 11:00 a.m. and noon with an average of 688 vehicles. The maximum morning hourly volume of 718 vehicles occurred on a Tuesday between 11:00 a.m. and noon. The afternoon weekday maximum hourly volume occurred most frequently between 4:00 and 5:00 p.m. with an average of 861 vehicles. The maximum afternoon hourly volume of 932 vehicles occurred on a Friday between 4:00 and 5:00 p.m.

The Yamabe & Horn Engineering, Inc. collected traffic counts at several locations around Kerman in 2007. The 2007 data indicates that the maximum hourly volumes generally occurred between 7:00 and 9:00 a.m. and between 4:00 and 7:00 p.m., with the afternoon volumes generally being the highest.

TABLE 20
PROJECT AREA AVERAGE DAILY TRAFFIC VOLUMES

Street	Location	Direction	2006 Daily Volume(1)
Modoc Ave			
	n/o Nielson Ave	BOTH	154
	s/o Nielson Ave	BOTH	152
	n/o Whitesbridge Road	BOTH	152
Siskiyou Ave			
	s/o Nielson Ave	BOTH	304
	n/o Whitesbridge Road	BOTH	304
	n/o Kearney Ave	BOTH	3,033
	s/o Kearney Ave	BOTH	3,111
	n/o California Ave	BOTH	1,583
	s/o California Ave	BOTH	474
	n/o Church Ave	BOTH	474
	s/o Church Ave	BOTH	494
	n/o Jensen Ave	BOTH	494
Del Norte Ave			
	n/o Nielson Ave	BOTH	253
	s/o Nielson Ave	BOTH	298
	n/o Whitesbridge Road	BOTH	298
	n/o Kearney Ave	BOTH	1,843
	n/o California Ave	BOTH	839
Madera Ave (SR145)			
	n/o Whitesbridge Road	BOTH	11,086
	s/o Whitesbridge Road (4)	BOTH	16,681
	n/o Church Ave	BOTH	10,050
	s/o Church Ave	BOTH	7,149
Vineland Ave			
	n/o Whitesbridge Road	BOTH	444
	s/o Whitesbridge Road	BOTH	2,789
	n/o Kearney Blvd	BOTH	2,724
	s/o Kearney Blvd	BOTH	2,767
	n/o California Ave	BOTH	1,701
	n/o Church Ave	BOTH	199
	s/o Church Ave	BOTH	129
	n/o Jensen Ave	BOTH	129
	s/o Jensen Ave	BOTH	93
Goldenrod Ave			
	n/o Whitesbridge Road	BOTH	395
	s/o Whitesbridge Road	BOTH	959
	n/o Kearney Blvd	BOTH	959
	s/o Kearney Blvd	BOTH	1,079
	s/o California Ave	BOTH	536

Street	Location	Direction	2006 Daily Volume(1)
Nielson Ave			
	w/o Modoc Ave	BOTH	91
	e/o Modoc Ave	BOTH	64
	w/o Siskiyou Ave	BOTH	97
	e/o Siskiyou Ave	BOTH	57
	w/o Del Norte Ave	BOTH	57
	e/o Del Norte Ave	BOTH	91
Whitesbridge Rd. (SR180)			
	w/o Siskiyou Ave	BOTH	6,735
	e/o Siskiyou Ave	BOTH	8,807
	w/o Madera Ave(5)	BOTH	10,879
	e/o Madera Ave	BOTH	9,843
	w/o Goldenrod Ave	BOTH	8,496
	e/o Goldenrod Ave	BOTH	8,289
Kearney Blvd.			
	e/o Modoc Ave	BOTH	480
	w/o Siskiyou Ave	BOTH	1,334
	e/o Siskiyou Ave	BOTH	1,539
	w/o Vineland Ave	BOTH	2,903
	e/o Vineland Ave	BOTH	2,113
	w/o Goldenrod Ave	BOTH	1,528
	e/o Goldenrod Ave	BOTH	1,349
California Ave			
	w/o Siskiyou Ave	BOTH	1,080
	e/o Siskiyou Ave	BOTH	893
	w/o Del Norte Ave	BOTH	1,531
	e/o Del Norte Ave	BOTH	751
	e/o Vineland Ave	BOTH	113
	w/o Goldenrod Ave	BOTH	1,546
	e/o Goldenrod Ave	BOTH	1,474
Church Ave			
	e/o Siskiyou Ave	BOTH	55
	w/o Madera Ave	BOTH	355
	e/o Vineland Ave	BOTH	113
Jensen Ave			
	w/o Siskiyou Ave	BOTH	1,612
	e/o Siskiyou Ave	BOTH	1,545
	w/o Del Norte Ave	BOTH	1,545
	e/o Del Norte Ave	BOTH	1,569
	w/o Madera Ave	BOTH	1,569
	e/o Madera Ave	BOTH	2,143
	w/o Vineland Ave	BOTH	2,143

Analysis of Existing Operation Conditions

An analysis of the existing Kerman circulation system was conducted using the daily traffic volumes obtained from Caltrans and Yamabe & Horn Engineering, Inc., the peak-hour intersection counts.

The daily traffic volumes were used to evaluate the segments of key streets based on a "level-of-service" performance criteria, as described in the 1985 Highway Capacity Manual (HCM).

Level-of-service (LOS) is a qualitative measure of the operational conditions within a traffic stream. Six levels of service, each with a letter designation, have been established. LOS A represents the best operating conditions and LOS F represents the worst. A description of the levels of service for roadway segments (with traffic flow that is uninterrupted by traffic controls) and the defining range of volume-to-capacity (v/c) ratios for each service level are presented in Table 23.

The ultimate capacity of a roadway segment is reached when the v/c ratio reaches 1.0 (at the threshold from LOS E to LOS F). Generally, an LOS of "C" or better corresponds to operating conditions that are considered acceptable by most drivers.

TABLE 21
LEVEL OF SERVICE INTERPRETATION

LOS	DESCRIPTION	V/C
A	Free flow, low volume, high operating speed, high maneuverability.	0.00-0.59
B	Stable flow, moderate volume, speed somewhat restricted by traffic conditions, high maneuverability.	0.60-0.69
C	Stable flow, high volume, speed and maneuverability determined by traffic conditions.	0.70-0.79
D	Unstable flow, high volumes, tolerable but fluctuating operating speed and maneuverability.	0.80-0.89
E	Unstable flow, high volumes approaching roadway capacity, limited speed, intermittent vehicle queuing.	0.90-0.99
F	Forced flow, volumes lower than capacity above due to very low speeds; heavy queuing of vehicles, frequent stoppages.	1.0

The v/c ratios and corresponding service levels of Kerman's major streets are presented in Table 25. The current service level ratings indicate that these roadways are generally operating at LOS A with traffic volumes that are well below their ultimate capacities. Notable exceptions include the two-lane sections of Madera (north of Whitesbridge) and Whitesbridge (west of Madera).

Because the transition from two-lanes to four-lanes occurs on Madera north of Whitesbridge, it is assumed that the reported daily volumes on Madera north of

Whitesbridge can be applied both to he two-lane and four-lane sections. As shown in Table 25, the four-lane section is operating at LOS A, while the two-lane section is operating at LOS D. Similarly, because a transition from two-lanes to four-lanes occurs on Whitesbridge west of Madera, it is assumed that the reported daily volumes on Whitesbridge west of Madera can be applied both to the two-lane and four-lane sections. The four-lane section is operating at LOS A; the two-lane section at LOS B.

TABLE 22
SEGMENT CAPACITIES

ROADWAY	LEVEL "E" CAPACITIES
4 Lane Freeway	80,000 vehicles per day
4 Lane Divided Arterial	27,000
2 Lane Divided Arterial	15,000
4 Lane Undivided Arterial	24,000
2 Lane Undivided Arterial	12,000
4 Lane Divided Collector	20,000
2 Lane Divided Collector	10,000
4 Lane Undivided Collector	18,000
2 Lane Undivided Collector	9,000

Source: 1985 Highway Capacity Manual

Intersection Analysis

A "Level of Service" (LOS) analysis was performed with the existing peak-hour traffic counts at Kerman's two major intersections. For the Madera at Kearney intersection, which is controlled with a two-way stop, the analysis was performed with the Highway Capacity Software (HCS) "Unsignalized Intersections" module, which is based on Chapter 10 of the Highway Capacity Manual.

The HCS computational procedure assumes that traffic on the major, uncontrolled street is not affected by movements from the minor, controlled street. It is assumed that left turns from the major

TABLE 23
SEGMENT LEVEL OF SERVICE ANALYSIS

Street	Lanes	Type(1)	Daily Volume(2)	Daily Capacity(3)	V/C	LOS
Modoc Ave						
n/o Nielson Ave	2	C	154	9,000	0.02	A
s/o Nielson Ave	2	C	152	9,000	0.02	A
n/o Whitesbridge Road	2	C	152	9,000	0.02	A
Siskiyou Ave						
s/o Nielson Ave	2	C	304	9,000	0.03	A
n/o Whitesbridge Road	2	C	304	9,000	0.03	A
n/o Kearney Ave	2	C	3,033	9,000	0.34	A
s/o Kearney Ave	2	C	3,111	9,000	0.35	A
n/o California Ave	2	C	1,583	9,000	0.18	A
s/o California Ave	2	C	474	9,000	0.05	A
n/o Church Ave	2	C	474	9,000	0.05	A
s/o Church Ave	2	C	494	9,000	0.05	A
n/o Jensen Ave	2	C	494	9,000	0.05	A
Del Norte Ave						
n/o Nielson Ave	2	C	253	9,000	0.03	A
s/o Nielson Ave	2	C	298	9,000	0.03	A
n/o Whitesbridge Road	2	C	298	9,000	0.03	A
n/o Kearney Ave	2	C	1,843	9,000	0.20	A
n/o California Ave	2	C	839	9,000	0.09	A
Madera Ave (SR145)						
n/o Whitesbridge Road	4	E	11,086	24,000	0.46	A
s/o Whitesbridge Road	4	E	16,681	24,000	0.70	B
n/o Church Ave	2	E	10,050	12,000	0.84	D
s/o Church Ave	2	E	7,149	12,000	0.60	A
Vineland Ave						
n/o Whitesbridge Road	2	C	444	9,000	0.05	A
s/o Whitesbridge Road	2	C	2,789	9,000	0.31	A
n/o Kearney Blvd	2	C	2,724	9,000	0.30	A
s/o Kearney Blvd	2	C	2,767	9,000	0.31	A
n/o California Ave	2	C	1,701	9,000	0.19	A
n/o Church Ave	2	C	199	9,000	0.02	A
s/o Church Ave	2	C	129	9,000	0.01	A
n/o Jensen Ave	2	C	129	9,000	0.01	A
s/o Jensen Ave	2	C	93	9,000	0.01	A
Goldenrod Ave						
n/o Whitesbridge Road	2	C	395	9,000	0.04	A
s/o Whitesbridge Road	2	C	959	9,000	0.11	A
n/o Kearney Blvd	2	C	959	9,000	0.11	A
s/o Kearney Blvd	2	C	1,079	9,000	0.12	A
s/o California Ave	2	C	536	9,000	0.06	A

Street	Lanes	Type(1)	Daily Volume(2)	Daily Capacity(3)	V/C	LOS
Nielson Ave						
w/o Modoc Ave	2	C	91	9,000	0.01	A
e/o Modoc Ave	2	C	64	9,000	0.01	A
w/o Siskiyou Ave	2	C	97	9,000	0.01	A
e/o Siskiyou Ave	2	C	57	9,000	0.01	A
w/o Del Norte Ave	2	C	57	9,000	0.01	A
e/o Del Norte Ave	2	C	91	9,000	0.01	A
Whitesbridge Rd. (SR180)						
w/o Siskiyou Ave	2	A	6,735	12,000	0.56	A
e/o Siskiyou Ave	2	A	8,807	12,000	0.73	C
w/o Madera Ave	4	A	10,879	24,000	0.45	A
e/o Madera Ave	4	A	9,843	24,000	0.41	A
w/o Goldenrod Ave	2	A	8,496	12,000	0.71	B
e/o Goldenrod Ave	2	A	8,289	12,000	0.69	B
Kearney Blvd.						
e/o Modoc Ave	2	C	480	9,000	0.05	A
w/o Siskiyou Ave	2	C	1,334	9,000	0.15	A
e/o Siskiyou Ave	2	C	1,539	9,000	0.17	A
w/o Vineland Ave	2	C	2,903	9,000	0.32	A
e/o Vineland Ave	2	C	2,113	9,000	0.23	A
w/o Goldenrod Ave	2	C	1,528	9,000	0.17	A
e/o Goldenrod Ave	2	C	1,349	9,000	0.15	A
California Ave						
w/o Siskiyou Ave	2	C	1,080	9,000	0.12	A
e/o Siskiyou Ave	2	C	893	9,000	0.10	A
w/o Del Norte Ave	2	C	1,531	9,000	0.17	A
e/o Del Norte Ave	2	C	751	9,000	0.08	A
e/o Vineland Ave	2	C	113	9,000	0.01	A
w/o Goldenrod Ave	2	C	1,546	9,000	0.17	A
e/o Goldenrod Ave	2	C	1,474	9,000	0.16	A
Church Ave						
e/o Siskiyou Ave	2	C	55	9,000	0.01	A
w/o Madera Ave	2	C	355	9,000	0.04	A
e/o Vineland Ave	2	C	113	9,000	0.01	A
Jensen Ave						
w/o Siskiyou Ave	2	A	1,612	9,000	0.18	A
e/o Siskiyou Ave	2	A	1,545	9,000	0.17	A
w/o Del Norte Ave	2	A	1,545	9,000	0.17	A
e/o Del Norte Ave	2	A	1,569	9,000	0.17	A
w/o Madera Ave	2	A	1,569	9,000	0.17	A
e/o Madera Ave	2	A	2,143	9,000	0.24	A
w/o Vineland Ave	2	A	2,143	9,000	0.24	A

(1) A: Arterial; C: Collector
(2) 2007 average volumes obtained from either 2007 field counts or adjusted 2005 volumes.
(3) Ultimate capacity.

The computations establish a "reserve capacity" and LOS for each intersection approach. The HCM level-of-service criteria for un-signalized intersections is presented in Table 26

TABLE 24
HCM LEVEL-OF -SERVICE CRITERIA OF UNSIGNALIZED INTERSECTIONS

Reserve Capacity	Level of Service	Delay to Minor Street Traffic
>400 cars per hour	A	Little or no delay
300-399	B	Short delays
200-299	C	Average delays
100-199	D	Long delays
0-99	E	Very long delays
*	F	Severe congestion

* Demand exceeds capacity

Traffic Signal Warrants

The following intersections are arterial/arterial or arterial/collector intersections that are currently un-signalized (controlled by two-way or all-way stops) and require further analysis to determine level of service and Traffic Signal Warrants:

Whitesbridge Road & Modoc Avenue, Whitesbridge Road & Siskiyou Avenue, Whitesbridge Road & Del Norte, Whitesbridge Road & Vineland Avenue, Whitesbridge Road & Goldenrod Avenue, Whitesbridge Road & Sycamore Avenue, Madera Avenue & Neilson Avenue, Madera Avenue & California Avenue, Madera Avenue & Church Avenue and Madera Avenue & Jensen Avenue

The following intersections are designated as collectors for each approach:

Nielson Avenue & Modoc Avenue, Nielson Avenue & Siskiyou Avenue, Nielson Avenue & Del Norte Avenue, Nielson Avenue & Vineland Avenue, Nielson Avenue & Goldenrod Avenue and Nielson Avenue & Sycamore Avenue.

Future development at these intersections will reduce the level of service and the traffic control may warrant a change from two way stops to all way stops. Roundabouts use in increasing in the United States. Roundabouts have the ability to reduce congestion and delay, thereby reducing air pollution. Roundabouts should be considered as a primary option over all-way stops or traffic signals. As development occurs in these areas, further analysis will be needed to determine the level of service of a roundabout compared to a traffic signal or all-way stops for each intersection.

TABLE 25
INTERSECTION LEVEL-OF-SERVICE ANALYSIS

Intersection	Peak Hour LOS 1			
	East Bound	West Bound	North Bound	South Bound
Madera at Nielson (Stop Sign for EB)	B	DNE	A	A
Madera at California (2-way stop)	C	C	C	C
Madera at Church (Stop Sign for EB)	B	DNE	A	A
Madera at Jensen (2-way stop)	A	A	A	A
Whitesbridge at Modoc (2-way stop)	A	A	B	B
Whitesbridge at Siskiyou (2-way stop)	A	A	B	B
Whitesbridge at Del Norte (2-way stop)	B	B	B	B
Whitesbridge at Vineland (2-way stop)	B	B	B	B
Whitesbridge at Goldenrod (2-way stop)	A	A	A	A
Whitesbridge at Sycamore (2-way stop)	A	A	A	A

1 Afternoon peak-hour assumed to be 4:30 to 5:30 p.m.
2 For left-turn movement on major street approach.
3 For left-turn, through, and right-turn movements sharing a lane.
DNE: CURRENTLY DOES NOT EXIST.

Traffic Signal Warrants

The potential need for traffic signals at the following intersections:
Madera Avenue & Neilson Avenue
Madera Avenue & California Avenue
Madera Avenue & Church Avenue
Madera Avenue & Jensen Avenue
Whitesbridge Road & Modoc Avenue
Whitesbridge Road & Siskiyou Avenue
Whitesbridge Road & Del Norte
Whitesbridge Road & Vineland Avenue
Whitesbridge Road & Goldenrod Avenue
Whitesbridge Road & Sycamore Avenue

Evaluation of the intersection based on the “Traffic Signal Warrants" presented in Chapter 4 of the Manual of Uniform Traffic Control Devises. These warrants are based on criteria that considers minimum vehicle volumes on the "major" and "minor" streets, minimum pedestrian volumes, and accident history.

Several of the warrants require minimum traffic volumes for eight hours within a 24-hour period. Although hourly directional volumes were not obtained on the approaches to the Madera and Kearney intersection, the existing afternoon peak-hour traffic volumes and the two-way hourly volumes on Kearney suggest that the intersection volumes approach the minimum eight-hour volume requirements of two warrants. The "Minimum Vehicle Volume" warrant requires that: 1) the two Madera approaches have a total minimum volume of 500 vehicles per hour for eight hours and 2) the higher volume Kearney approach has a minimum volume of 150 vehicles per hour for eight hours. The "Interruption of Continuous Traffic" warrant requires that: 1) the two Madera approaches have a total minimum volume of 750 vehicles per hour for eight hours and 2) the higher volume Kearney approach has a minimum volume of 75 vehicles per hour for eight hours.