FOX FIRE RANCH

SPECIFIC PLAN

THE MASTER PLANNED COMMUNITY

Submitted:

November 14, 1989

GPA No.: GPA-5-89 (I)
Approved: January 32, 1990 Resolution No.: 90-15

ZC No.: ZC-54-89
Approved: January 23, 1990 Ordinance No.: 1403

Specific Plan 1-89:
Adopted: June 19, 1990 Ordinance No.: 1430

Specific Plan Amendment SPA-1-89(A)
Adopted: November 6, 1990 Ordinance No.: 1439

Specific Plan Amendment SPA-1-89(A-2)
Adopted: July 6, 1993 Ordinance No.: 1658

Specific Plan Amendment SPA-1-89(A-3)
Adopted: April 18, 1995 Ordinance No.: 1738

Specific Plan Amendment SPA-1-89(A-4)
Adopted: February 20, 1996 Ordinance No.: 1777

Specific Plan Amendment SPA-1-89(A-5)
Adopted: February 19, 1998 Ordinance No.: 1868

Specific Plan Amendment SPA-1-89(A-6)
Adopted: July 15, 1998 Ordinance No.: 1884

Development Agreement DA-2-89(M-2) Ordinance No.: 1659
(Refer to separate document)

Development Agreement DA-2-89(M-3) Ordinance No.: 1739
(Refer to separate document)

Specific Plan Amendment SPA-1-89 (A-7) Ordinance No.: 2026
Adopted: February 3, 2004

Specific Plan Amendment SPA-89-001 (A-8) Ordinance No.: 2063
Adopted: August 17, 2004

Applicant:

Century Homes Communities Development
Victorville, California
Robert Reinen
(909) 381-6007

Prepared By:
Stephen Long Associates/Kaleidoscope
Redlands, California
Stephen Long
(909) 335-7376 ©Copyrighted 1989 - Stephen Long Associates

SPECIFIC PLAN

FOXFIRE ❖ RANCH

THE MASTER PLANNED COMMUNITY

A CENTURY HOMES COMMUNITIES DEVELOPMENT

CITY OF VICTORVILLE

Table of Contents

CONTENTS:

1. INTRODUCTION 1-1

- Backgrounds 1-1
- General Plan Relationship 1-6

2. ENVIRONMENTAL RESOURCES 2-1

- Introduction 2-1
- Summary: Impacts and Mitigation Measures 2-17

3. DEVELOPMENT PLAN 3-1

- Introduction 3-1
- Land Use Plan 3-1
- Land Use Regulations 3-9

4. INFRASTRUCTURE PLAN 4-1

- Circulation 4-1
- Public Works 4-6

5. IMPLEMENTATION 5-1

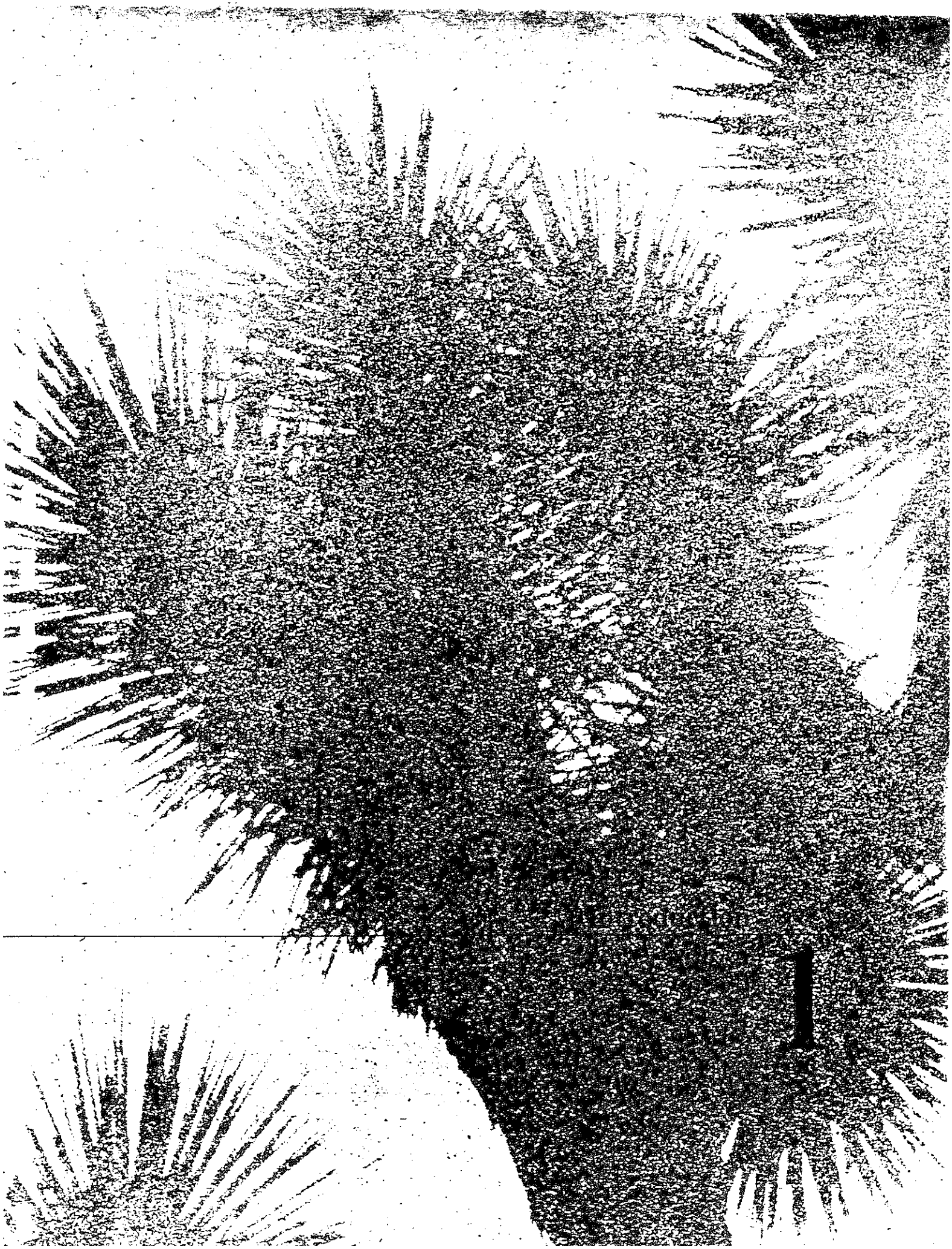
- Density Transfer 5-1
- Application Process 5-2
- Municipal Finance Mechanisms 5-5

6. APPENDIX

List of Exhibits/Tables

LIST OF EXHIBITS:		PAGES:
1.	COMMUNITY SETTING	1-4
2.	SITE LOCATION	1-4
3.	REGIONAL SEISMICITY	2-3
4.	SOILS	2-5
5.	HYDROLOGY	2-6
6.	NOISE	2-13
7.	GENERAL PLAN	2-15
8.	ZONING	2-16
9.	SPECIFIC PLAN/LAND USE PLAN	3-3
10a.	PATHWAY NETWORK	3-6
11.	LAND USE REGULATIONS	3-7
12.	ROADWAY STANDARDS	4-2
12a.	PASEO SECTIONS/PLANS	4-3
13.	CIRCULATION	4-4
14.	WATER CONCEPT	4-7
15.	SEWER CONCEPT	4-9
16.	OFF-SITE SEWER	4-10
17.	DRAINAGE CONCEPT	4-12

LIST OF TABLES/DIAGRAMS:		
1.	SUMMARY DATA	1-5
2.	SOIL SURVEY	2-4
3.	SPECIFIC PLAN LAND USE ALLOCATIONS	3-4
4.	RESIDENTIAL DEVELOPMENT STANDARDS	3-18



1 Introduction

• Background

Introduction

The Foxfire Ranch Specific Plan, at Amethyst Road, describes a planned community consisting of approximately 225 acres of primarily residential uses located in the southwest portion of Victorville. Foxfire Ranch is envisioned as a high quality, family oriented, master planned community. Through strong cohesive community design, Foxfire Ranch will offer not just a desirable living environment, but a way of life for future residents.

Purpose and Intent

This Specific Plan serves as a document for the future development of the Foxfire Ranch Planned Community. It sets forth detailed Land Use, associated regulations, Circulation Standards, Infrastructure Service and Municipal Funding Mechanisms as well as supporting goals and policies to implement the Land Use Plan. The plan also incorporates environmental impact documentation including mitigation measures for the environmental assessment review process.

The Specific Plan, as a result, becomes an implementation tool of the current City of Victorville General Plan. It can be described as a bridge between the overall goals of the General Plan and more detailed planning which implements the Land Use Plan.

The City of Victorville General Plan provides the primary goals and policy foundation for the Specific Plan. This Plan is essentially a further refinement of the general goals and policies stated in the General Plan. However, the City of Victorville Community Development Land Use Policy and Zoning Map will have to be amended to reflect a Specific Plan designation.

Additionally, a development agreement can be entered into with the City and approved by the legislative body if it determines the agreement is consistent with the General Plan, the Specific Plan, and is in the mutual best interest of the City of Victorville and the developer (Refer to Chapter 18.59 in Title 18 of the Victorville Municipal Code titled Zoning).

The Specific Plan is intended to be a flexible planning document which provides the City of Victorville with comprehensive sets of plans, programs and regulations which assures development of the project area as a coordinated planned community involving a mixture of land uses. The main intent of the Plan is to reduce the need for subsequent detailed planning and environmental review procedures for development within the Specific Plan boundaries. The Specific Plan, along with environmental resource information, provides the necessary standards and environmental documentation for the project area so that future development applications, consistent with the Specific Plan, may proceed with the application process without a requirement for new documentation.

The Specific Plan was initiated by the developer to provide a number of benefits to the City and the planning area as a whole including:

❑1 An opportunity for individual lifestyle choices expressed through a complementary mix of residential housing types, and supporting commercial uses. This will expand the appeal of the development to a broad income range;

❑2 An appropriate character of residential development given the existing conditions, the marketplace, and surrounding land uses;

❑3 Examples of enhanced desert landscaping, which promote water conservation within the model home complex;

❑4 The provision for future roadway extensions and major infrastructure concepts;

❑5 Recommended mechanisms to provide and finance necessary public service improvements in the area;

❑6 Adequate environmental documentation so that a reduced scope of environmental review will be sufficient for individual development applications which are consistent with the plan;

❑7 Additional development regulations for the western sphere annexation area to assure that future development will be compatible with surrounding areas; and

❑8 A clear basis for subdivision review so that individual project applications which are consistent with the plan can be processed in a timely manner.

In addition, the plan is designed to address a number of specific City objectives, including the desire to: (a) construct the major arterials and collectors identified in the General Plan's Circulation Element; (b) ensure that residential development in the area takes place in an orderly, well-conceived manner as the necessary public services are provided; (c) ensure that residential development in the city will be consistent with regional, commercial and industrial growth.

Jurisdiction and Boundaries

Foxfire Ranch, recently annexed into the City of Victorville, is located northwest of the Mall of Victor Valley and south of Palmdale Road in the Victor Valley portion of the high desert area of Southern California as shown in Exhibit 1 and Exhibit 2. Victor Valley is comprised of the communities of Apple Valley, Victorville, Hesperia, Lucerne Valley, Silver Lakes, Helendale, Phelan and Adelanto. The project site is generally bounded by Cobalt Road to the west, Luna Road to the south, San Martin Road to the east, and Palmdale Road (SR 18) to the north. The project area is connected via Palmdale Road and Highway 395 to the adjacent Freeway.

Contents

The Specific Plan, adopted as an ordinance, will guide development of the project area by regulations and measures contained within this document. Environmental resource considerations in concert with General Plan goals and policies formulate the basic framework for the Development Plan. The plan is organized into the following sections:

1. Introduction: The introductory section includes the project description and the authority and scope of the document in accordance with State Planning, Zoning and Development law. It also includes a discussion of the Specific Plan's relationship with the goals and policies of the elements of the current City of Victorville's General Plan.

2. Environmental Resources: This section includes a description of the existing conditions and environmental documentation (based on State CEQA guidelines) associated with the project site and surrounding area.

3. Development Plan: A discussion of the land use plan and development program are included in this section. It also includes the administrative and regulatory provisions to implement the land use plan.

4. Infrastructure Plan: This includes a description of the planned major circulation network including public works (water, sewer and drainage) improvements that support the Land Use Plan.

5. Implementation: A discussion describing potential implementation mechanisms such as capital improvement programs, assessment district financing, etc., is covered in the implementation section.

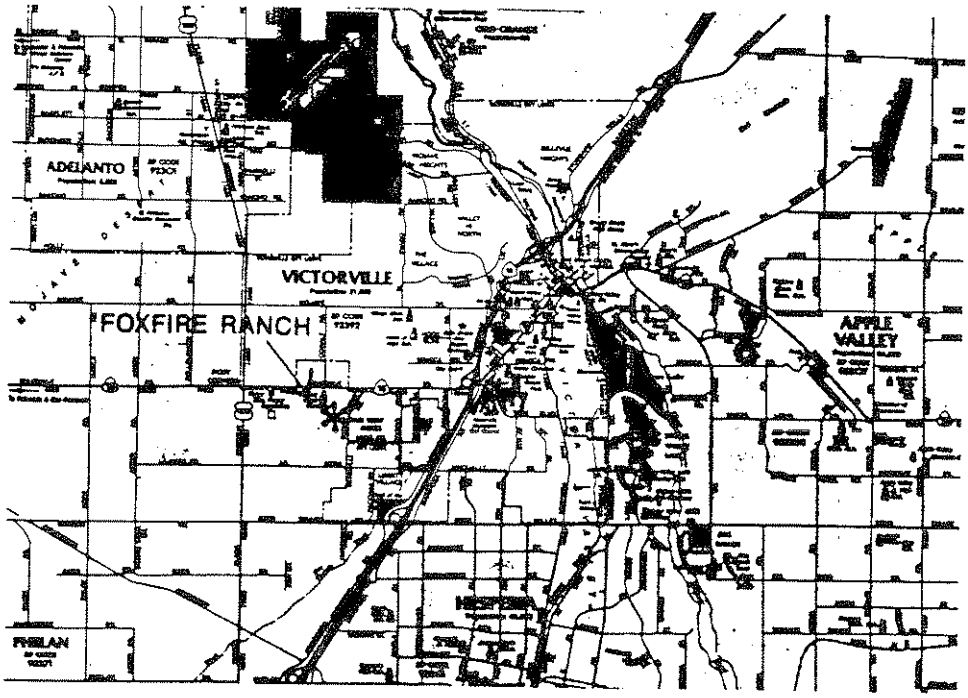
The Specific Plan will establish the overall development patterns in Foxfire Ranch with regulatory provisions extracted and/or amended from applicable sections of the City of Victorville Municipal Code Zoning Ordinance (Title 18) and Subdivision Ordinance (Title 17).

Authority and Scope

The adoption of this Specific Plan by the City of Victorville is authorized by Article 8, Specific Plan of the Planning, Zoning and Development Law of the California Government Code and pursuant to state and local guidelines. The Government Code authorized cities or counties to prepare, adopt, and administer Specific Plans for portions of their jurisdictions, as a means of implementing the General Plan.

Application

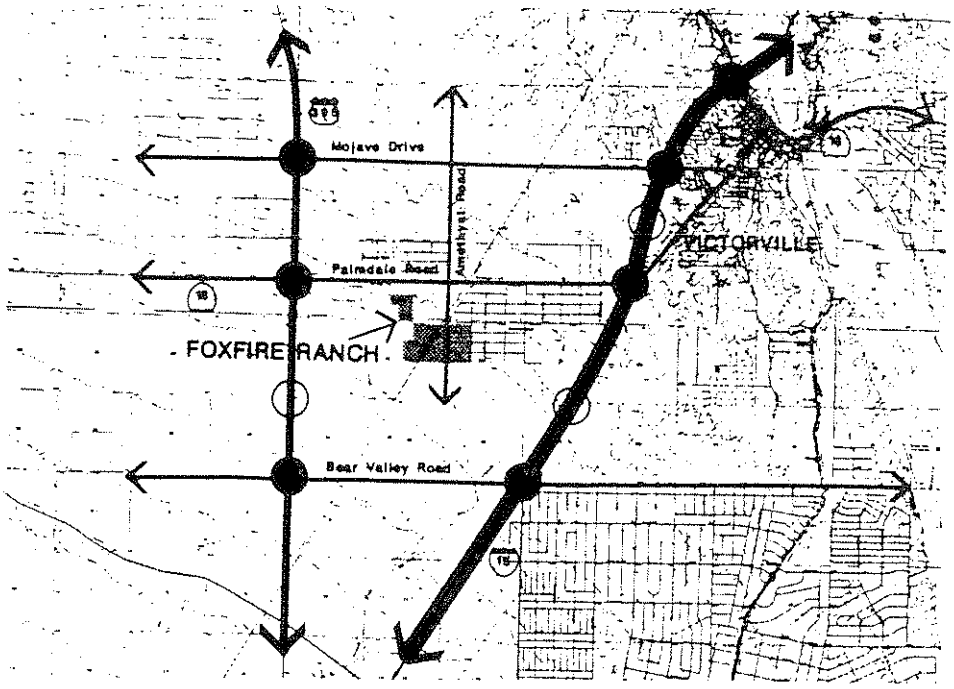
The Specific Plan is one of many policy or regulatory tools used by local governments to guide community development. The Foxfire Ranch Specific Plan applies only to that property within the City of Victorville (portions of Sections 25 and 26) and known as Foxfire Ranch. The boundary of the project site is shown on Exhibit 2, Site Location.



North ▲ Not To Scale

Community Setting

Site Location



North ▲ Not To Scale

TABLE 1: SUMMARY DATA

Planning Area Location	· Immediately south of Palmdale Road (State Route 18) and approximately 3.5 miles west of Intersection of Interstate 15 and Palmdale Road;
Planning Area Size	· Approximately 225 acres;
Parcelization and Ownership	· 45 Parcels ranging in size form 2.5 to 20 acres;
Governmental and Service Jurisdictions	· City of Victorville · Fire: City of Victorville · Police: San Bernardino County Sheriff · Sewer: Victor Valley Wastewater Reclamation Authority · Water: Victor Valley County Water District

Specific Plan Land Use (Acres)

Land Use	Total Acres	Total[1] Homes	Overlay[2]
Residential:			
· Very Low 1-2.5 DU/AC	7.50	18	
· Low 2-3.5 DU/AC	33.70	100	ARO
· Medium-Low 3-5 DU/AC	60.70	262	ARO
· Medium 4-7 DU/AC	90.98	522	ARO
Non-Residential:			
· Commercial	6.00	--	ML/L
· High School	10.00	--	
Major Roads/ Open Space	18.40	--	
LADWP Easement	47.50	--	

1 915 Total Number of Dwelling Units Allowed.
2 Medium Residential (Adult Residential Overlay) for Planning Areas 2.4, 2.5, 2.6 and 2.7
Medium-Low Residential for Planning Area 1.4
Low Residential for Planning Area 1.5

Specific Plan Adoption

The process for the adoption of a Specific Plan requires a public hearing by the Planning Commission. Based on a recommendation by the Planning Commission, the City Council can then adopt the Specific Plan by ordinance. The adoption is by ordinance when the existing zoning ordinance and/or other codes are amended. Once the Specific Plan is adopted, the City Council shall deny approval of any tentative map, or a parcel map if the proposed map (subdivision) is inconsistent with the Specific Plan [Subdivision Map Act (California Government Code, Section 66474(a) and (b)].

• General Plan Relationship

Introduction

This Specific Plan is subject to the goals and policies in the City of Victorville's General Plan. The California Government Code requires the Specific Plan be consistent with the General Plan and include regulations, conditions, programs, and proposed legislation which are necessary or convenient for the implementation of the General Plan.

This Specific Plan is a refinement of, and an elaboration on, the General Plan. The plan has been formulated to be consistent with persistent goals and policies as outlined in the General Plan. However, amendment to the General Plan will be required to accommodate this Specific Plan.

The following is a summary discussion of the relationship of this Specific Plan to the various elements of the City's General Plan. The review is organized as follows:

- ❑9 Community Development Element
- ❑10 Housing Element
- ❑11 Circulation Element
- ❑12 Safety Element
- ❑13 Environmental Resource Element
- ❑14 Park and Recreation Element
- ❑15 Noise Element
- ❑16 Historic Preservation Element
- ❑17 Solid Waste Management Element

Physical Setting

The physical setting is comprised of twelve categories which include: geology, seismic hazards, soils/liquefaction, mass wasting, flood protection, water quality, agriculture, open space, biotic communities, fire, noise, and land suitability for urbanization.

A thorough search and evaluation of available data and site reconnaissance was made to determine and analyze the physical environment of the project site and surrounding environs.

Community Development Element: The Community Development Element includes general land use goals and policy guidelines for the City of Victorville. Twelve categories are utilized in the General Plan to designate land use throughout the City. In addition, the project site is located in an area identified as suitable for urbanization. The proposed Specific Plan Land Use Plan reflects patterns within the broad categories in the General Plan.

Consistency with the overall goals in the City's General Plan is achieved by the proposed planned community which creates an identity with a balanced variety of housing products within a broad price range. The project will be phased over a long term.

Housing Element: The goals that are included in the City's Housing Element are generally oriented toward developing a balanced residential environment.

The multiple residential product concept provided for the Specific Plan is consistent with such goals.

Planned residential development for the Specific Plan area will provide significant new housing opportunities for area residents. Through a diverse range of product types, densities and price ranges, the project will offer an alternative to families and individuals seeking to locate close to an expanding employment base in the Victor Valley region.

Circulation Element: The Circulation Element includes the Master Circulation Plan. The Circulation Element describes the goals and policies for planning, developing and maintaining, on a citywide basis, an integrated system of surface transportation necessary to service the existing and planned land uses within the City.

The Element also graphically depicts the general location and classification of an integrated system consisting of transportation corridors, freeways, arterials and collectors. The Specific Plan includes the following to facilitate the intent of the Circulation Plan:

Development within the Specific Plan shall be responsible for roadway improvements shown on the Master Circulation Plan and within the Specific Plan boundaries.

Implement the arterial and collector system to the required roadway standards as defined by the City of Victorville Master Circulation Plan.

Design a local circulation system which serves the community and provides linkages to neighborhood and transit facilities.

Encourage alternate forms of transportation with emphasis toward providing public transportation.

Increase opportunities for pedestrians and bicyclists.

Safety Element: The Safety Element incorporates goals and policies pertaining to seismic and geologic hazards materials. The fundamental goal of the Safety Element is to provide a safe living environment consistent with available resources required to identify and control natural and other hazards.

Geology/Seismic Hazards: The geotechnical analysis shows that no active or potential faults are known to exist within the project area. Therefore, it is concluded that the project area is safe for development, subject to applicable building and mechanical codes. Prior to issuance of building permits; however, detailed investigations shall be conducted, and appropriate construction practices implemented.

Mass Wasting: The project site is relatively flat and is not subject to landslides. Because of the sandy texture of the project site's soils, cutbanks may not be stable and may be subject to sloughing. Grading and earth work activity will be performed in accordance with and conform to applicable city ordinances and permit requirements.

Flood Protection: Preliminary hydraulic investigations have been conducted within the project site and concluded that it is safe for development. A drainage concept plan for the proposed development provides for flood protection. The project area is located outside of the 100 and 500 year flood plain.

Hazardous Materials: The project site is not located near the Interstate 15 corridor or the Atchison, Topeka and Santa Fe mainline railroad.

George Air Force Base is currently being reviewed for future land use options by a joint reuse committee representative of the County and cities in the high desert. These options will be monitored during subsequent, more detailed development phases.

Fire: Because the project site is in a wildfire area, all proposed fire protection facilities and procedures will be reviewed and stated requirements of the City of Victorville Fire Department will be met.

The water system will have sufficient capacity and pressure to meet fire flow requirements. A fuel modification program for all areas bordering upon natural open space can be developed, if necessary.

Environmental Resource Element: The Environmental Resource Element is concerned with the preservation of natural resources and the maintenance of open space.

Geological Resources: A review of United State Geological Survey and California State Division of Mines and Geology Geotechnical Studies was conducted as a part of the development program. A 1980 Bureau of Land Management (BLM) study identified the Victorville area as having a good potential for feasible oil and gas deposits. The BLM study also shows a potential for locatable mineral resources in the project area. The development program for the project site proposes only commercial and residential land uses. No mining activities are proposed.

Soils: The soils associated with the project are identified by the United States Department of Agriculture. Soil Conservation Service (SCS) as being suitable for development. All soils related to the project site are subject to the hazard of soil blowing.

Air Quality: Development of energy conservation techniques for both building construction and site planning during more detailed phases of the project.

Water Quality: The Soil Conservation Service (SCS) identifies soil permeability associated with the project site as moderately slow to rapid. Water drawn from wells has retained a consistent high quality through many years of testing. Consequently, development in the Victorville area has had no apparent effect on water quality for the water resources contained in underground aquifers. Additional water quality standards for the proposed development will include proposals for erosion control measures during subsequent construction phases, and development plans to control storm water pollution.

Biotic Communities: The proposed right of way areas within the project site may consist of enhanced or transitional desert. This area can be revegetated to provide a transition between natural areas and private landscape areas. Minimal irrigation in the right of way areas will allow desert species to flourish. Some plant species found on the project site may be transplanted within the development areas.

The proposed development will emphasize desert landscaping methods. Where possible, the native vegetation will be enhanced and supplemented with drought tolerant plants that require minimal irrigation. Non-native trees and flowers can be interspersed with natives. Most yuccas, including the Joshua

tree, are protected under the native plant law. Special permits will be obtained prior to their removal or transplanting, when feasible.

In addition, development efforts will be required to be directed towards the preservation of sensitive and unique habitats as well as rare or endangered species living within the project area.

Paleontological/Architectural/Historic Resources: The project site falls within the fossiliferous strata identified in the current General Plan. Because paleontological resources may be unearthed during construction, a mitigation measure will include that any discovered needs to be salvaged by a trained specialist. No significant historic resource areas, as mapped in the General Plan or in any Cultural Resource Survey of the area (San Bernardino County Museum, are located on the property. The project site is currently vacant.

Park and Recreational Element: The Park and Recreation Element identifies a park facilities of local and city-wide significance including specialized facilities. All city-required requirements will be met.

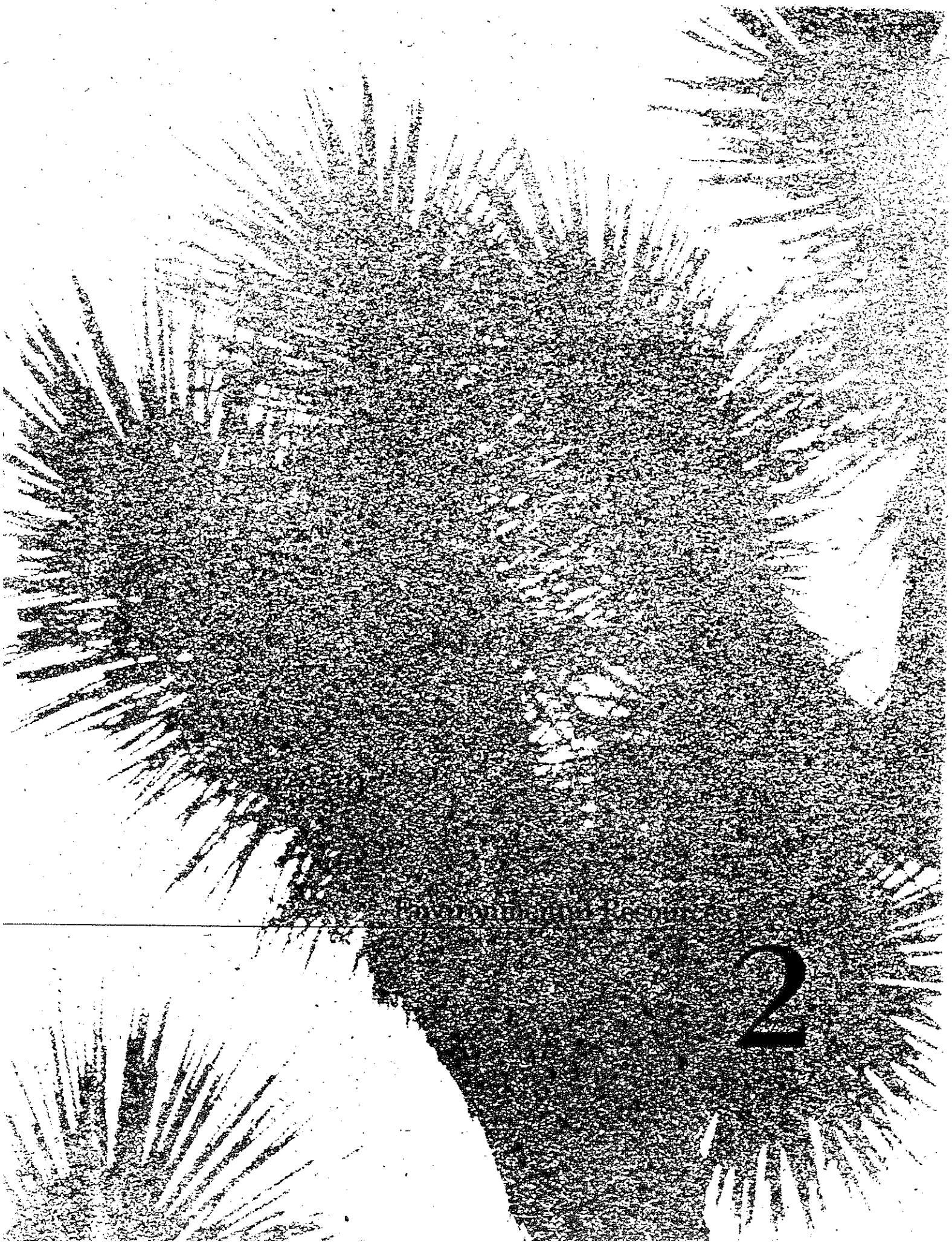
Noise Element: Major noise sources may be associated with existing and/or new land uses at George Air Force Base and all roadways. Consistent with city policies, all new residential buildings may be required to comply with noise attenuation standards. New development within the Specific Plan area will comply with the intent and purpose of the Noise Element.

Historic Resources: The Historic Element identifies historical sites through cultural, economic, historic personages or events and distinguished architecture or other notable works. Historic preservation is not applicable to the vacant project site.

Solid Waste Management: The community will be served by several public and quasi-public agencies. The agencies servicing the project site for solid waste are the County of San Bernardino Solid Waste Management District and Victorville Disposal, Inc.

The solid waste management element was developed to facilitate the state approval of establishing a city owned landfill. This would alleviate the need for the City to contract with San Bernardino County to dispose of its solid waste into the County landfill.

Land Use Regulations: The Specific Plan is intended to amplify existing jurisdictional implementation processes with specific district regulation geared to the project area. These regulations, upon adoption, will replace those currently established for the Specific Plan boundary by the Victorville Zoning Code. Section 3 of this document contains applicable Land Use Regulations for the Foxfire Ranch Specific Plan.



Powder and Resources

2

2 Environmental Resources

• Introduction

The environmental resources provides a baseline framework through which the Foxfire Ranch Development Plan has evolved. The existing issues and conditions pose certain opportunities and constraints, which were considered in the development of the Land Use Plan and Development Program. An analysis of specific items within the natural and man made environment suggested a range of development alternatives which were consistent with the current General Plan Goals and Policies

Implementation of the Land Use Plan will change the undeveloped site to urban uses. The character of the site would be transitioned into a major focal point for the valley. Consequently, the intensity in the use of the land would increase over the existing vacant condition.

The site would be phased over an extended period. Residential uses would follow as market demand, economic conditions and public services dictate.

Residential and commercial uses allowed in the Land Use Plan and Development Program are consistent with adjacent off-site uses as well as the development trend established for the City's western area.

Region

The major area-wide physical feature is the Mojave River located approximately 7 miles from the project site. Another prominent regional feature is Quartzite Mountain (4,532 ASL) located to the north of the City of Victorville.

Topography

The project site is located on a gently sloping alluvial plain which has slightly rugged and eroded features. Few landforms are present to give the site unusual or unique topographic character. The only defined drainage course in the area begins west (across 395) of the project site and proceeds northerly toward Palmdale Road (State Route 18). On-site topography is relatively flat with a gradual elevation ranging from 3050 to 3175 feet above sea level (ASL). Slopes range from 2-5% across the site. Gullies exist due to the natural drainage tending to concentrate as it traverses the project site in a northeasterly direction.

Generally, the surrounding undeveloped area has similar landform features as those contained on the project site.

Development of the project will necessitate some landform modification in order to develop building pads, roadways and infrastructure.

Geologic Units

The project area is underlain by a sequence of a basement complex of Pre-Cambrian granites and gneisses. Sedimentary rocks, dating from the Paleozoic age, are made up of limestone, sandstone, quartz and mudstone. They

are formed by the deposition of sediments transported by streams, oceans, ice and/or wind.

Surficial geology on-site includes Older Alluvium undifferentiated and Old Lake deposit. The Mojave Desert consists of a large alluvial plain created heavy erosion deposition. The San Gabriel and San Bernardino Mountains south of the site are the primary source for the alluvium. Older alluvium consists of well-bedded silts, clays, and sand which is interbedded with freshwater limestones. Any excavation on these soils can be accomplished with conventional earthmoving equipment, and no unstable slope conditions should be encountered utilizing standard grading procedures.

Geologic Structure

Although no known or suspected fault tracks traverse the project site, several fault systems are located in the Victor Valley region.

The predominant geologic structure of the region consists of the Helendale Fault located northeast of the site. This fault does not have a significant earthquake potential as compared to more distant active faults.

The nearest active faults include:

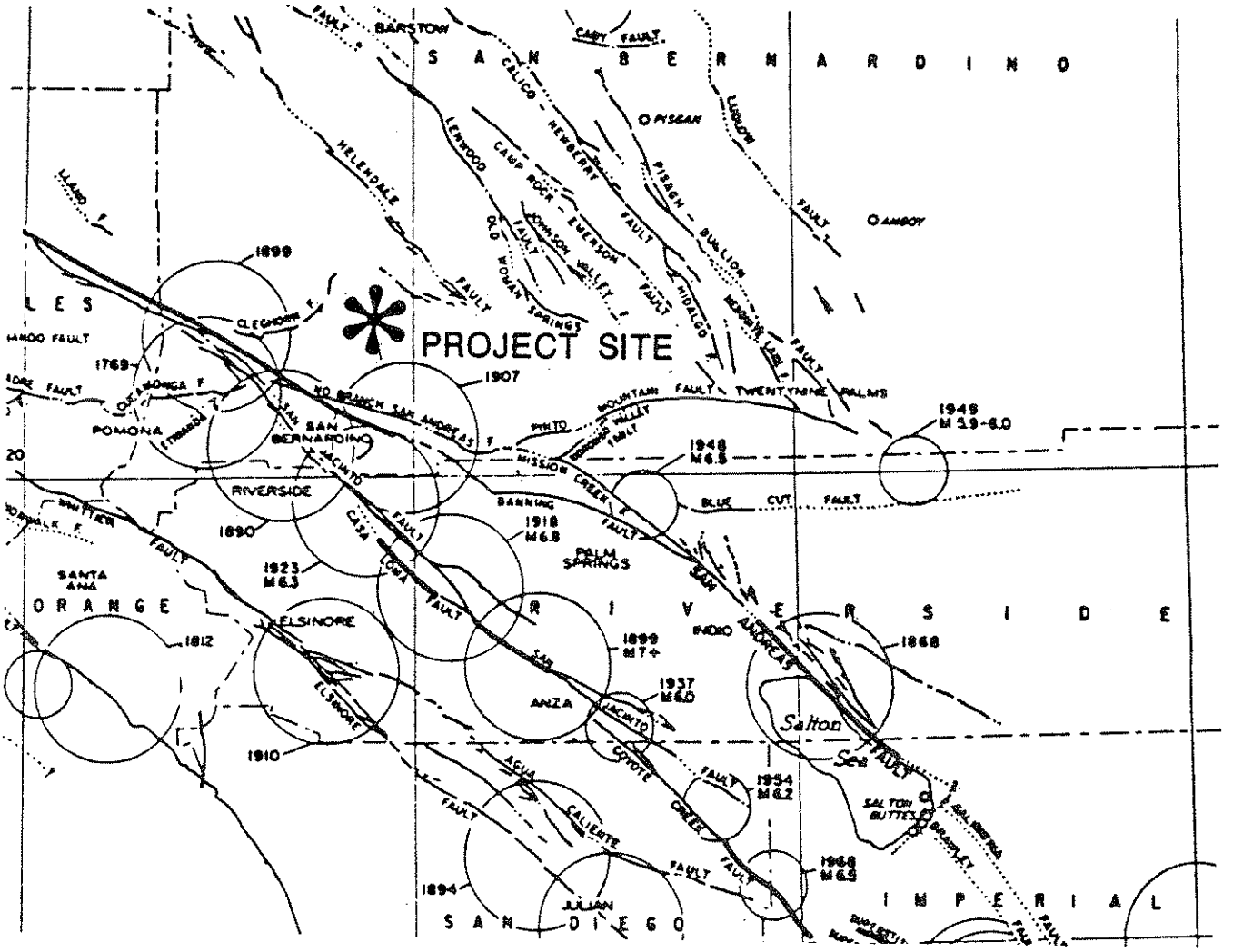
Fault	Distance from Project Site	Richter Magnitude Event
Helendale	10 Miles Northeast	6.5
San Andreas	15 Miles Southwest	8.2
San Jacinto	18 Miles Southwest	7.5

The location of these faults relative to the site are illustrated on Exhibit 3. Based on California State Division of Mines and Geology information, the project site is not located near any seismically active fault zones and, consequently, is not exposed to any unusually seismic-related hazards. However, the project is within an area which can expect moderate groundshaking intensity. In the event of a major earthquake along one of these nearby faults, in particular the San Andreas, the Victorville area may sustain property damage, possibly resulting in injury and loss of life. The degree of impact on the Victorville area depends on: (a) the distance from the quake epicenter; (b) the magnitude of the quake; and (c) the characteristic of soils and subsurface geology of the area. Maximum probable earthquakes of 7 and 8 on the Richter Scale could produce maximum expected ground accelerations of 0.2g to 0.4g.

Soil Characteristics

The soils, mapped by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), are representative of the Mojave Desert alluvial plain physiographic area. Soil units identified within the project site consist primarily of the Bryman Series. Project soils are delineated on Table 2 and Exhibit 4.

The Bryman series (105-109) consist of very deep, well drained soils found on terraces and old alluvial fans. They are the most common soils in the Victorville area. These soils formed in alluvium derived dominantly from granite sources. Soils in this series present only slight structural constraints to development. The development constraint is due to expansion and contraction with changing water amounts (shrink-swell).



KALEIDOSCOPE

North ▲ Not To Scale

REGIONAL SEISMICITY

MAJOR EARTHQUAKES AND RECENTLY ACTIVE FAULTS IN THE SOUTHERN CALIFORNIA REGION

ACTIVE FAULTS

Total length of fault zone that breaks Holocene deposits or that has had seismic activity

Fault segment with surface rupture during an historic earthquake, or with extensive fault creep

● Holocene volcanic activity (Amboy, Pisgah, Cinder Pinnacle and Salton Buttes)

EARTHQUAKE LOCATIONS

1899 M7+

Approximate epicentral area of earthquakes that occurred 1769-1933. Magnitudes not recorded by instruments prior to 1906 were estimated from damage reports equivalent to intensity VII (Modified Mercalli scale) or greater, this is roughly equivalent to Richter M 6.0. 31 moderate* earthquakes, 7 major and one great earthquake (1857) were reported in the 164-year period 1769-1933.

1968 M7+

Earthquake epicenters since 1933, plotted from improved instruments. 29 moderate* and three major earthquakes were recorded in the 40-year period 1933-1973.

Table 2:
Soil Survey San Bernardino County, California
Mojave River Area Series

Map Unit	Bedrock	Water Table	Road Fill	Alkaline	Shrink Swell	Slope	Wind
Bryman Series							
Bryman/106 Loamy Fine Sand	>60	Deep	Good	Neutral-Moderate	Low >6%	2-5%	High Erodible

Hydrology/Surface Water

There are no surface water sources on the project site. The Mojave River drainage area consists of about 4,700 square miles. Near Victorville the average discharge per year is 51,440 acre-feet and the average monthly flow is 71.0 cubic feet per second. The project area is elevated approximately 400 feet above the flood plain of the Mojave River, which is located 7 miles east of the project site.

The project site is not located in the Mojave River floodplain which runs east of the site. Drainage patterns on-site (refer to Exhibit 5), like the floodplain, follow a northeasterly direction. To the southeast from the project area the Oro Grande Wash runs parallel to Interstate 15.

Groundwater

Subsurface water is indicated to be greater than 6 feet based on soil interpretation records. Subsurface flows have been measured and are shown to vary from approximately 20 feet below the surface near the Mojave River to approximately 50 feet within downtown Victorville. In the vicinity of the project site subsurface flows are approximately 150 feet deep. A review of the Housing and Urban Development (HUD) Flood Hazard Boundary Maps illustrates that the proposed project site is included in Zone C which is designated outside of the 500 year floodplain.

The project area is located within the Mojave River Water Basin (Victor Valley). The Victor Valley County Water District (VVCWD) which serves the project site obtains their water supply from this basin, as well as from other local water districts and private wells.

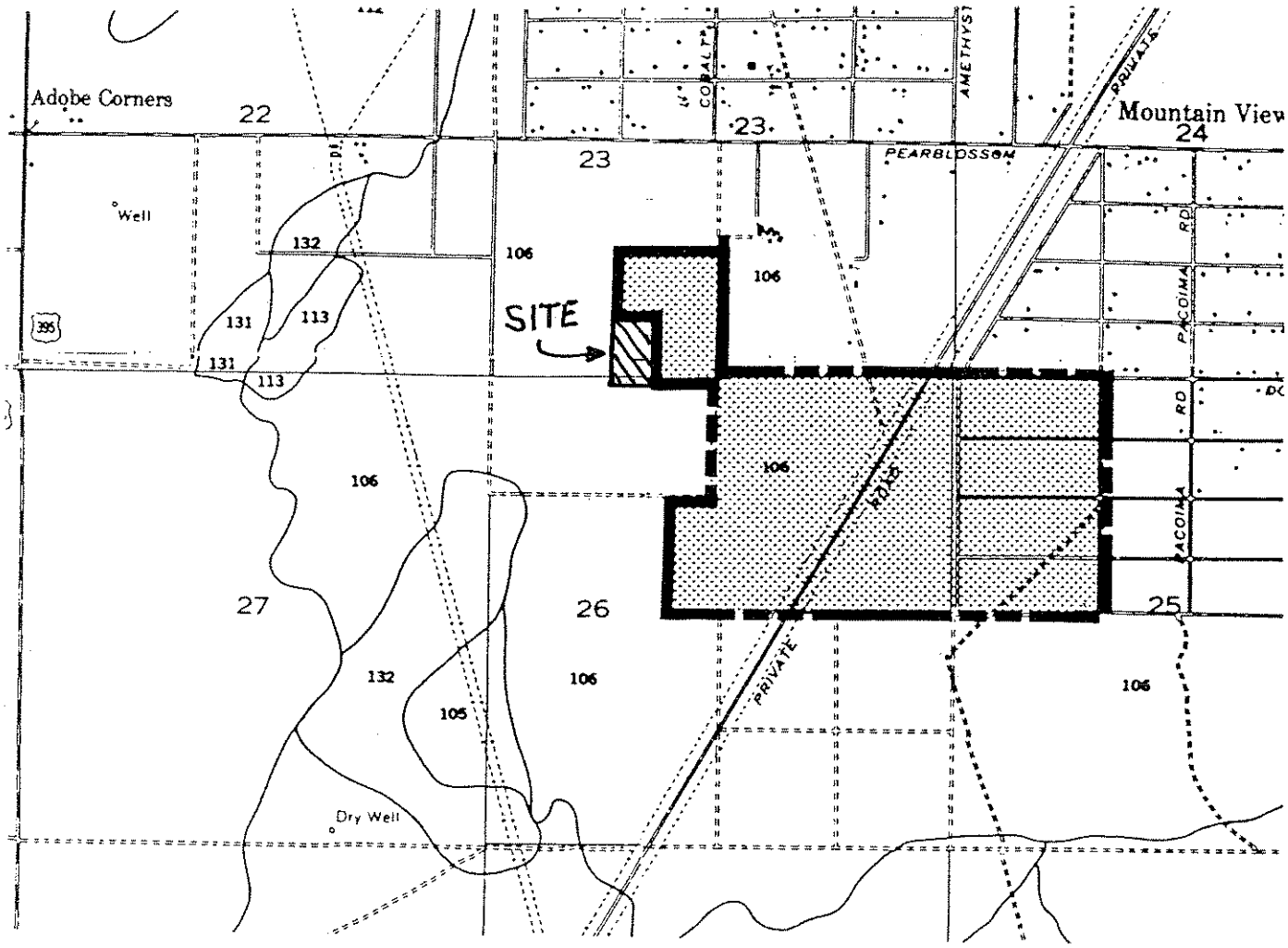
The Mojave Water Agency, which monitors the basin's water supply, has noted that the basin is currently being overdrafted on a regional basis. The water table has been falling over the past several years. Current studies on the overdrafting of the Mojave River Basin have thus far been inconclusive on the supply of groundwater available and the amount of overdrafting occurring.

The agency has entitlement to a specified water allocation from the California Aqueduct; however, none of this entitlement has been used, and is presently considered only as a backup supply.

Water Quality

The domestic (potable) water supply is of very high water quality. Water drawn from wells and examined for mineral content and other constituents has retained consistent high quality through many years of testing. Consequently, development of urban uses in the Victor Valley currently has had no apparent effect on water quality for the water resources contained in underground aquifers.

Water in the high desert is a rare and valuable commodity. With the exception of well and supplemental water from the aqueduct, no other sources currently exist. Water is a precious resource in Victor Valley and must be protected so that it can continue to serve the community's needs into the future.



KALEIDOSCOPE

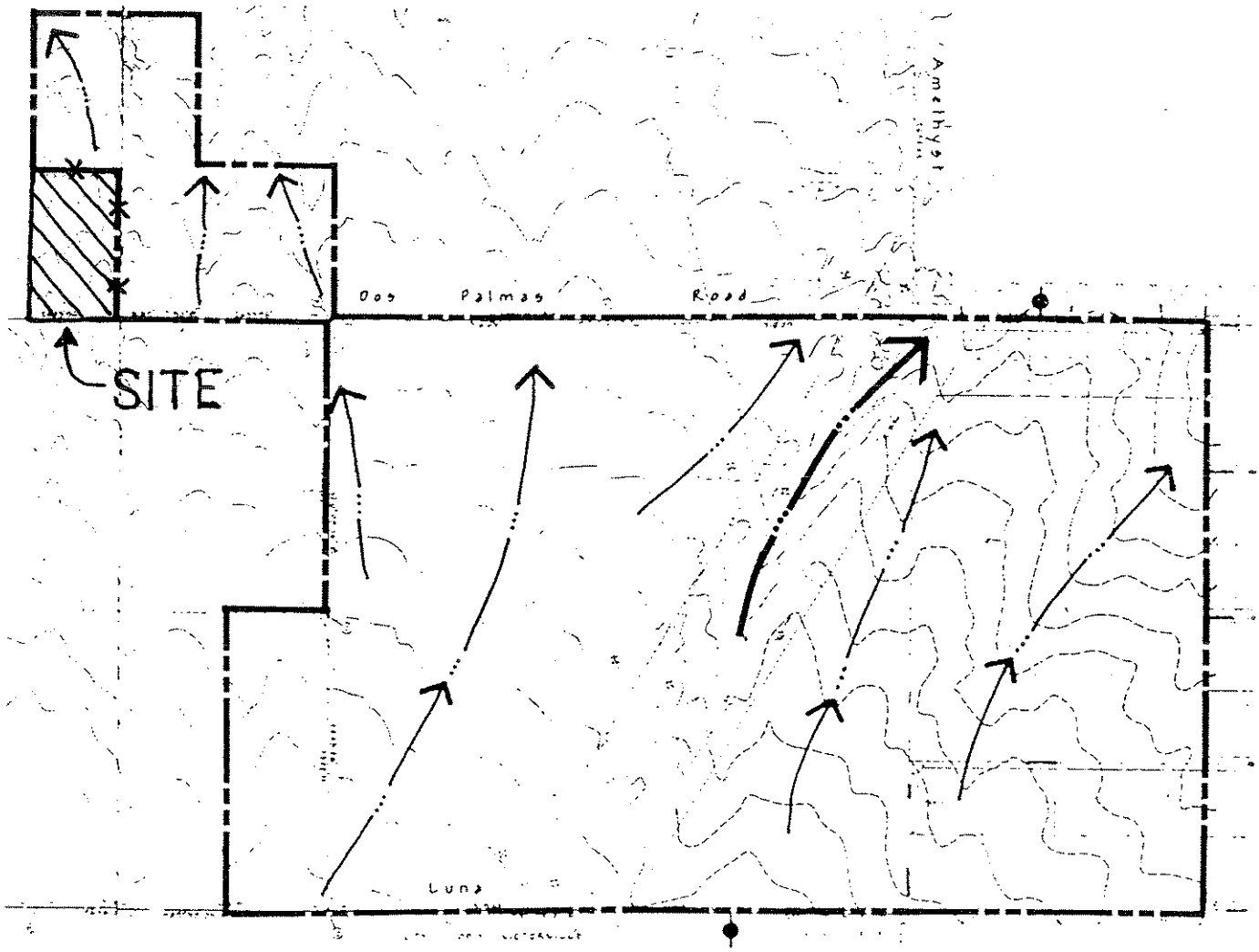
North ▲ Not To Scale

SOILS

Soil Series/Map Unit

106	BRYMAN LOAMY FINE SAND

SPA-89-001(A7)



KALEIDOSCOPE

North ▲ Not To Scale

HYDROLOGY

Existing Flow Pattern

SHEET FLOW CONDITION

MINOR DRAINAGE COURSE

HIGH POINT

Biota

Native Flora: The project site contains no significant vegetation concentrations. Generally, the site contains the desert-type habitat that is characteristic of the region.

Several predominate plant communities occur in the Victor Valley region. These include Joshua Tree Woodland, Creosote Bush Scrub, Salt Bush Scrub, Riparian Forest. Joshua Tree Woodland and Creosote Bush Scrub communities consist primarily of drought-resistant and deep-rooted plants which maximize moisture intake and provide an anchor the plants against the frequent wind.

The dominant species identified for the project site area include Joshua Tree (Yucca brevifolia), Creosote Bush (Larrea divaricata), and Mormon tea (Ephedra californica). Major forage species are Indian rice grass, desert needle grass and filaree. An assessment of the project site was the result of a thorough review of existing information relating to biological resources of the on-site review and aerial photographic interpretation. No rare, threatened, endangered species or habitat are known to exist on-site. Most yuccas, including the Joshua tree (Yucca brevifolia), and all cacti are protected under the State Native Plant Law. The Joshua Tree is also protected under the City of Victorville Municipal Code Section 13.32.

Clearing or any disturbance destroying the soil structure and vegetation may result in increased soil blowing. In some cases, historical clearing has influenced an increase of Indian rice grass.

Planting windbreaks will help reduce soil blowing. Among the trees most suitable for windbreaks are Aleppo Pine, Poloverde, and Athel or Evergreen Tamarisk.

Native Fauna: The majority of animal life in the Victor Valley region is found in the high desert outside of the urban influence. Fauna within the project site is minimal due to the lack of suitable habitat and the proximity of human habitation and intrusion. Animal life expected to occur within the project area includes three species of kangaroo rat (panamint, desert and merriam kangaroo rat), pocket mouse and desert pocket mouse, zebra-tailed and whiptail lizards, gecko and desert night lizard, jack rabbits, and occasional snakes. The coyote, badger and kit fox are the most common predators in the area. Also, the spotted skunk, desert tortoise and several species of squirrels, are known to live in the Mojave Desert in the Victorville area. Many of these mammals are nocturnal. It is anticipated that the majority of these species will relocate and migrate to surrounding vacant areas as development occurs. The desert tortoise (Xerobates agassizii) is currently listed as a threatened species. In addition, the Mohave ground squirrel (Spermophilus mohavensis) is a state-listed threatened species. The City of Victorville will require an on-site field study prior to any site grubbing and/or grading. No other rare, threatened or endangered species are known to exist in the site.

Birds are usually sparsely distributed in the area and are expected to occur only as transients to the site, depending on food availability and cover.

Climate and Air Quality

Climate: The project area is located within the Southeast Desert Air Basin. The climate of the Victor Valley area is generally dominated by the semi-permanent high-pressure center over the Pacific Ocean and the San Gabriel and San Bernardino Mountains to the south that restrict almost all marine influence from the nearby ocean. The climate is therefore mainly a continental climate with hot summers, cool winters, low humidity, infrequent rainfall, and clear skies. Winds are mainly from the south through Cajon Pass and can carry pollutants from highly urbanized areas into the Victorville area.

Winds and the temperature of the layers of air within the air basin generally determine the localized rate of dispersion of air pollutants near a new source as well as governing the regional transport of air pollution into and out of a given area. In Victorville, winds are either out of the south, originating in the polluted environments of western Riverside and San Bernardino Counties, or from the west where air from the San Fernando Valley entered the Antelope Valley through Soledad Canyon. In winter, especially at night, winds may become calm and allow for localized pollution stagnation, but summer daytime winds are strong from the south and transport air into the Victor Valley from other airsheds.

Temperature inversions, which control the vertical spread of air pollutants, are not as prevalent in the Southeast Desert Air Basin as in the South Coast Air Basin. Because Victorville is near one of the outflows of the South Coast Air Basin, it receives a fairly concentrated sample of air from the south. However, without the inversion to trap this inflowing coastal air mass, the pollutants quickly become diluted.

In winter, the pooling of cool air in lower elevations creates numerous radiation (localized) inversions. These shallow inversions, in conjunction with nearby calm air, could cause localized pollution "hot spots" if there were large concentrations of industrial or vehicular sources. These inversions cause high pollution levels at night in winter in Las Vegas or Phoenix, but the Victorville area is not developed to the extent that these inversions (which burn off after sunrise) could cause significant air quality problems.

Air Quality: State and Federal agencies have set ambient air quality standards for certain air pollutants. The National Ambient Air Quality Standards (NAAQS) have been established for ozone, inhalable particulate matter, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. The State standards are generally more restrictive than the Federal standards. A review of the State and Federal air quality standards and attainment standards reveal that existing air quality in Victorville is generally very good in contrast to the urban area of the South Coast Air Basin.

The Air Resources Board (ARB) regulates mobile emission sources and oversees the activities of County Air Pollution Control Districts (APCD) and Regional Air Quality Management Districts (AQMD).

The San Bernardino County Air Pollution Control District (SBAPCD), operates an ambient air quality monitoring station in Victorville. The SBAPCD is a County agency empowered to regulate stationary sources in the Victorville area. As of July 1, 1993, the San Bernardino County Air Pollution Control District will become a separate regulatory agency known as the Mojave Desert Air Quality Management District.

Historic data indicates that levels of carbon monoxide, nitrogen dioxide, sulfates, and lead have not exceeded or even approached their respective National Ambient Air Quality Standards. However, particulates, which result either from wind-blown dust or hazy, polluted air from the South Coast Air Basin, often exceed the State standards, but rarely exceed Federal standards.

The main air quality concern in Victor Valley is from ozone. The amount the Federal hourly ozone standard has been exceeded ranges from approximately 56 to 105 days over the last five years. These high levels of ozone cause the Victorville area, as part of the Southeastern Desert Air Basin (SEDAB), to be declared a non-attainment area for ozone.

Most studies have shown that the source for high ozone levels in the lee of the San Gabriel is polluted air from the South Coast Air Basin. Until emissions are sufficiently reduced in the coastal communities, the inland valleys will continue to have unhealthful levels of photochemical air pollution. The Air Quality Management Plan (AQMP) for the Southeast Desert Air Basin recognizes the interaction and interbasin transport between the south coast and the southeastern desert, and concedes that little can or needs be done locally to try to improve air quality until the Los Angeles Basin attains AQMP standards.

Inhalable particulate matters are those particulates which, when inhaled, can cause health problems. Particulates in the air result from various dust and fume producing operations (industry and agriculture), general incineration and atmospheric photochemical reactions. Natural sources of particulates include wind blown dust and pollens. Some particulates in the Victor Valley area may be transported in the polluted air from the South Coast Air Basin.

The number of times particulate matter--10 micron (PM10) standards were exceeded, number from 7 to 20 times, measured every six days for the past four years.

Construction activities will disturb the dry desert soil, which then creates significant quantities of fugitive dust once the protective desert varnish soil crust is broken. The Environmental Protection Agency (EPA) suggests a fugitive dust emission factor of 80 pounds per acre disturbed per day of construction. Through the use of dust control such as regular watering, the emission level can be significantly reduced. Specific regulations that may apply to the project include Rule 403, which limits fugitive dust emissions.

Since these emissions are released mainly during the day when strong winds and deep thermal convection provide good local ventilation potential, there is little chance of any localized stagnation of these emissions and no resulting air quality impact except in the immediate vicinity of the construction itself would be expected.

Additional measurements and/or records of various pollutants are maintained by the San Bernardino County Air Pollution Control District with monitoring stations within the Victorville, Hesperia and Barstow areas and include the following.

Carbon monoxide (CO) is emitted primarily by motor vehicles. The highest carbon monoxide levels within the Southeastern Desert Air Basin are generally measured during the winter months. This occurs when localized inversions are formed by the cool air drainage to lower elevations (basins) in conjunction with nearby calm air. The highest one hour and eight hour average parts per million recorded by the Barstow monitoring station in the last three years have not exceeded standard excesses.

Sulfur dioxide (SO_2): This pollutant is a combustion product of sulfur or sulfur-containing fuels. Sulfur dioxide levels are also generally highest in the winter time. No sulfur dioxide standards have been exceeded in the last three years at the Barstow monitoring station.

Nitrogen dioxide (NO_2), a forerunner to the ozone, is emitted from motor vehicle engines, refineries, et al. Nitrogen dioxide is the "brownish" colored gas observed during periods of highly concentrated pollution. The standards for nitrogen dioxide (highest one hour average, parts per million) have not been exceeded in the last five years based on existing air quality data.

Lead (Pb): Gasoline powered engines and fuel pumps are a major source of airborne lead. The use of unleaded fuels and fuel pump recovering systems is helping to reduce levels of airborne lead. No excess of established standards has been recorded at the Victorville Monitoring Station.

Archaeology

A review of the California Archaeological inventory of the San Bernardino County Museum, Archaeological Information Center, and a paleontological records check were conducted at the San Bernardino County Museum, Earth Sciences Department. Also, the National Register of Historic Places, California Historical Landmarks (1979), and Historical Landmarks of San Bernardino County (Quinn 1980) were consulted to determine the proximity of historical resources to the site. The results of these literature and record searches revealed no historic or prehistoric cultural resources in the project vicinity. In addition, the project site is located approximately one mile from the fossiliferous strata identified under cultural resources in the current Victorville General Plan.

Historical

The project site is within a larger territory once inhabited by the Serrano Indians at the time of exploration by the Spanish. In 1776, Father Garces traveled along the Mojave River east of the project site and recorded various Indian villages that existed along the river at the time. During the 1940's, the San Bernardino County Historical Society and the Archaeological Survey Association of Southern California conducted numerous archaeological surveys and some excavation of certain sites along the upper Mojave River area. Research indicates that the Indians of the area were hunters and gatherers living in small extended family groups, and moved camps seasonally to secure food from animals and plants of the desert and mountains.

Although no subsurface investigation was undertaken, it is believed that no cultural resources exist below the surface, chiefly because Victorville's traditional growth occurred among the Mojave River, and as a result, most areas of historical significance are found near the river. It is unknown whether historical and archaeological resources are contained on the project site.

Paleontology

In 1985, the City of Victorville retained a qualified paleontologist to conduct a city-wide geologic survey to determine the location of fossil-bearing lake bed strata. The project area is located upon the fossiliferous strata identified under cultural resources in the current Victorville General Plan, Technical Background Reports.

The project area is located on fluvial and lacustrine sediments, a formation known as Shoemaker Gravel. This is underlain by the finer-grained "Harold" formation, sediments that are described by Bowen (1954:89) as follows:

"South of the Upper Narrows of the Mojave River, thin, light yellowish gray limey siltstone and claystone are distributed over several acres, indicating the former existence in very late Pleistocene or recent time, of a shallow lake. This may have been the result of uplift (damming) on the Victorville fault."

Previous paleontologic material has been recorded in the Earth Sciences Department of the San Bernardino County Museum from approximately 25 localities in the "Harold" formation. The paleontological species discovered at these localities are thought to predate the Pleistocene Rancholabrean and mammal age, and are probably more than 450,000 years old.

Aesthetics

The project site is generally flat and is physically separated from surrounding properties by roadways and/or transmission lines. Variable densities included in the land use map and development program along with flexibility in land use patterns and landscape edge treatments will allow for compatibility with adjacent land uses.

Major off-site views will be of the San Gabriel and San Bernardino Mountains south of the site, the Quartzite Mountain to the north, and the Granite Mountains to the east. There are minor on-site views from the surrounding roads.

Noise The project site, being vacant, is not a source for noise generation nor is it particularly affected by noise intrusion from any off-site sources.

The Community Noise Equivalent Level (CNEL) serves as the noise rating scale most commonly used in California for land use compatibility assessment. The CNEL scale is a 24 hour, time-weighted annual average noise level based on the A-weighted decibel. A-weighting is a frequency response of the human ear. Noise levels were determined and depicted in the Noise Element using the CNEL scale.

The normally acceptable external noise standard for residential areas is 60-65 CNEL. An interior noise level of less than 45 CNEL is acceptable and is generally attainable in areas where exterior noise levels do not exceed 60-65 CNEL.

The City's Noise Element contains maps which identify noise contours for aircraft operating out of George Air Force Base and roadways with significant daily traffic volumes.

George Air Force Base is located to the north, approximately five miles from the closest point on the project site. The Department of the Air Force has prepared the 1983 Air installation Compatible Use Zone (AICUZ) study which presents both crash hazard and noise impact planning criteria for lands affected by military flight operations. A review of the study concludes that the site is not within the influence of aircraft operations or within a 65 dB contour. Development will not be subject to the recordation of a Noise and/or Avigation Easement.

On December 15, 1992, George AFB was deactivated. Future land uses for George AFB are being reviewed by a joint re-use committee, representative of cities in the high desert region. The City's Noise Element contains maps which identify noise contours for commercial aircraft operating out of George Air Force Base site and roadways with significant daily traffic volumes.

There may be a short term impact on ambient noise levels as a result of construction related noise. Noise generated by construction equipment can reach substantial levels. Greatest potential for problems exists for the Seminary located along Palmdale Road. Construction noise may, to a lesser extent, may affect the nearby sensitive receptors.

Project related traffic may increase noise levels on both perimeter and interior roadways. The existing and future residences located adjacent to the site will be effected more or less by higher noise levels.

Project related traffic may increase noise levels on streets in the area. In order to determine accurate noise levels generated by future development on-site, additional noise assessments may be needed.

Land Uses Existing land uses in the project vicinity are residential, including single family, multiple family units, mobile homes, and commercial uses. Most of the surrounding area is relatively undeveloped, predominantly in a natural condition. Paved and dirt roads are numerous, allowing unencumbered access into the project site. Land uses within the project site include semi-improved and dirt roads. A power line easement (City of Los Angeles Department of Water and Power) bisects the project site. Tower structures are located within the easement. An additional power line easement (Southern California Edison) is to the northwest and southwestern of the

project site. This power line easement terminates at a substation off of Palmdale Road.

The project site is located in a vicinity that has been growing over a period of years. The Civic Center and new urban core at Palmdale Road and Interstate 15 is located approximately 2-1/2 miles from the eastern portion of the site. This area has extended outwardly, developing in response to the desirable features of the area and low cost of the land. As a result, some parcels of land have remained vacant. The project site, made up of several parcels, is one of these, remaining vacant while adjacent parcels infill with development.

General Plan/Zoning

Properties surrounding the project site are designated within the residential and commercial categories. The General Plan designates the project site as residential land uses with limited commercial uses along Amethyst Road.

The very low density residential (2 DU/AC), the low density residential (5 DU/AC) designation and commercial designations along Amethyst Road have been established under the current General Plan for the western sphere annexation area. These designations have been established to deal with specific land use patterns through the development process.

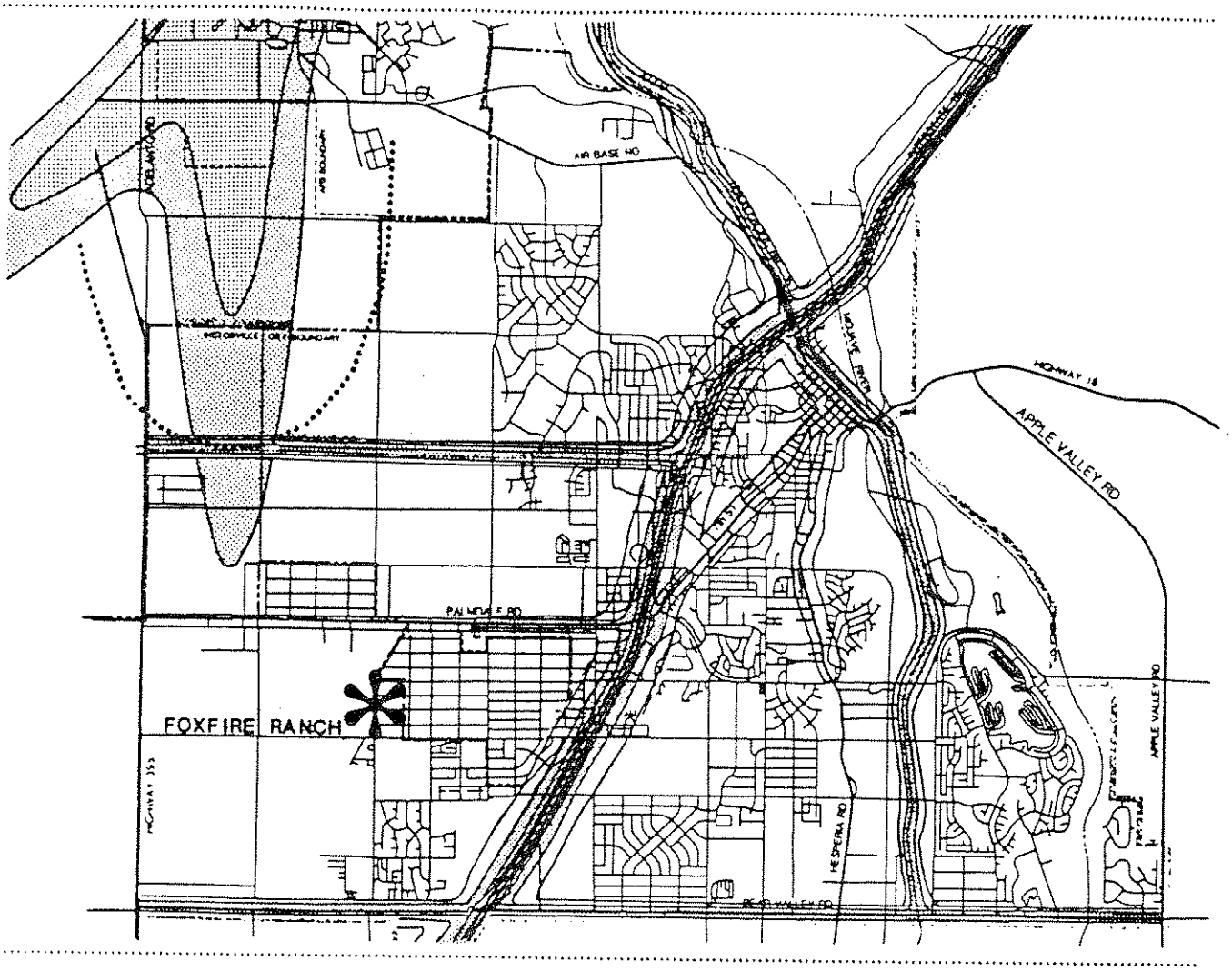
General Plan Land Use Designations for the southwest sphere annexation area are illustrated on Exhibit 7, General Plan.

The pre-zoning adopted by the City Council and submitted to LAFCO in August 1989, consists of single family residential and commercial for the project site. (Refer to Exhibit 8, Zoning).

The Single Family Residential District is designated by the primary symbol R-1 and is intended to allow for residential uses. An additional Single Family Residential District is designated by the primary symbol R-1T (4 DU/AC). It is also intended for residential uses. The Transitional District (T) provisions were combined with the R-1 district provisions to utilize development standards to address buffers in specific areas. This is to ensure orderly, proper and harmonious development within and between zone districts of different restrictions. The Neighborhood Retail District is designated by the primary symbol C-1 and is intended to allow for neighborhood level commercial activities. The General Commercial District is designated by the primary symbol C-2 and provides for the widest range of commercial uses. Implementation of the land use plan would change the primarily undeveloped site to urban uses. The rural character of the site would be transitioned into a major planned residential community adjacent to the Highway 395 and Palmdale Road corridor. Consequently, the intensity in the use of the land may increase over the existing condition. The Land Use Plan will require a General Plan Amendment and Zone Change to a Specific Plan (SP) designation.

The site would be developed over an extended period. Uses would follow as market demand and economic conditions dictate. Uses proposed in the Land Use Plan and Development Program are consistent with adjacent off-site uses as well as the development trend proposed for this area.

The Specific Plan is the mechanism through which land use and regulatory provisions will be established and enforced for that area within the Specific Plan boundaries. Zoning will be based upon regulations and standards within this Specific Plan and applicable regulations in the City of Victorville Municipal Code Zoning Ordinance (Title 18) and Municipal Code Subdivision Ordinance (Title 17).



CITY OF VICTORVILLE

North ▲ Not to Scale

■ NOISE
Future Contours

60 dB Ldn

65 dB Ldn

70 dB Ldn

65 dB Ldn
1 Mile Contour

Circulation/Traffic

The Circulation Element (revised 1991) of the current City of Victorville General Plan includes all of the aforementioned roadway improvements of importance to development of the project site. These improvements are long range policies of the circulation element.

A traffic study of Foxfire Ranch has been completed by Kunzman Associates. (Refer to separate document (revised) by Kunzman Associates.

The project area is served by a super arterial and a major arterial. The super arterial is Palmdale Road and the major arterial is Amethyst Road. Both Dos Palmas and Luna Roads serve the project site as major east/west collectors. In addition, Cobalt Road serves the project as a north/south collector. The super and major arterials provide local and indirect regional access to the project area. All of these roads are shown on the currently adopted Circulation Plan.

Regional/Local Road System

Regional access to the project area is provided by Highway 395 and Interstate (I-15), a major north-south interstate freeway.

A full interchange is located at Palmdale Road and Interstate 15. The bridge structure over the freeway currently provides four lanes for through traffic. Turn lanes are provided at each end of the structures for vehicles to enter the on-ramps.

There is an interchange located at Highway 395 and Interstate 15 Freeway. The bridge structure over the freeway provides two lanes for through traffic.

Palmdale Road is a super arterial proposed as a six lane facility with a median. Amethyst Road, a major arterial, is proposed as a four lane facility with a center turn lane.

Public Services: The Foxfire Ranch development project will be served by several public and quasi-public agencies.

Schools

The Foxfire Ranch development project currently lies within the Victorville Elementary School District. The School District projects approximately 685 students for the project site. This is based on a .54 student ratio per household.

Police

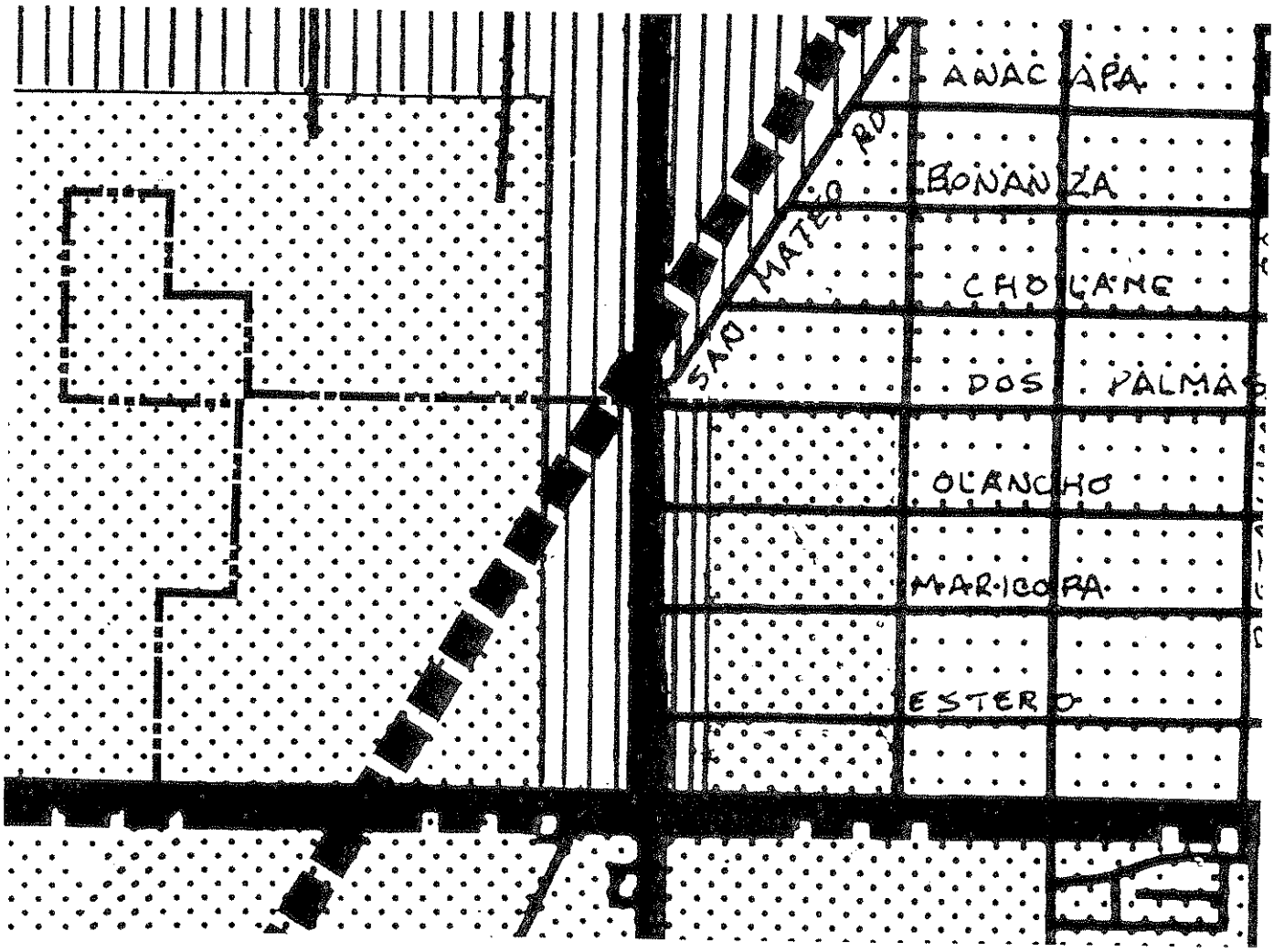
The San Bernardino County Sheriff's Department is under contract to the City of Victorville to provide police protection and traffic safety services. These services include traffic and neighborhood police control, emergency calls, and crime prevention. The County Sheriff's Department would respond to the project site from its station at 14455 Civic Center Drive and/or 14199 McArt Road. Response time to outer city limits would be approximately 8 to 10 minutes. Manpower needs are based upon variable factors which include response times, volume of requests for service, and traffic conditions.

Fire

The City of Victorville Fire Department provides fire and life safety services from a fire station at Amethyst and La Mesa Road. This station is approximately one half mile from the project site and is within a two minute response time.

Hospitals

Medical services will be provided to the project area from St. Mary Desert Valley Hospital and Victor Valley Community Hospital. St. Mary Desert Valley Hospital opened a new facility in December 1983, replacing the hospital's 60-bed facility. The new hospital facility has approximately 75 general acute-care beds and is maintaining an 85% occupancy rate. Victor Valley Hospital presently has 109 beds with 9 general acute care beds with a 90% occupancy rate.



KALEIDOSCOPE

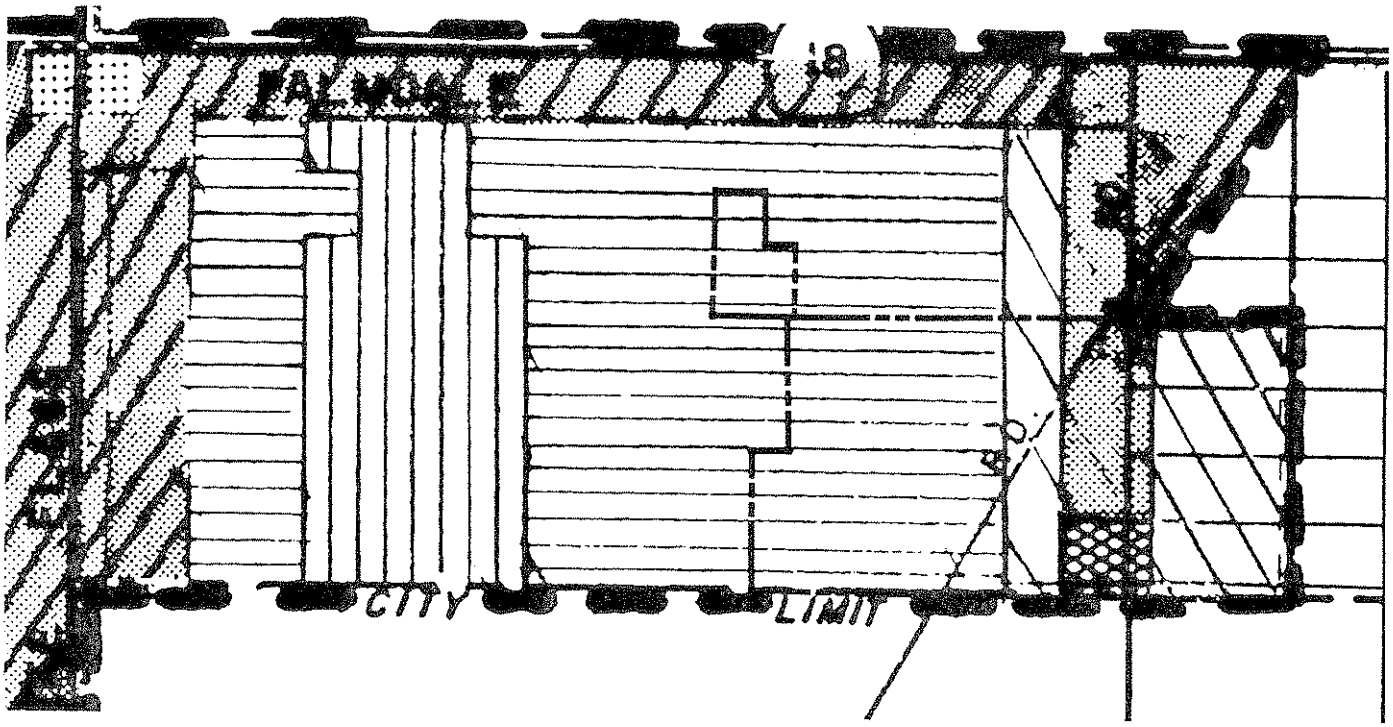
North ▲ Not To Scale

GENERAL PLAN

VERY LOW DENSITY
2 DU/AC

LOW DENSITY RESIDENTIAL
5 DU/AC

COMMERCIAL



KALEIDOSCOPE

North ▲ Not To Scale

ZONING

R-1
SINGLE FAMILY RESIDENTIAL DISTRICT

R-1T (4 DU)
SINGLE FAMILY RESIDENTIAL DISTRICT TRANSITIONAL

C-1
NEIGHBORHOOD RETAIL DISTRICT

C-2
GENERAL COMMERCIAL DISTRICT

Recreation and Parks The City of Victorville Recreation and Parks Department provides maintenance services to City-owned vacant lots, parks, the City Hall Complex, and street trees within right of ways. The surrounding facilities include Liberty Park and the Hook Community Complex. A community park is proposed within the Eagle Ranch (Mesa Verde) Community, approximately one mile from the project site. The Recreation and Parks Department uses a modification of the National Recreation and Park Standards to estimate service demands.

Public Utilities Public Utilities providing services to Foxfire Ranch are indicated in the following table.

Public Utility Agency
City of Victorville Public Works Department
Wastewater - Victor Valley Wastewater Reclamation Authority
Water - Victor Valley County Water District
Solid Waste - County of San Bernardino Solid Waste Management District
Victorville Disposal, Inc.
Electricity - Southern California Edison Company
Gas - Southwest Gas Corporation
Telephone - Continental Telephone of California
Television - High Desert Cable Vision; Total TV

Utilities are more fully discussed in the Infrastructure component of the Specific Plan.

• Summary: Impacts and Mitigation Measures

Earth Resources Site grading will slightly modify the existing terrain to prepare the land for development as necessary for drainage, infrastructure, and earthwork balancing considerations. No unusual geotechnical hazards or land subsidence constraints are expected subsequent to building construction. Mitigation includes adherence to grading regulations, and preparation of a soils analysis as necessary to recommend specific soil compaction requirements.

Hydrology Modification of the project site surface through grading and paving is expected to increase surface runoff. Urban contaminants from surface runoff will incrementally degrade surface water quality. Mitigation includes preparation of hydrological analysis to determine storm drain specifications, and erosion measures to minimize sediment during grading, and extending the City's street-sweeping program into the site area.

Biota During site construction, the existing habitat will be removed as a result of earth movement, and wildlife will be displaced to off-site locations. The site may contain the desert tortoise (Xerobates agassizii). This species is currently listed as a threatened species by the U.S. Department of Interior, Fish and Wildlife Service. In addition, the Mojave ground squirrel (Spermophilus mohavensis) is a state listed threatened species by the California Department fish and game may occur on-site. A biological study to determine if the desert tortoise and Mojave ground squirrel are located within the project site will be required by the City prior to grading approvals for the implementation of the Specific Plan. Other than the desert tortoise and Mojave ground squirrel, no other known rare, threatened or endangered species or significant habitat is located within the project site, thus additional impacts are not considered significant. After development, animal habitat will shift in favor of rodents, reptiles, and songbirds. Mitigation includes use of desert-type landscape materials to encourage the return of native wildlife. In addition, coordination between the developer and the City will take place at the time of project grading to cause as many Joshua trees as possible to be relocated into open space areas.

Air Quality During and subsequent to site construction, emissions from construction equipment, new vehicular traffic, and indirect energy consumption will cumulatively degrade basin air resources. Construction emissions are of short-term duration. Mitigation includes encouraging the use of local shuttle systems, van pool programs and bicycles. It is also suggested that energy conservation be practiced. Fugitive construction dust impacts will be controlled through compliance with Air Quality Management District regulations.

Archaeology/Paleontology Site development is not expected to impact any archaeological resources as a result of site conditions and characteristics. For paleontological resources; however, site grading may expose significant vertebrate fossils. Mitigation measures are designed to minimize the impact on cultural resources, including archaeological resources, and will include additional field survey and monitoring during grading in the event that artifacts are discovered.

Prior to issuance of a grading permit, the applicant shall provide either a copy of a contract with a licensed paleontologist/archaeologist to monitor all grading operations or a letter from said licensed professional indicating that a monitoring program is not necessary during grading prior to issuance of a grading permit.

Noise Short-term construction-related noise impacts will temporarily disrupt the local noise environment, primarily affecting adjacent residences. After project build-out, vehicles generated from proposed land uses will increase noise levels along interior and perimeter roadways. Residential uses adjacent to certain roadways may be affected by this increase. Both Palmdale Road and Highway 395 are expected to service sufficient vehicles that may affect residences adjacent to these facilities. Mitigation measures include conducting additional site-specific noise assessments to determine measures which will satisfactorily reduce noise to an acceptable level, and adherence to local noise regulations.

Land Use Approval of the Foxfire Ranch development project will require amendments to the General Plan and Zoning map to a Specific Plan (SP) designation. Proposed land uses are similar to existing designations, representing more of an implementation of proposed planning for the southwestern sphere area rather than change in land use direction. Adjacent uses will be affected by change in the existing rural environment to one of urban character. Mitigation includes requiring adequate setbacks, buffers, etc. where potential land use conflicts exist.

Traffic/Circulation Development of the site will create uses which will generate traffic on local streets significantly decreasing vehicular capacity on specific roadways and at local intersections. Approximately 13,700 ADT is forecast for project land uses, of which 1,320 are expected to occur during the evening peak hour. Based on information provided by the City of Victorville, a seven (7) percent growth rate was utilized to a 1999 target year.

A level of service was used as the basis for roadway selection determination unless modified by the City Engineer. The Circulation System within the Foxfire Ranch Development follows the City of Victorville's Circulation Plan. The Circulation Analysis shows that Amethyst Road is a major arterial. Dos Palmas Road will be an arterial and that Cobalt Street, and Luna Road are collector streets (see Exhibit 13, Circulation). The Circulation Analysis summarizes existing traffic conditions, project traffic impacts, and proposed mitigation measures. Refer to Appendix A for the Foxfire Ranch Traffic Study prepared by Kunzman Associates (revised April 1993).

With the addition of the following streets, the circulation system will be able to provide access to the site and accommodate project traffic volumes:

- Construction of Dos Palmas Road from Pacoima Road to Cobalt Road.
- Completion of Luna Road from Foxfire Ranch to U. S. 395 (may be in conjunction with other developments in the area).
- Construction of Cobalt Road from Luna Road to Dos Palmas Road.
- Construction of Amethyst Road from Luna Road to Palmdale Road (2 inside lanes) as part of the City of Victorville's master planned streets based on the City's Development Impact Fee (DIF) Program.

The cumulative traffic volumes in 1995 (i.e., existing, plus project, plus growth, plus other development) will have the following impacts:

- Require the widening of U. S. 395 to four lanes.
- Increase the need for a traffic signal at U. S. 395/Bear Valley Road (Note: existing volumes satisfy the signal warrants).
- Increase the congestion on Palmdale Road near I-15. However, traffic destined for commercial facilities along 7th Street or northbound on I-15 has the option of traveling north on Amargosa Road to Mojave Road to reach these destinations.
- Require the widening of Bear Valley Road to six (6) lanes between Amargosa Road and I-15.

The following measures are recommended to mitigate the impact of the project on traffic circulation:

- Construct streets identified in Item c in Traffic Impacts section.
- Participate in off-site improvements (City master planned streets to be constructed with funds from the Development Impact Fees (DIF) Program to the existing circulation system as directed by the reviewing agency.

Because SR 395 is a State Highway, Caltrans should take the responsibility when the necessary warrants are met.

It is recommended that the City monitor the key intersections in the vicinity of the site for warrants for traffic signals as development within the surrounding area occurs. This way the development of the roadway system can parallel the development of the project area and the surrounding areas providing for gradual expansion in both building construction and public improvements. It will also help the City avoid installation of unwarranted traffic signals. As an example, fees are being collected from the various developers to be applied towards specific master planned improvements, i.e., traffic signals which are projected to be warranted due to the accumulated traffic volumes from numerous developed areas. The City could then contract for their construction at such time as they are warranted. Refer to separate traffic study (revised April 1993) prepared by Kunzman Associates.

Public Services

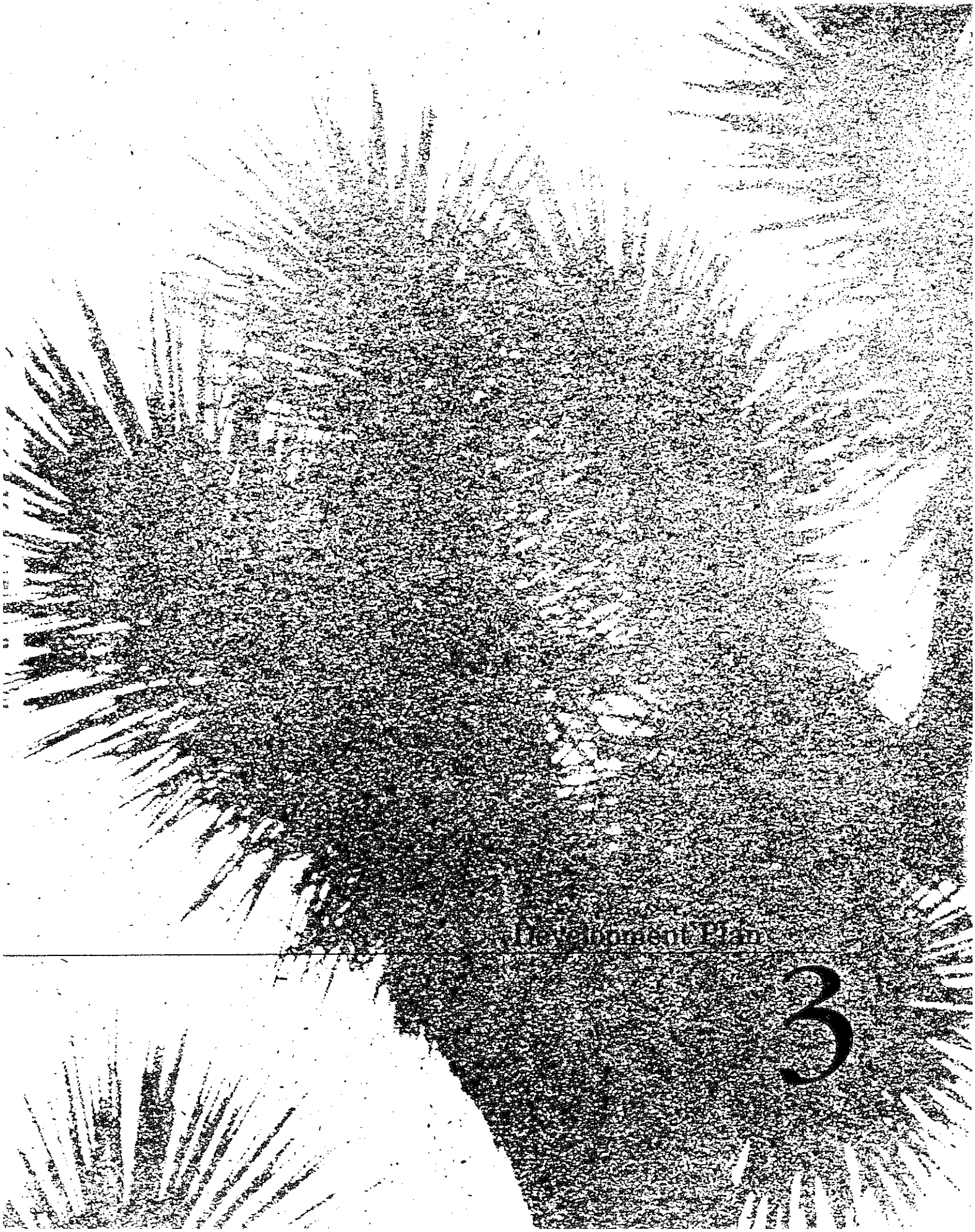
Project site development will not significantly impact most community services and public utilities. The planned expansion of master planned facilities will provide for orderly growth to the area without significant impact. For police, fire, and education,

site development may require additional staffing and facilities to provide adequate service to the site. Mitigation includes: 1) providing sufficient water supply to effectively control fire, 2) requiring site plan review by the Fire Department, 3) providing water conservation devices, 4) providing landscaping in accordance with City code, 5) collecting connection fees for sewage treatment, and 6) collecting funds for the Capital Facilities Improvement Program.

The aforementioned impacts and mitigation measures are based on existing information and may not be all inclusive. An additional environmental assessment may be necessary on site specific projects.

Growth Inducement

Development of the Foxfire Ranch Specific Plan will induce growth in the area. While this in itself may not be a significant impact, the growth inducement will require additional demands on natural and man-made resources and the environment.



Development Plan

3

3 Development Plan

• Introduction

Foxfire Ranch is proposed as a master planned mixed residential use community including primary and secondary residential development. As one of the city's few master planned communities, the project will be a unique component to the City's western area annexation. The potential also exists to set a development standard in the western sphere area that the surrounding areas can follow.

The following goals and objectives constitute policy guidelines for the Development Plan.

Create an identifiable community that provides a variety of housing products including detached homes for entry level couples, families, move up buyers, seniors, and commercial services which promote a sense of community;

To reinforce the community identity through control of project decision elements such as architecture, landscape, walls, signage, distinctive entry treatments and a viable circulation network;

Create development flexibility to reflect anticipated marketing needs and provide for family housing that will be marketable within the Victorville area;

Allow for an integrated circulation system which will serve residential and commercial needs without encouraging regional circulation intrusion, while encouraging alternative means of transportation;

Conserve energy and prevent neglect of the area's natural resources through compatible site design and use of drought tolerant plant material; and

Propose a logical phasing plan based on the marketplace and the extension and provision of infrastructure.

• Land Use Plan

Development Concept

Foxfire Ranch is envisioned to be a high quality Master Planned Residential Community. The Development Program provides for a range of residential products as well as support commercial uses. Residential uses will include array of housing products from affordable to move-up for a broad range of home buyers. In addition, there is flexibility for developing a planned community that integrates both primary and secondary (senior) housing. The development of this planned community offers proximity to a major urban area while providing rural style desert living. All planning areas within Foxfire Ranch will be linked through a common road network with associated open space/recreation trail system, with links to a regional open space network (i.e., utility corridors).

The land use plan is designed with sufficient flexibility to permit adjustments in housing types and densities to meet future market conditions while still achieving the objectives and design intent for Foxfire Ranch. The Land Use Plan is illustrated in Exhibit 9. Specific Plan Land Use Allocations as shown in Table 3, provides a breakdown of the project by density, acres, and total number of homes.

Century Homes will serve as the master developer and as the home builder for the Foxfire Ranch planned community. In addition, Century Homes will bring backbone infrastructure facilities to each development parcel.

Phasing

Phasing of development is proposed to move generally from east to west. This strategy involves a number of considerations including:

- Development growth taking place east of the project site.
- Utilities that are planned to be available at the northeastern portion of the site;
- A mix of residential land uses and densities provided through east to west phasing.

The construction of landscaped right of ways will be phased to coincide with residential construction so that increments of landscaped right of ways and open space will be developed coincidentally with increments of housing.

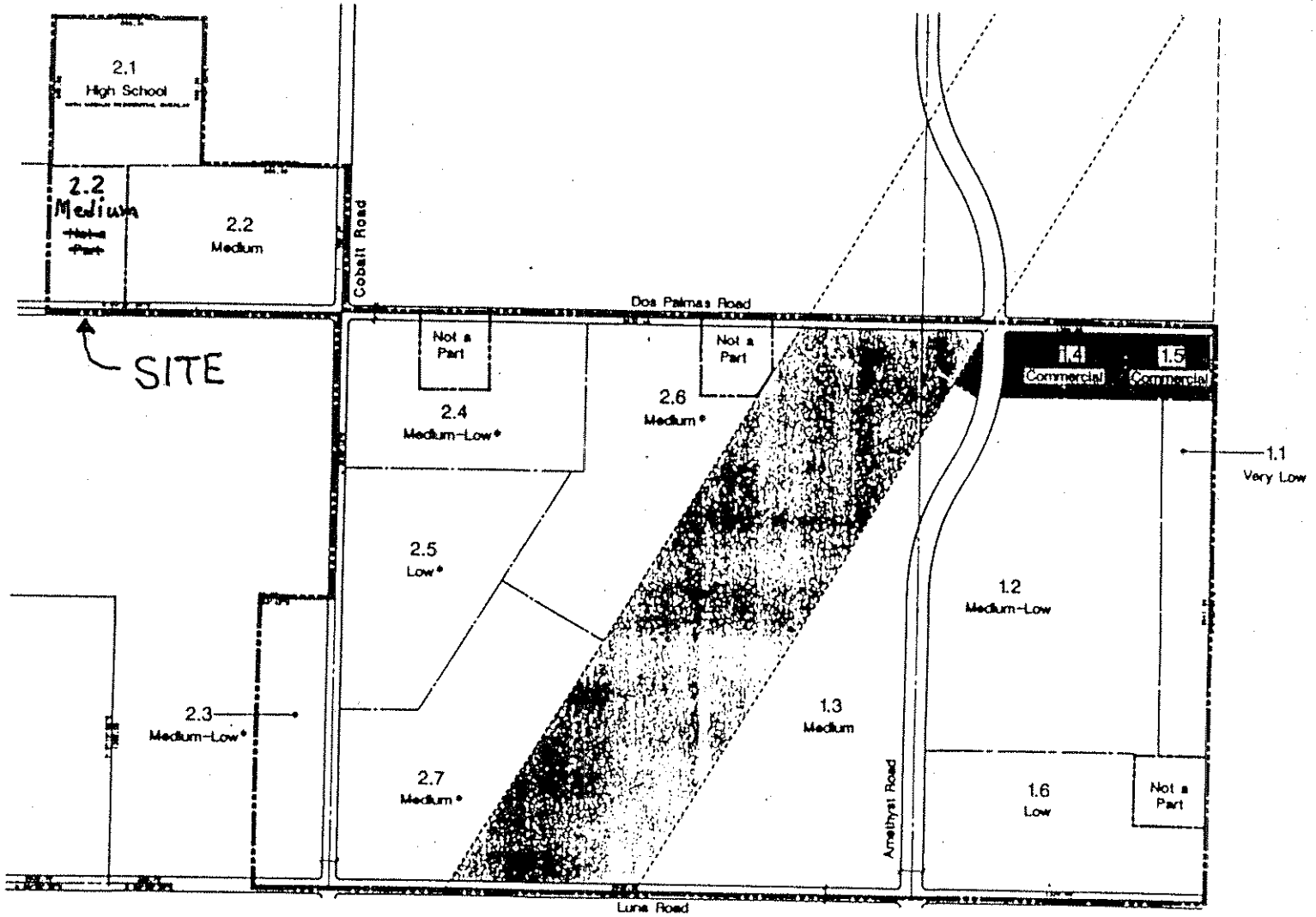
The phasing of the plan is designed to provide flexibility to respond to changing economic and market conditions occurring at the time of development.

Residential Land Uses

The residential mixture at Foxfire Ranch has been designed to provide a strong community image and to include a broad range of densities and housing types. Residential products and densities are grouped and located based upon similar characteristics and site criteria. It is anticipated that Foxfire Ranch will include singles, young starter families, families with older children, empty nesters and retired residents.

Very Low Residential: A single family detached residence will be on a single lot with standard yard setbacks. Relatively formal arrangements will occur within tracts along local streets and cul-de-sacs. Lots will range from 10,000 s.f. Proposed densities are from 1-2.5 residential homes per acre.

Specific Plan Land Use



Community Wide Road with Pedestrian Path in ROW

1.3 Medium* Planning Area Boundary Land Use Program

Very Low Residential 1-2.5 DU/AC

Low Residential 2-3.5 DU/AC

Medium-Low Residential 3-5 DU/AC

Medium Residential 4-7 DU/AC

* Adult Overlay Med. Residential (4-7 DU/AC)

Commercial

LADWP Easement

C E N T U R Y H O M E S

FOXFIRE RANCH

NORTH ▲ FEET 0 200 500 METERS 0 50 100 150

KALEIDOSCOPE

A · DESIGN · CONSORTIUM
REDLANDS, CALIFORNIA (714) 794-4585

EXHIBIT 9

Table 3
SPECIFIC PLAN LAND USE ALLOCATIONS

Land Use	Planning Area	Gross[3] Acres	DU Range	Homes	Overlay[1]
Residential					
Very Low (1-2.5 DU/AC)	1.1	7.50	7-18	18	
Low (2-3.5 DU/AC)	1.6	16.40	32-57	39	
	2.5*	17.30	51-60	60	Adult Residential
Medium-Low (3-5 DU/AC)	1.2	36.60	109-183	167	
	2.3	10.00	50	41	Adult Residential
	2.4	14.10	42-70	54	Adult Residential
Medium (4-7 DU/AC)	1.3	31.40	125-219	180	
	2.2	15.00	60-105	84	
	2.6	19.30	77-135	135	Adult Residential
	2.7	25.28	101-176	110	Adult Residential
Non-Residential					
Commercial	1.4	3.50			Medium-Low(17)
High School	2.1	10.00			
Commercial[4]	1.5	2.50			Low(8)
Major Roads[2]	--	15.90			
~~Subtotal~~		~~224.78~~	~~634-1073~~	~~902~~	~~25~~
LADWP Easement		47.50			
TOTAL		272.28		915	

[1] Adult Residential Overlay is at the Medium Residential Density (4-7 DU/AC).

[2] Major roads are computed on half and full road sections (1/2 Luna Road; Amethyst Road w/median; 1/2 Dos Palmas Road; 1/2 Cobalt and Cobalt Road); Roads have not been subtracted from gross acreage for the Land Use Designations.

[3] Based on recorded parcel maps.

[4] Commercial Area (Planning Area 1.5) will be utilized as a Detention/Retention Basin.

Low Residential: A single family detached residence on a single lot, with standard yard setbacks. Formal arrangement of homes will occur within tracts along local streets and cul-de-sacs. Lots will range from 8,000 s.f. The density is 2-3.5 residential homes per acre.

Medium-Low Residential: A single family detached residential home on a single lot. Neighborhoods will be laid out in formal methods with local streets and cul-de-sacs. Residential lots will range from 6,500 s.f. Densities will range from 3-5 residential homes per acre.

Medium Residential: A single family detached residential home on a single lot. Neighborhood tracts can be laid out in more formal arrangements along local streets and cul-de-sacs. Lots will range from 4,000 s.f. Density can range from 4-7 residential homes per acre. The Adult Residential Overlay will also range from 4-7 homes per acre. Lots will also range from 4,000 s.f.

Commercial Land Uses

The Specific Plan proposed a commercial site adjacent to Dos Palmas Road. Uses will be neighborhood oriented, along with other local-serving retail and service uses.

Community Facilities/Trail System

The planning objective is to develop a transportation system which provides adequate automobile circulation while encouraging alternative means of pedestrian access. Emphasis is placed on the continuity of trails and open space connections between adjacent planned communities and Foxfire Ranch. The convenient location of commercial services and community facilities in the area will encourage the use of alternative transportation modes. Refer to Exhibit 10 - Community Facilities/Trail System.

Foxfire Ranch will provide a neighborhood park and paseo that will be convenient to Foxfire Ranch community residents and promote an important pedestrian link between community facilities.

During the implementation stage, connections will be provided through tentative tract map submittals and shall be consistent with Exhibit 10a. - Pathway Network. Connections will be made by secondary paseos along roadways, adjacent to and/or through neighborhood residential projects.

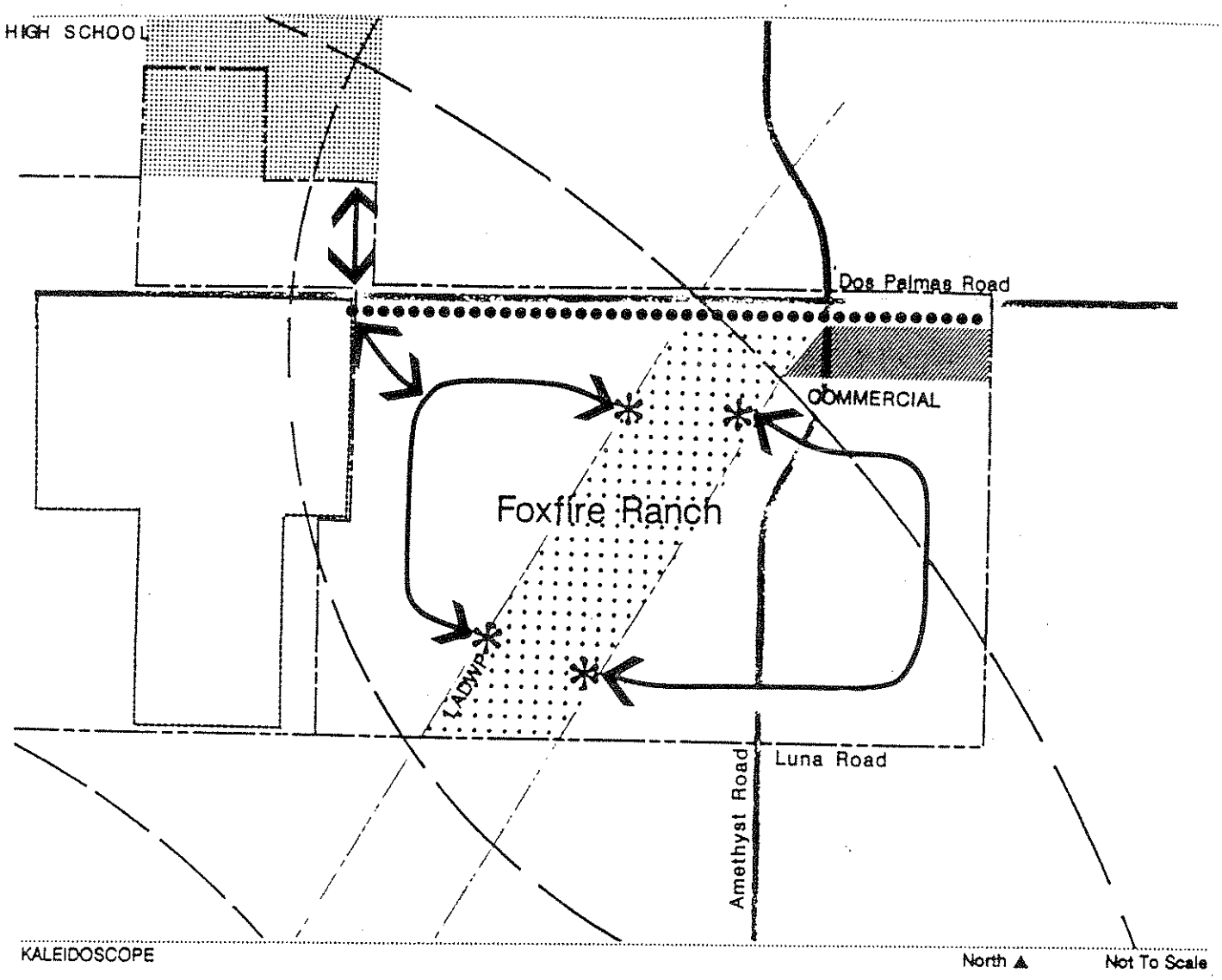
The paseo (rights-of-way) of major arterials, landscape easement and/or lettered lots including community walls) will be offered for dedication to the City of Victorville and funded through a variety of municipal finance mechanisms, such as assessment districts. The use of enhanced desert landscaping and water conservation measures is strongly encouraged. Refer to Exhibits 12 and 12a, and Section 4, Infrastructure Plan, Circulation, for a discussion of Roadway Options.

Pathway Network

A paseo is a landscape enhanced lineal greenbelt with a meandering pedestrian pathway. *(The primary paseo was removed through Specific Plan Amendment SPA-89-001 (A-8)*

The secondary paseo within the Foxfire Ranch project will link various neighborhoods and the adjacent Los Angeles Department of Water (LADWP) utility easement. The secondary paseo will be located within neighborhoods and work in combination with local streets.

The paseos will be offered for dedication to the City of Victorville and can be funded through a variety of municipal finance mechanisms such as an assessment district. The use of enriched desert landscaping and water conservation methods is strongly encouraged. Refer to Exhibit 12 and Section 4, Infrastructure Plan, Circulation, for a discussion of Roadway Standards.



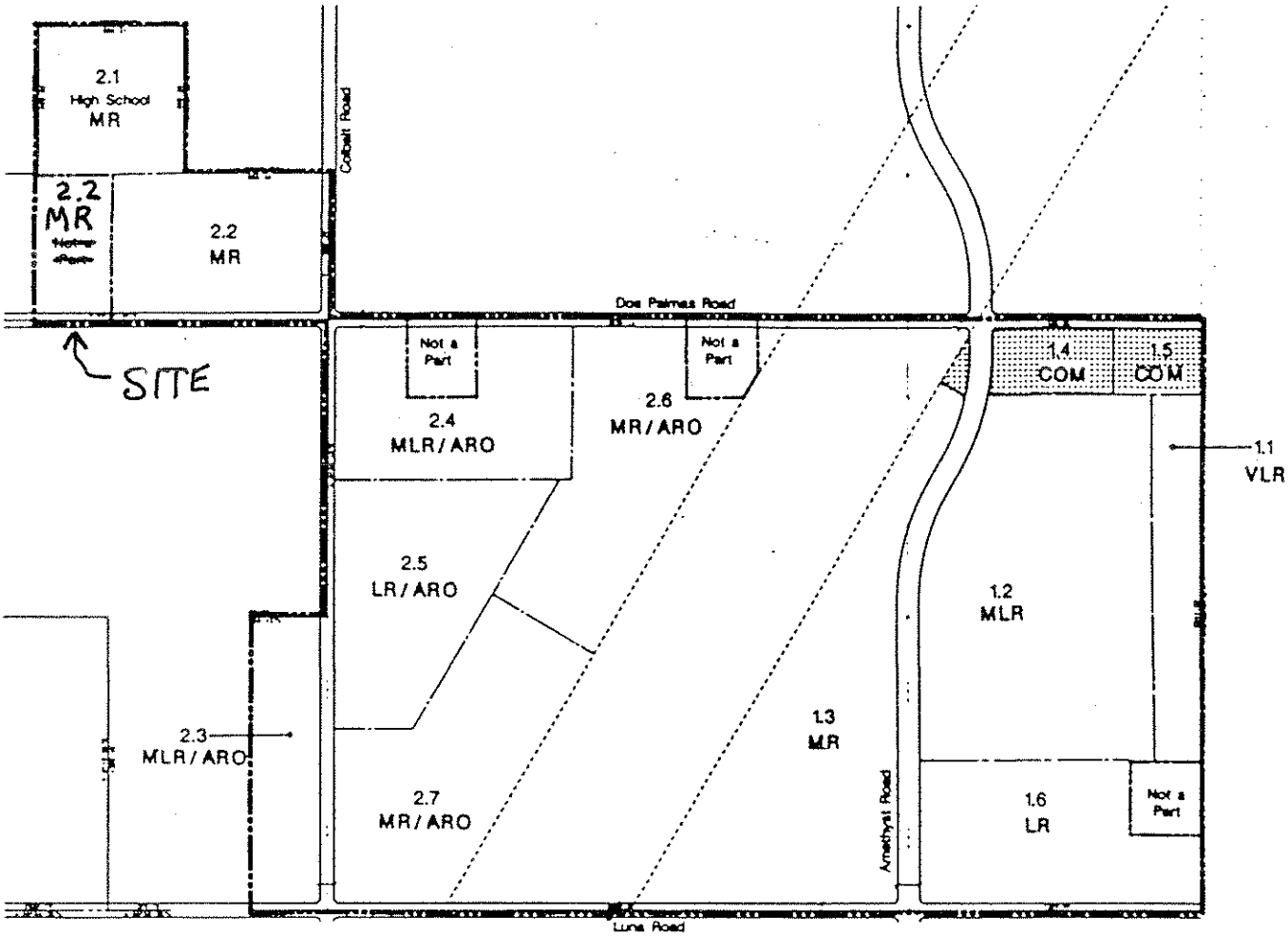
PATHWAY NETWORK

PRIMARY PEDESTRIAN PASEO *[The primary paseo was removed through Specific Plan Amendment SPA-89-001 (A-8)]*

SECONDARY PASEO WITH LOCAL STREET

LADWP EASEMENT

ACCESS POINTS



KALEIDOSCOPE

North ▲ Not To Scale

LAND USE REGULATIONS

Districts

VLR	VERY LOW RESIDENTIAL	COM	COMMERCIAL
LR	LOW RESIDENTIAL	LR/ MLR	LOW RESIDENTIAL OVERLAY MEDIUM-LOW RESIDENTIAL OVERLAY
MLR	MEDIUM-LOW RESIDENTIAL	ARO	ADULT RESIDENTIAL OVERLAY MR - MEDIUM RESIDENTIAL
MR	MEDIUM RESIDENTIAL		

Project Design

The project can be identified and unified through design elements such as architecture, signage, landscaping, color, paving, walls, fencing, and entry treatments. Design criteria would be implemented through more detailed tract map submittals. The major objective of the design criteria would be to establish general controls that will ensure consistency in design and promote visual quality within the project area.

Through innovative and imaginative designs, a level of community design can be achieved that enhances property values for the future homeowners and at the same time satisfies the City's aesthetic and visual goals for the expansion area. The design criteria can be structured to allow some variability in design. Individual neighborhoods would then be able to establish their own design character yet remain compatible with the overall community.

• Land Use Regulation

Purpose and Application

The purpose of the Specific Plan's Land Use Regulations is to protect the public health, safety, and welfare by implementing the planning provisions of this Specific Plan and the General Plan.

The Land Use Regulations And Standards included have been established to provide criteria for the development of planning areas/lots within Foxfire Ranch in the City of Victorville. This will ensure a coordinated, comprehensive planned community project and take advantage of the superior environment which results from community-scale master planning.

These Land Use Regulations and standards are developed to ensure compliance with the intent and spirit of the California Government Code Specific Plan regulations (Sections 65450 through 65507). The objective of these regulations is to allow is development flexibility to meet changing community desires and to be market driven.

The Land Use Regulations and standards combine provisions for the opportunity to propose innovative design concepts in site planning, consistent with orderly development and protection of sensitive resources. They also contain provisions for a logical and timely sequence of review. They are further intended to implement the goals and policies of the current City of Victorville General Plan.

The included Land Use Regulations and standards are to assure that development of individual planning areas/lots within Foxfire Ranch is consistent with the City of Victorville's intention for development in the western annexation area.

The Land Use Regulations in this section apply to properties within the Foxfire Ranch Specific Plan boundaries and are intended to implement the Land Use Plan. The regulations, when referenced, work in conjunction with the City of Victorville's Municipal Codes, or in those situations where the Specific Plan's regulations and standards do not fully address an issue. The City Municipal Codes are set forth in Title 18 of the Victorville Municipal Code titled "Zoning" and Title 17 of the Victorville Municipal Code titled "Subdivision," which are in effect at the time of approval of this Specific Plan. They are intended to be utilized by the City, developer and builder to ensure that the proposed development will proceed in an efficient and coordinated manner, to create a high quality Planned Residential Community. Unless specifically regulated otherwise by the regulations contained in this document, the regulations contained in Title 18 of the Victorville Municipal Code titled "Zoning" and Title 17 of the Victorville Municipal Code titled "Subdivision" shall apply, and all subsequent amendments thereto from the time of approval of this specific plan up to the adoption of Ordinance No. 1738.

General Provisions

A. INTRODUCTORY PROVISIONS

1. CITATION

This ordinance shall be known as the "Foxfire Ranch Specific Plan", (Specific Plan-1-89).

2. AUTHORITY FOR THE SPECIFIC PLAN

These Land Use Regulations and Development Standards implement the Foxfire Ranch Specific Plan. The regulations and standards may be adopted by ordinance pursuant to Article 8, Specific Plans of the Planning, Zoning and Development Law of the California Government Code, in compliance with the provisions of Sections 65450 et seq. (California Government Code Sections 65000-66003), Sections 21100 through 21107 et seq. of the State of California Public Resource Codes, and pursuant to state and local guidelines. The Government Code authorizes cities and counties to prepare and adopt Specific Plans for portions of their areas of jurisdiction as a means to implement their General Plan.

3. CONSISTENCY WITH THE GENERAL PLAN

The Foxfire Ranch Specific Plan is based on the current City of Victorville's General Plan and related municipal codes. The Plan includes detailed regulations and standards necessary for the implementation of the current General Plan. The various land uses permitted by the Specific Plan are consistent with the goals and policies described in the General Plan. This Specific Plan; however, focuses on those issues which directly affect and are of greatest importance to the Foxfire Ranch project area. Reference should be made to the General Plan for guidance concerning goals and policies which are not covered by this Specific Plan.

4. RELATIONSHIP TO OTHER REGULATIONS

The Specific Plan will provide the user with the information needed to determine what city goals, policies, regulations and standards will guide the development of a particular planning area as shown on the Specific Plan Land Use Plan (Refer to Exhibit 8). Areas not specifically covered by this plan, however (i.e., construction standards, health regulations, subdivision procedures, etc.), will continue to be governed by existing city codes, and no provision of this plan is intended to repeal, abrogate, annul, impair, or interfere with any existing city ordinance except as is specifically changed by adoption of this plan.

5. CONFLICT WITH OTHER REGULATIONS

Whenever the provisions of this plan impose more restrictive regulations upon buildings or structures, or on the use of lands, or require larger yards, or setbacks, or otherwise establish more restrictive regulations than are imposed or required by any other law, title, ordinance, code, or regulation, the provision of this plan shall govern.

6. AGREEMENTS

The provisions of this plan are not intended to interfere with or abrogate any easements, covenants, or other existing agreements which are more restrictive than the provisions of this plan. The Specific Plan is not intended to supersede any development agreement, entered into with the City of Victorville, if a conflict arises.

7. VALIDITY

If any section, subsection, sentence, clause, phrase, or portion of the Specific Plan is for any reason held to be invalid by the decision of any court or competent jurisdiction, such decision shall not affect the validity of the remaining portion of this plan.

B. GENERAL REGULATIONS

1. Any detail or issue not specifically covered by the provisions contained herein shall be subject to the provisions of the City of Victorville's Municipal Code. Municipal Code sections that are most applicable to the most similar issue, condition, and/or situation shall apply to all Land Use Districts within the Specific Plan.

2. Construction shall comply with applicable provisions of the Uniform Building Code as amended and the various other mechanical, electrical and plumbing codes related thereto.

3. Grading plans submitted for all projects within the Specific Plan boundary shall be accompanied by geological and soils engineers' reports which shall incorporate all pertinent recommendations.

4. Grading will be permitted outside of the Specific Plan Boundaries when it is consistent with an approved grading plan. If planning areas (parcels) are under different ownership, a letter of understanding will be required. Stockpile and borrow sites may be permitted within areas scheduled for future development, subject to an approved grading plan. Prior to the use of any ungraded site as a stockpile or borrow site, a biological survey shall be conducted by a qualified biologist to determine if the site contains occupied habitat for the desert tortoise (Gopherus agassizii). The result of said survey shall be filed with and reviewed by the City of Victorville prior to issuance of a grading permit. All mitigation measures identified in the biological survey and/or by any City department shall be implemented prior to the establishment of the stockpile or borrow site.

5. Model homes may be used for the sale of homes within a recorded tract if approved as a Conditional Use per Chapter 18.74 of Title 18 of the Victorville Municipal Code titled "Zoning."

6. For all residential development within this Planned Community, the developer will display a copy of the proposed Land Use Plan in all sales offices.

7. Dedication and improvements of all right-of-way shall be approved by the City Engineer.

8. Dedication of park, recreational facilities or open space shall be in conformance with the General Plan requirements of the City of Victorville.

9. Conditional Use Permits shall be processed in the Manner prescribed by Title 18 of the Victorville Municipal Code titled "Zoning".

10. The following uses shall be permitted in any residential land use district through a PUD pursuant to Chapter 18.49 of Title 18 of the Victorville Municipal Code titled "Zoning":

    a. Adult housing projects with a minimum age requirement. The Adult Residential Overlay District shall meet the requirements of Safety Area 4.

11. PLANNING AREA BOUNDARIES

    a. Except as otherwise shown, dimensions are measured from center line of major arterials, arterials and collectors.

    b. Adjustments in the Planning Area boundaries should not exceed a cumulative total of 20% of the original size. These adjustments may result from final road alignments, geotechnical or engineering refinements to the parcel (lot), tentative and/or final tract map and shall not require an amendment to the Specific Plan where such adjustments are consistent with the intent of this Specific Plan and the City's General Plan.

    c. Boundaries are not dimensioned in the Specific Plan and shall be established by the parcel (lot), tentative or final subdivision map.

12. All landscape and/or grading plans shall include provisions for graded sites which are scheduled to remain unimproved during the rainy season.

13. The maximum number of dwelling units for each planning area is established in the Specific Plan Land Use Allocations Table 3. Permitted density ranges for each residential category are also specified. The total number of residential units allowed within each planning area can exceed the total allowed by the Land Use Plan by up to 10%, as long as the cumulative project total does not exceed 915 residential units. In addition, development of a lower number of dwelling units, or of a lower density than that specified for a planning area may occur without requiring an amendment to this Specific Plan. No residential planning area established by this Specific Plan shall be further subdivided except for tentative tract purposes for individual residential lot development, which may include open space, recreational amenities, paseo and/or pathway network.

14. If any portion of these Land Use Regulations is, for any reason, declared by a court of competent jurisdiction to be invalid or ineffective in whole or in part, such decision shall not affect the validity of the remaining portions thereof. The City Council hereby declares that they would have enacted these regulations and each portion thereof irrespective of the fact that any one or more portions be declared invalid or ineffective.

15. Unless otherwise provided, any ambiguity concerning the content or application of this Specific Plan shall be resolved by the Director of Planning. The decision can be appealed to the Planning Commission, and then if necessary to the City Council.

16. Areas of open space, parks, as well as paseo and/or pathway networks shown on a Parcel/Lot, Tentative Tract Maps as in-tract open space (within Planning Areas) rights-of-way for major arterials, that portion of Luna Road adjacent to Amethyst Road, landscape easements, and lettered lots, including walls shall be irrevocably offered for dedication to the City of Victorville prior to the recording of any Final Map dividing land within the Foxfire Ranch Specific Plan. The in-tract open space, parks, paseo and/or pathway network rights-of-way and landscape easements including walls shall be deemed consistent with the Specific Plan, if approved by City. Dedication of these facilities shall not be accepted by the City until all improvements have been completed consistent with City-approved plans.

17. Development of the high school site shall be subject to review and approval of a conditional use permit pursuant to Chapter 18.74 of Title 18 of the Victorville Municipal Code titled "Zoning."

18. Construction of required improvements that have City approved improvement plans can proceed prior to the recordation of the final map. All improvements that have been constructed and have been accepted by the City of Victorville will only be required to post a warranty bond for twenty percent (20%) of the total improvement cost. Improvements that have not yet been accepted by the City of Victorville can be bonded at a reduced percentage based on the amount of work remaining as recommended by City staff.

C. DEFINITIONS

1. A "Planning Area" is defined as a homogenous area considered as an increment of the Specific Plan area and is specifically identified as a numbered lot on the Specific Plan Land Use Map.

2. Per Chapter 18.04 of Title 18 of the Victorville Municipal Code titled" Zoning" and Chapter 17.08 of Title 17 of the Victorville Municipal Code titled "Subdivision." Terms used in these Land Use Regulations and standards shall have the same definitions as given in Title 18 of the Victorville Municipal Code titled "Zoning" and Title 17 of the Victorville Municipal Code titled "Subdivision."

D. CHANGES IN THE SPECIFIC PLAN

1. ADMINISTRATIVE CHANGES

The following changes in this Specific Plan may be made without amending the plan per Chapter 18.58.070 of Title 18 of the Victorville Municipal Code titled "Zoning."

a. The addition of new information to the Specific Plan maps or text for the purpose of clarification that does not change the effect or intent of any standard or regulation.

b. Changes to the community infrastructure such as drainage systems, roads, water and sewer systems, etc., which do not have the effect of increasing or decreasing capacity in the project area beyond the specified maximum density range, and do not otherwise change the intent of any provision of this plan.

c. An adjustment in any site development standard and/or regulation not including density by not more than ten percent (10%) of that otherwise specified herein and which does not increase the overall specific maximum density range.

d. Upon appeal to the Planning Commission of any decision of the Director of Planning made pursuant to this Section, the Planning Commission shall set the matter for hearing in a manner prescribed in Title 18 of the Victorville Municipal Code titled "Zoning."

e. A "transfer" of dwelling units from one Planning Area to another Planning Area may be made regardless of ownership and between residential districts. Residential density can be transferred from one land owner to another by mutual agreement provided that other requirements set forth under the Land Use Regulations and standards are met. Any transfer shall not cause the total number of units for the project to be exceeded.

2. SPECIFIC PLAN AMENDMENTS

The following changes to the Specific Plan shall require an amendment to the Specific Plan:

a. Changes to the text or maps of the Specific Plan other than the addition of new information which does not change the effect or intent of any standard and/or regulation.

b. Changes in the overall Specific Plan boundaries.

c. Increase in dwelling unit density beyond the maximum specified total project density range of 915.

d. Changes in infrastructure such as drainage systems, roads, water and sewer systems, etc., which have the effect of increasing or decreasing capacity beyond the specific density range in the project area.

e. Major changes in the designated alignment or location of the backbone infrastructure system.

f. Any other additions or deletions which may change the effect or intent of any Land Use Regulation and/or standard.

3. SPECIFIC PLAN PROVISIONS

Amendment Procedures

All proposed amendments to the Specific Plan shall be processed and acted upon pursuant to Chapters 18.76 and 18.78 of the City of Victorville's Municipal Code Zoning Ordinance.

The procedures, as outlined in California Government Code Section 65453 et. seq., and Division 20 of the Public Resource Code are to be followed when adoption of an amendment to a Specific Plan is initiated.

E. LAND USE REGULATION AND SITE RELATED STANDARDS

The regulations and standards presented below are separated into several land use districts (Refer to Exhibit 11). Roadways shall be in conformance with the circulation plan, roadway cross-sections and standards contained in the Circulation Component of this Specific Plan.

1. ESTABLISHMENT OF LAND USE DISTRICT

a. In order to carry out the objectives and policies of the Specific Plan, the planning area is divided into the following Base Land Use Districts:

- VLR - Very Low Residential
- LR - Low Residential
- MLR - Medium Low Residential
- MR - Medium Residential
- COM - Commercial

b. In addition, the following Overlay District is established:

1) ARO - Adult Residential Overlay.
Note: LR, Low Residential and MLR, Medium Low Residential Overlay for the Commercial District. (Refer to Table 3, Land Use Allocations).

F. RESIDENTIAL USES AND REGULATIONS

1. General

a. As shown on Exhibit 11, Land Use Regulations, the Foxfire Ranch Specific Plan has allocated certain residential and commercial districts to a specific Planning Areas and to specific Overlay District.

b. The Land Use Regulations shall be applied only within the boundaries of the Foxfire Ranch community whose land use area is defined in the Specific Plan Land Use Plan.

c. Conformance of a Residential Land Use proposal with the Foxfire Ranch Specific Plan shall be determined as follows:

1) The number of units within any residential-designated area of the Specific Plan Land Use Plan shall be determined by the total homes Refer to Specific Plan Land Use Map, Exhibit 9 and Specific Plan Land Use Allocations, Table 3.

2) The minimum individual building site area provided in these regulations is a net figure which represents an absolute minimum.

d. Fences, hedges, and walls: shall comply with the provisions of Chapter 18.64 of Title 18 of the Victorville Municipal Code titled "Zoning".

e. All entry monumentation, (either free standing and/or part of a wall) for the total community including individual neighborhoods shall be limited to a maximum of eight (8) feet in height for graphic logo and identification signage. No graphic logo or identification sign above six (6) feet in height shall not be more than ten (10) feet in length. No graphic logo or identification signage less than six (6) feet in height shall extend more than twenty (20) feet in length. All entry monumentation shall be set back to allow for sight distance per provisions in Chapter 18.64.060 of Title 18 of the Victorville Municipal Code titled "Zoning." Illumination will be by backlighting.

f. Masonry chimneys, fireplaces, wing walls, bay windows, and kitchen garden windows, and other minor architectural features, may project into any minimum yard setback area pursuant to Section 18.64 of Title 18 of the Victorville Municipal Code titled "Zoning". In addition, architectural features (bay windows, chimneys, fireplaces, kitchen garden windows) and other architectural features and/or building projections may project into the rear yard setback a maximum of four feet (4') provided the width of the feature does not exceed twenty-five percent (25%) of the building width as approved by the Planning Department. In no event shall such chimney, fireplaces, wing walls and other minor architectural features project into any required setback area so as to be closer than three (3) feet to any property line of the building site.

g. Patio covers, open trellis and beam construction including patio covers (excludes enclosed patios) shall be permitted to be free standing and/or attached to the residence (detached unit only). Patio and/or trellis may extend to within eight (8) feet from the rear property line and five (5) feet from the side yard property line as measured from the center line of the structural supports. Detached patio covers and trellises may be extended to within six (6) feet of any building structure as regulated by the Uniform Building Code (UBC).

h. Where noise levels may exceed community standards for residential use, developers are required to utilize construction techniques to reduce interior noise levels within all habitable structures at or below 45 Ldn.

i. All development proposals to be reviewed by the City through the PUD process for the Adult Residential Overlay District.

j. In any planning area proposed for residential purposes, Planned Unit Developments (PUD) may be allowed. The procedure for review and approval of those Planned Unit Developments shall be those procedures established in Titles 17 and 18 of the Victorville Municipal Code. No Site Plan Review shall be required for Planned Unit Developments within the adopted Specific Plan boundaries.

2. VLR - Very Low Residential District

a. Purpose and Intent

The VLR District is intended to permit development of a range of residential units including single-family detached homes. This very low density residential category permits a density range from one (1) to two and one half (2-1/2) dwelling units per gross acre.

b. Permitted Uses

The following principal uses are permitted in the Very Low Residential District:

1. Single-family detached dwellings (one dwelling per lot).
2. Parks and open space areas, recreation centers and facilities, and trails.
3. Utility facilities not subject to discretionary approval.

4. Uses and structures typically incidental or accessory to residential uses as specified in Chapter 18.66, Title 18 of the Victorville Municipal Code titled "Zoning."

c. Conditional Uses

The following principal uses are conditional in the Very Low Density Residential District and shall be permitted only if approved pursuant to Chapter 18.74 of the Victorville Municipal Code titled "Conditional Uses."

1. Churches
2. Day care
3. Utility facilities that are subject to discretionary review.
4. Temporary structures and enclosures for use during construction activities (construction office) and model homes, model home sales centers and signs.

d. Accessory Uses

In addition to the general regulations governing accessory uses, the following specific limitations and special regulations shall apply to the Very Low Density Residential.

1. Recreational vehicles can be stored on any lot provided that required off-street parking areas are not utilized and access thereto is not obstructed. No vehicles so stored shall be occupied;
2. The keeping of dogs, cats and birds shall be subject to the regulations set forth in the Victorville Municipal Code.
3. An accessory building may occupy part of a required rear yard and/or side yard along the interior side lot line. An accessory structure may be constructed to the property line of said rear and side yard provided that the roof system does not extend beyond the property line and shall meet all building code requirements;
4. No accessory building designated for use as servant's quarters or as a guest house shall contain any kitchen or cooking facility;
5. Home occupations shall be permitted as approved by the Planning Commission pursuant to Section 18.66.020;
6. Child care not to exceed the child limits of a large family day care as specified in Title 22 of the California Administrative Code and licensed by the California Department of Social Services.
7. Home school of not more than eight children, provided not more than six children are from outside of the resident family, shall be allowed.

e. Site Development Standards

When single-family detached subdivisions are implemented, the following standards apply:

1. Building site area: ten thousand (10,000) square foot minimum.
2. Building site width: eighty (80) feet minimum. Cul-de-sacs, knuckles, and exterior curves of local streets shall comply with Chapter 17.48.090 of Title 17 of the Victorville Municipal Code titled "Subdivision."
3. Building site depth: One hundred ten (110) feet minimum.

TABLE 4
Residential Development Standards

Category/ Density	Permitted Uses	Accessory Structures	Minimum Lot* Dimensions (Width by Depth)	Building Coverage	Yards*	Building* Height	Parking	Street Standards
VLR: Very Low Residential (1-2.5 DU/AC)	• S.F. Detached • Open Space; Rec. Facilities; Paseos Trails	• Garage • Fences, Walls Trellis/Patio Covers • Pools	• 80 ft. x 110 ft. • 85 ft. Min. Corner Lot • Min. area 10,000 s.f. • Cul-de-sac/knuckles and exterior curves per Chapter 17.48.090	40% Max.	Front: 25 ft. min and 35 ft. Side: 5 ft. min Street Side: 10 ft. min. Rear: 20 ft. min.	2 Stories per single family	2-Car Garage 60 ft. ROW residence min.	Local Street
LR: Low Residential (2-3.5 DU/AC)	• VLR Uses • S.F. Detached • Open Space; Rec. Facilities; Paseos/ Trails	• Garages • Fences, Walls Trellis/Patio Covers • Pools	• 70 ft. x 100 ft. • 75 ft. Min. Corner Lot • Min. area 8,000 s.f. • Cul-de-sac/knuckles and exterior curves per Section 17.48.090	40% Max	Front: 20 ft. min. Side: 5 ft. min. Street Side: 10 ft. min Rear: 20 ft. min.	2 Stories and 35 ft.	2-Car Garage per single family residence min.	Local Street 60 ft. ROW
MLR: Medium Low Residential (3-5 DU/AC)	• LR Uses • S.F. Detached • Open Space; Rec. Facilities; Paseos/ Trails	• Garages • Fences, Walls Trellis/Patio Covers • Pools	• 60 ft. x 95 ft. • 65 ft. Min. Corner Lot • Min. area 6,500 s.f. • Cul-de-sac/knuckles and exterior curves per Section 17.48.090	40% Max.	Front: 20 ft. min. Side: 5 ft. min Street Side: 10 ft. min Rear: 15 ft. min.	2 Stories and 35 ft.	2-Car Garage per single family residence min.	Local Street 60 ft. ROW
MR: Medium Residential (4-7 DU/AC)	• MLR Uses • ARO-Residential Overlay • S.F. Residences	• Garages • Fences, Walls Trellis/Patio Covers • Pools	• 40 ft. x 90 ft. • 45 ft. Min. Corner Lot • Min. area 4,000 s.f • Cul-de-sacs/knuckles and exterior curves per Section 17.48.090	50% Max.	Front: 18 ft. min. Side: 5 ft. min. Street Side: 10 ft. min. Rear: 15 ft. min	2 Stories and 35 ft.	2-Car Garage per single family residence min.	Local Street 60 ft. ROW
ARO: Adult Residential Overlay (4-7 DU/AC)	• S.F. Residences including Patio Homes/ duplexes	• Related to permitted uses	• 50 ft. x 80 ft. • 55 ft. Min. Corner Lot • Min. area 4,000 s.f. • Cul-de-sac/knuckles and exterior curves per Section 17.48.090	50% Max.	Front: 17 ft. min. Side: 5 ft. min. Street Side: 10 ft. min. Rear: 10 ft. min.	2 Stories and 35 ft.	2-Car Garage per single family residence min.	Local Street 60 ft. ROW

4. Building height: thirty-five (35) feet maximum. No building shall have more than two and one half stories.
5. Building site coverage: forty (40) percent maximum for all buildings on the site.
6. Yard Requirements:
   a. Front Yard: Twenty five (25) minimum.
   b. Side Yard: Five (5) feet minimum.
   c. Rear Yard: Twenty (20) feet minimum.
   d. From any property line abutting on a street of a corner lot ten (10) feet minimum, subject to the exceptions set forth in Chapter 18.64.040, of Title 18 of the Victorville Municipal Code titled "Zoning."
7. Garages: The placement and/or construction of garages shall comply with yard requirements for a main building. Detached garages may be placed or constructed anyplace within the required rear or interior side yard setback area.
8. Off-street parking in compliance with Chapter 18.60 of Title 18 of the Victorville Municipal Code titled "Zoning." Two (2) spaces are required for each dwelling unit, and shall be within a fully enclosed garage.

3. LR - Low Residential District

a. Purpose and Intent

The LR District is intended to permit development of a range of residential units including single-family detached homes. This low density residential category permits a density range from two (2) to three and one half (3-1/2) dwelling units per gross acre.

b. Permitted Uses

The following principal uses are permitted in the Low Residential District:

1) Single-family detached dwellings (one dwelling per lot).
2) Parks and open space areas, recreation centers and facilities, and trails.
3) VLR - Very Low Residential uses, provided at a minimum said development shall comply with all development standards of said Land Use Plan.
4) Utility facilities not subject to discretionary approval.
5) Uses and structures typically incidental or accessory to residential uses as specified in Chapter 18.66, Title 18 of the Victorville Municipal Code titled "Zoning."

c. Conditional Uses

The following principal uses are conditional in the Low Density Residential District and shall be permitted only if approved pursuant to Chapter 18.74 of the Victorville Municipal Code entitled "Conditional Uses."

1) Churches
2) Day care
3) Utility facilities that are subject to discretionary review.
4) Temporary structures and enclosures for use during construction activities (construction office) and model homes, model home sales centers and signs.

d. Accessory Uses

In addition to the general regulations governing accessory uses, the following specific limitations and special regulations shall apply to the Low Density Residential.

1) Recreational vehicles can be stored on any lot provided that required off-street parking areas are not utilized and access thereto is not obstructed. No vehicles so stored shall be occupied;
2) The keeping of dogs, cats and birds shall be subject to the regulations set forth in the Victorville Municipal Code.
3) An accessory building may occupy part of a required rear yard and/or side yard along the interior side lot line. An accessory structure may be constructed to the property line of said rear and side yard provided that the roof system does not extend beyond the property line and shall meet all building code requirements;
4) No accessory building designated for use as servant's quarters or as a guest house shall contain any kitchen or cooking facility;
5) Home occupations shall be permitted as approved by the Planning Commission pursuant to Chapter 18.66.020;
6) Child care not to exceed the child limits of a large family day care as specified in Title 22 of the California Administrative Code and licensed by the California Department of Social Services.
7) Home school of not more than eight children, provided not more than six children are from outside of the resident family, shall be allowed.

e. Site Development Standards

When single-family detached subdivisions are implemented, the following standards apply:

1) Building site area: eight thousand (8,000) square foot minimum.
2) Building site width: seventy (70) feet minimum. Cul-de-sacs, knuckles, and exterior curves of local streets shall comply with Chapter 17.48.090 of Title 17 of the Victorville Municipal Code titled "Subdivision."
3) Building site depth: One hundred (100) feet minimum.
4) Building height: thirty-five (35) feet maximum. No building shall have more than two and one half stories.
5) Building site coverage: forty (40) percent maximum for all buildings on the site.
6) Yard Requirements:
   a. Front Yard: Twenty (20') foot minimum from property line to garage door, except fifteen feet (15') minimum from the property line is allowed where the residence is closer to the street than the garage. A minimum setback of twenty-seven feet (27') from the face of curb to the garage door; or eighteen feet (18') from the property line shall be required, whichever is greater, provided sectionalized doors are utilized.
   b. Side Yard: Five (5) feet minimum.
   c. Rear Yard: Twenty (20) feet minimum.
   d. From any property line abutting on a street of a corner lot ten (10) feet minimum, subject to the exceptions set forth in Chapter 18.64.040, of Title 18 of the Victorville Municipal Code titled "Zoning."

7) Garages: The placement and/or construction of garages shall comply with yard requirements for a main building. Detached garages may be placed or constructed any place within the required rear or interior side yard setback area.
8) Off-street parking in compliance with Chapter 18.60 of Title 18 of the Victorville Municipal Code titled "Zoning." Two (2) spaces are required for each dwelling unit, and shall be within a fully enclosed garage.

4. MLR - Medium-Low Residential District

a. Purpose and Intent

1) The MLR area is intended to allow for development of single family detached homes. The medium-low density residential category permits a density range of three (3) to five (5) dwelling units per gross acre.

b. Permitted Uses

The following principle uses are permitted in the Medium-Low Residential District:

1) Single family detached dwellings (one dwelling per lot).
2) Parks and open space areas, recreation centers and facilities and trails.
3) LR - Low Residential, provided at a minimum said development shall comply with all development standards of said Land Use District.
4) Utility facilities not subject to discretionary approval.
5) Uses and structures typically incidental or accessory to permitted residential uses as specified in Chapter 18.66 in Title 18 of the Victorville Municipal Code titled "Zoning."

c. Conditional Uses

The following principal uses are conditional in the Medium-Low Residential District and shall be permitted only if approved pursuant to Chapter 18.74 of the Victorville Municipal Code entitled "Conditional Uses."

1) Churches
2) Utility facilities that are subject to discretionary review.
3) Temporary structures and enclosures for use during construction activities (construction office) and model homes, model homes sales centers, and signs.

d. Accessory Uses

In addition to the general regulations governing accessory uses, the following specific limitations and special regulations shall apply to the Medium-Low Residential.

1) Recreational Vehicles may be stored on any developed single family residential lot in compliance with Section 18.16.040(2) of the Victorville Municipal Code.
2) The keeping of dogs, cats and birds shall be subject to the regulations set forth in the Victorville Municipal Code.
3) An accessory building may occupy part of a required rear yard and/or side yard along the interior side lot line. An accessory structure may be constructed to the property line of said rear and side yard provided that the roof system does not extend beyond the property line and shall meet all building code requirements;
4) No accessory building designated for use as servant's quarters or as guest house shall contain any kitchen or cooking facility;
5) Home occupations shall be permitted as approved by the Planning Commission pursuant to Section 18.66.020;
6) Child care not to exceed the child limits of a large family day care as specified in Title 22 of the California Administrative Code and licensed by the California Department of Social Services.
7) Home school of not more than eight children, provided not more than six children are from outside of the resident family, shall be allowed.

e. Site Development Standards

1) Building site area: Six thousand five hundred(6,500) square feet minimum.
2) Building site width: Sixty (60) feet minimum. Cul-de-sacs, knuckles and exterior curves on local streets shall comply with Chapter 17.48.090 of Title 17 of the Victorville Municipal Code titled "Subdivision."
3) Building site depth: Ninety-five (95) feet minimum.
4) Building site height: Thirty-five (35) feet maximum. No building shall have more than two and one half (2-1/2) stories.
5) Building site coverage: Forty (40) percent maximum for all buildings on the site.
6) Yard Requirements:
   a. Front Yard: Twenty (20) feet minimum from property line to garage door, except fifteen feet (15') minimum from the property is allowed where the residence is closer to the street than the garage. A minimum setback of twenty-seven feet (27') from the face of curb to the garage door; or eighteen feet (18') from the property line shall be required, whichever is greater, provided sectionalized doors are utilized.
   b. Side Yard: Five (5) feet minimum.
   c. Rear Yard: Fifteen (15) feet to property line.
   d. From any property line abutting a street of a corner lot, ten (10) feet minimum, subject to the exceptions set forth in Chapter 18.64.040, Title 18 of the Victorville Municipal Code titled "Zoning."
7) Off-street parking in compliance with Chapter 18.60 of Title 18 of the Victorville Municipal Code titled "Zoning." Two (2)

spaces are required for each dwelling unit, and shall be within a fully enclosed garage.

5. MR - Medium Residential District

a. Purpose and Intent

The MR District is intended to allow for development of single family detached: patio home, garden homes, cottage homes and attached: duplex homes. The medium density residential category permits a density range of four (4) to seven (7) dwelling units per gross acre.

b. Permitted Uses

The following principle uses are permitted in the Medium Density Residential District:

1) Single family dwellings (detached, one dwelling per lot or attached, two dwellings per lot.)
2) Parks and open space areas, recreation centers and facilities and trails.
3) MLR - Medium Low Residential, provided at a minimum said development shall comply with all development standards of said Land Use District.
4) Utility facilities not subject to discretionary approval.
5) Uses and structures typically incidental or accessory to permitted residential uses as specified in Chapter 18.66 in Title 18 of the Victorville Municipal Code titled "Zoning."

c. Conditional Uses

The following principal uses are conditional in the Medium Density Residential District and shall be permitted only if approved pursuant to Chapter 18.74 of the Victorville Municipal Code entitled "Conditional Uses."

1) Churches
2) Day care.
3) Community Club House
4) Utility facilities that are subject to discretionary review.
5) Temporary structures and enclosures for use during construction activities (construction offices) and model homes, model homes sales centers and signs.

d. Accessory Uses

In addition to the general regulations governing accessory uses, the following specific limitations and special regulations shall apply to the Medium Density Residential.

1) Recreational Vehicles may be stored on any developed single family residential lot in compliance with Section 18.16.040(2) of the Victorville Municipal Code.
2) The keeping of dogs, cats and birds shall be subject to the regulations set forth in the Victorville Municipal Code.
3) An accessory building may occupy part of a required rear yard and/or side yard along the interior side lot line. An accessory structure may be constructed to the property line of said rear and side yard provided that the roof system does not extend

beyond the property line and shall meet all building code requirements;

4) No accessory building designated for use as servant's quarters or as guest house shall contain any kitchen or cooking facility;]
5) Home occupations shall be permitted as approved by the Planning Commission pursuant to Section 18.66.020;
6) Child care not to exceed the child limits of a large family day care as specified in Title 22 of the California Administrative Code and licensed by the California Department of Social Services.
7) Home school of not more than eight children, provided not more than six children are from outside of the resident family, shall be allowed.

e. Site Development Standards

1) Building site area: Four thousand (4,000) square feet minimum.
2) Building site width: Forty (40) feet minimum. Cul-de-sacs, knuckles and exterior curves on local streets shall comply with Chapter 17.48.090 of Title 17 of the Victorville Municipal Code titled "Subdivision."
3) Building site depth: Ninety (90) feet minimum.
4) Building site height: Thirty-five (35) feet maximum. No building shall have more than two and one half (2-1/2) stories.
5) Building site coverage: Fifty (50) percent maximum for all buildings on the site.
6) Yard Requirements:
   a. Front Yard: Twenty feet (20') minimum from property line to garage door, except fifteen feet (15') minimum from the property line is allowed where the residence is closer to the street than the garage. A minimum setback of twenty-seven feet (27') from the face of curb to the garage door; or eighteen feet (18') from the property line shall be required, whichever is greater, provided sectionalized doors are utilized
   b. Side Yard: Five (5) feet minimum.
   c. Rear Yard: Fifteen (15) feet minimum.
   d. From any property line abutting a street of a corner lot, ten (10) feet minimum, subject to the exceptions set forth in Chapter 18.64.040, Title 18 of the Victorville Municipal Code titled "Zoning."
7) Off-street parking in compliance with Chapter 18.60 of Title 18 of the Victorville Municipal Code titled "Zoning". Two (2) spaces are required for each dwelling unit, and shall be within a fully enclosed garage.

G. COMMERCIAL USES AND STANDARDS

1. General

a. All development plans to be reviewed by the City pursuant to Chapter 18.71 of the Victorville Municipal Code titled "Site Plan."

2. General Commercial District

a. Purpose and Intent

The purpose of these provisions is to regulate the design and development of projects of a commercial nature in the designated Specific

Plan area. It is also the intent of this section to permit a variety of compatible uses and facilities supportive of the residential uses within the Specific Plan area and of the general community.

b. Permitted Uses

All uses shall be conducted within a completely enclosed building, however, the open storage of materials, products and equipment is allowed if approved pursuant to Chapter 18.74 of Title 18 of the Victorville Municipal Code entitled "Conditional Uses".

The following principal uses are permitted in the General Commercial District:

1) Any uses permitted in the C-1 District; Chapter 18.28 of Title 18 of the Victorville Municipal Code titled "Zoning."
2) Any uses permitted in the C-2 District; Chapter 18.30 of Title 18 of the Victorville Municipal Code titled "Zoning."
3) Churches.
4) Day care.
5) Parks/Playgrounds, Outdoor Recreation.
6) Watershed, Drainage Swales and/or Retention/Detention Basins.

c. Conditional Uses

The following principal uses are conditional in the Commercial District and shall be permitted only if approved pursuant to Chapter 18.74 of the Victorville Municipal Code entitled "Conditional Uses ".

1. Any conditional use enumerated in the C-1 District; Chapter 18.28 of Title 18 of the Victorville Municipal Code titled "Zoning".

2. Any conditional use enumerated in the C-2 District; Chapter 18.28 of Title 18 of the Victorville Municipal Code titled "Zoning".

H. OVERLAY DISTRICT

1. ARO - Adult Residential Overlay District

a. The purpose of the ARO - Adult Residential Overlay District provides development flexibility to meet market demands of adult residential communities. The Medium Density Residential category permits a density range of four (4) to seven (7) dwelling units per gross acre.

b. Permitted Uses

The following principle uses are permitted in the Adult Residential Overlay District:

1) Single family dwellings (detached, one dwelling per lot or attached, two dwellings per lot.)
2) Parks and open space areas, recreation centers and facilities and trails.
3) Utility facilities not subject to discretionary approval.
4) Uses and structures typically incidental or accessory to permitted residential uses as specified in Chapter 18.66 in Title 18 of the Victorville Municipal Code titled "Zoning".

c. Conditional Uses

The following principal uses are conditional in the Medium Density Residential District and shall be permitted only if approved pursuant to Chapter 18.74 of the Victorville Municipal Code entitled "Conditional Uses ".

1) Churches
2) Community Club House
3) Utility facilities that are subject to discretionary review.
4) Temporary structures and enclosures for use during construction activities (construction offices) and model homes, model homes sales centers and signs.

d. Accessory Uses

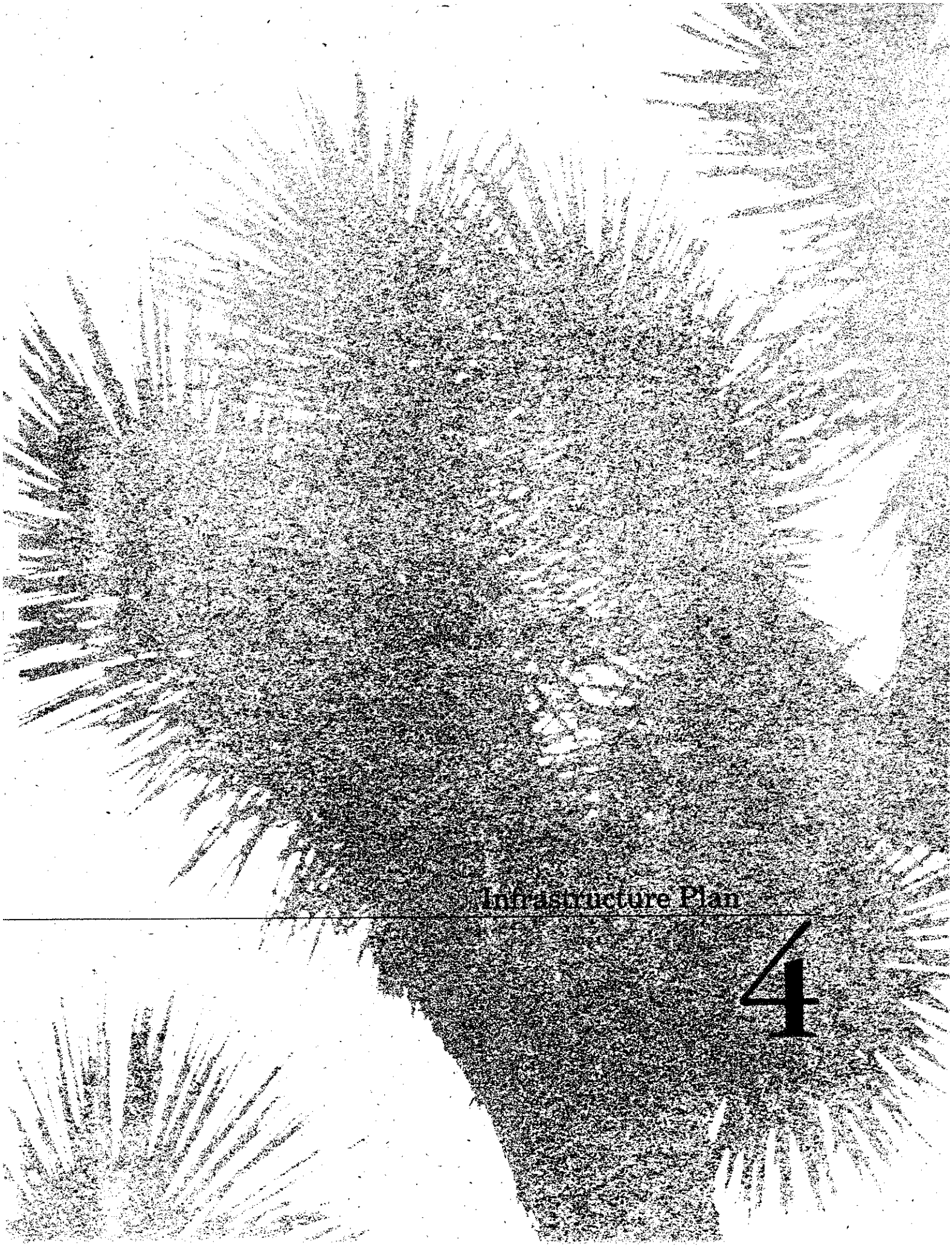
In addition to the general regulations governing accessory uses, the following specific limitations and special regulations shall apply to the Medium Density Residential.

1) Recreational Vehicles may be stored on any developed single family residential lot in compliance with Section 18.16.040(2) of the Victorville Municipal Code.
2) The keeping of dogs, cats and birds shall be subject to the regulations set forth in the Victorville Municipal Code.
3) An accessory building may occupy part of a required rear yard and/or side yard along the interior side lot line. An accessory structure may be constructed to the property line of said rear and side yard provided that the roof system does not extend beyond the property line and shall meet all building code requirements;
4) No accessory building designated for use as servant's quarters or as guest house shall contain any kitchen or cooking facility;
5) Home occupations shall be permitted as approved by the Planning Commission pursuant to Section 18.66.020.

e. Site Development Standards

1) Building site area: Four thousand (4,000) square feet minimum.
2) Building site width: Fifty (50) feet minimum. Cul-de-sacs, knuckles and exterior curves on local streets shall comply with Chapter 17.48.090 of Title 17 of the Victorville Municipal Code titled "Subdivision".
3) Building site depth: Eighty (80) feet minimum.
4) Building site height: Thirty-five (35) feet maximum. No building shall have more than two and one half (2-1/2) stories.
5) Building site coverage: Fifty (50) percent maximum for all buildings on the site.
6) Yard Requirements:
   a. Front Yard: Seventeen (17) feet minimum from property line. Garage doors shall be sectionalized for all front yard setbacks less than twenty (20) feet. Fifteen (15) feet where residence is closer to street than garage.
   b. Side Yard: Five (5) feet minimum.
   c. Rear Yard: Ten (10) feet minimum.
   d. From any property line abutting a street of a corner lot, ten (10) feet minimum, subject to the exceptions set forth in Chapter 18.64.040, Title 18 of the Victorville Municipal Code titled "Zoning".
7) Off-street parking in compliance with Chapter 18.60 of Title 18 of the Victorville Municipal Code titled "Zoning". Two (2) spaces are required for each dwelling unit, and shall be within a fully enclosed garage.

8) Conformance with California Civil Code 51.3: The living environment and services for adult housing at Foxfire Ranch, within this section shall conform to standard and criteria set forth in California Civil Code Section 51.3.
9) PUD Requirement: Residential building sites and uses of land within the Adult Residential Overlay District shall require an approved PUD pursuant to Chapter 18.49 of Title 18 of the Victorville Municipal Code titled "Zoning", prior to securing a building permit.



Infrastructure Plan

4

4 Infrastructure Plan

• Circulation

Area Wide Concept

The circulation plan provides the transportation system and basic standards for safe, efficient vehicular movement within and around the project area. This plan consists of alignments for arterials and collector roadways and their rights-of-way, and typical roadway sections (Refer to Exhibits 12 and 13).

The circulation plan has been developed based on the ultimate buildout of the Foxfire Ranch *community*.

Circulation System

Circulation within the Foxfire Ranch community will be provided by a roadway system keyed to the existing street system and based upon ultimate circulation patterns depicted on the General *Plan's* circulation map.

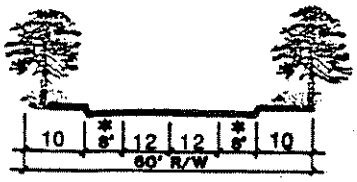
Emphasis is placed upon providing the primary access routes to link the various neighborhoods with *Palmdale Road, La Mesa Road, Amethyst Road, and Highway 395 (Super Arterial) with* the existing I-15 and SR 395 interchanges. The backbone of the Foxfire Ranch Circulation System consists of major arterials, collector roadways containing vehicular and non-vehicular functions. Roadway classifications include major arterials, collectors and local streets. A series of pedestrian pathways can reinforce the roadway system through the provision of minor intercommunity pedestrian loops.

The following describes the characteristics of the various roadway classifications which are part of the Specific Plan *Circulation* System:

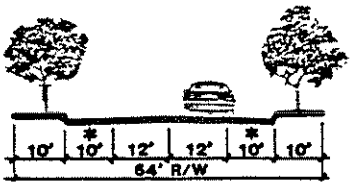
Major arterials: Major arterials service the immediate vicinity of the site for through traffic and provide linkages from super arterials, arterials and collectors to the regional transportation corridors. Amethyst Road, which runs north/south through the eastern portion of the project site, will be improved to its 100 foot right of way or a minimum of four travel lanes reflecting its major arterial status as designated on the current General Plan Circulation Map. The roadway section for Amethyst Road would allow for a 10 (ten) foot median within the project site area. It is proposed that no on-street parking or individual driveways are allowed on either side of this major arterial.

Collectors: Collectors service the primary areas of the project and links Foxfire Ranch to the regional transportation corridors. The collectors will have a 64-foot right-of-way to accommodate vehicular activity or a minimum of two travel lanes. The collector roads, as shown on Exhibit 13, allow east/west and north/south traffic.

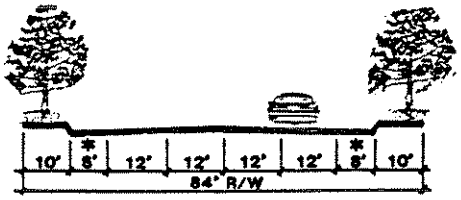
LOCAL STREET



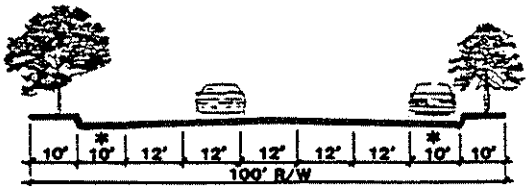
COLLECTOR



ARTERIAL



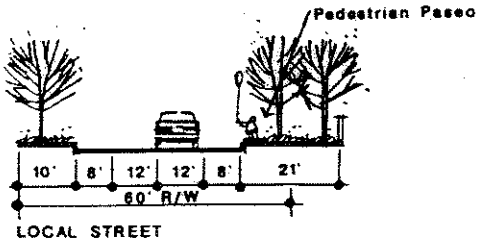
MAJOR ARTERIAL



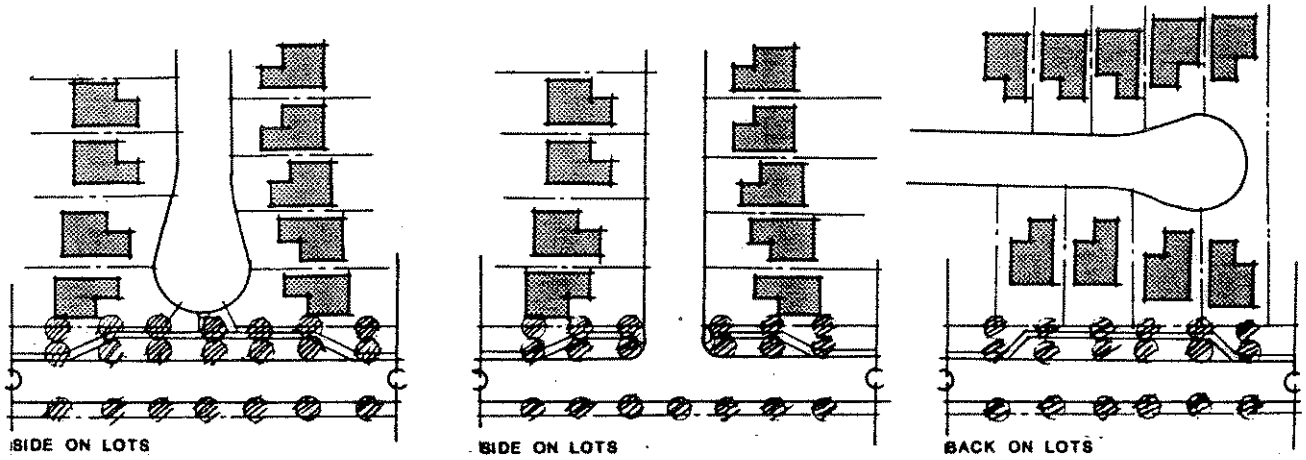
KALEIDOSCOPE

Not To Scale

ROADWAY STANDARDS



Section

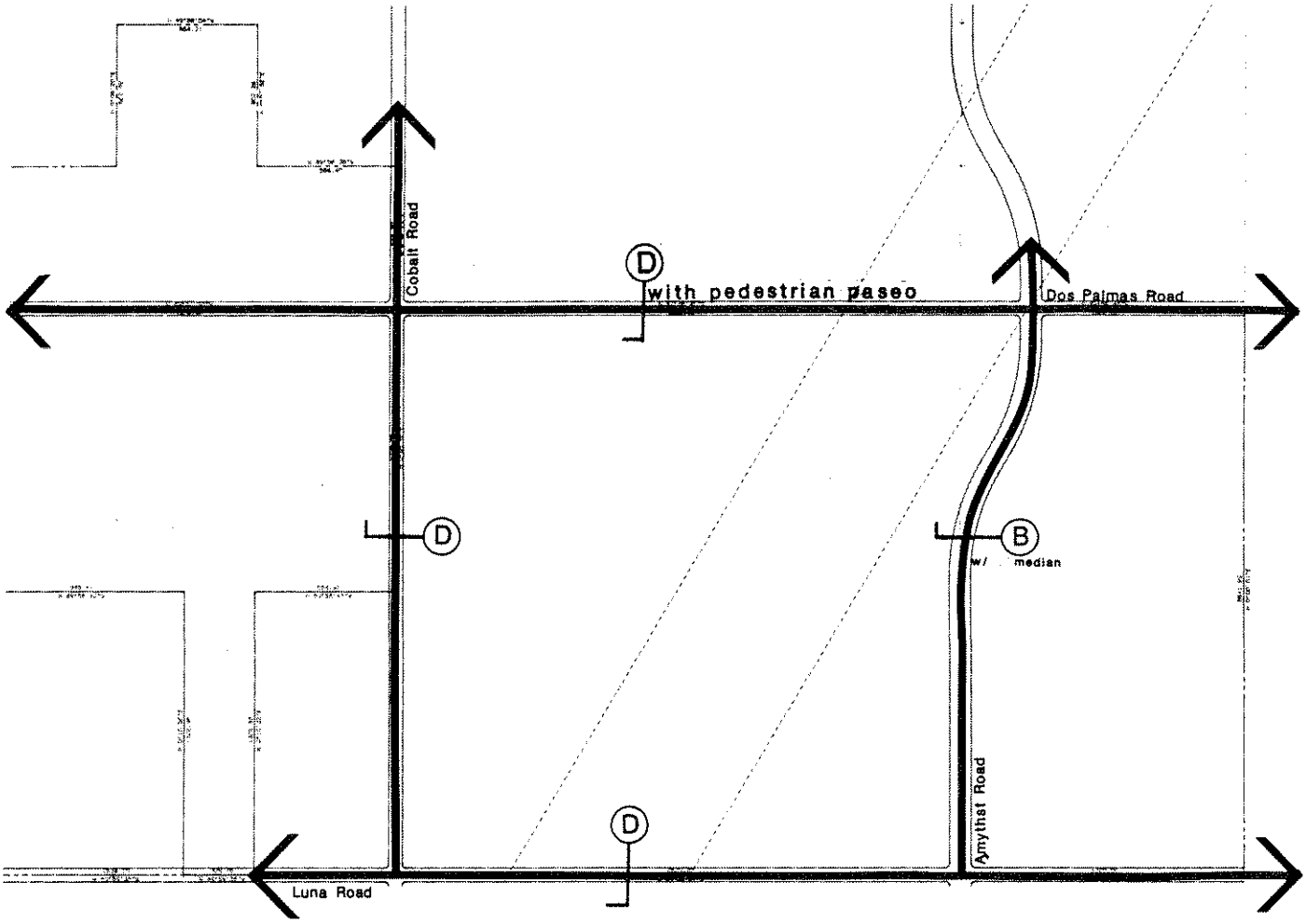


Plan

KALEIDOSCOPE

Not To Scale

PASEO SECTIONS/PLANS



KALEIDOSCOPE

North ▲ Not To Scale

CIRCULATION

B	MAJOR ARTERIAL
C	ARTERIAL
D	COLLECTOR

Luna Road, an east/west collector runs along the southern boundary of the project. It will be improved to half its 64 foot right-of-way, adjacent to the project. Dos Palmas Road, also an east/west collector, generally runs within the project site and will be improved to its 64-foot right of way and half its 64-foot right-of-way where it is adjacent to the project. Cobalt Road, a north/south collector generally runs along the western portion of the project. It will be improved to half its 64-foot right-of-way where it is adjacent to the project and improved to its 64-foot right-of-way where it occurs within the project.

Local Streets: Local streets will service each residential neighborhood within the project and are designed with a 60-foot right-of-way or a minimum of two travel lanes to accommodate automobiles and pedestrians.

Several local streets within the project will incorporate as a secondary paseo as shown on Exhibit 10a. - Pathway Network. In conjunction with the standard right of way, an additional 11-foot landscape area (one side of road) will also be offered for dedication. A 6-foot meandering pedestrian pathway will be located within this landscape area. The secondary paseo will work in combination with local streets to provide for pedestrian circulation. Within the Foxfire Ranch project, the secondary paseo and local streets will link various neighborhoods with the primary pedestrian paseo along Dos Palmas Road and the Los Angeles Department of Water and Power (LADWP) easement. Access points to the LADWP easement will be provided and will be a minimum of 10 feet wide with landscaping. Residential lots that are adjacent to the secondary paseo are allowed to front on, side on (in combination with a local street), side on (in combination with an existing cul-de-sac) and/or back on, or a combination of the aforementioned. A maximum of one third (1/3) of the units located adjacent to the secondary paseo are allowed to be backed on. However, the one third (1/3) can be exceeded by the applicant with supporting information, which will be reviewed and approved by the Planning Commission to ensure land use compatibility. All residential units adjacent to a secondary paseo shall be single story.

Circulation Analysis

The following is a brief summary of the Circulation Analysis prepared by Kunzman Associates (revised April 1993) for the Foxfire Ranch Specific Plan. Based on information provided by the City of Victorville, a seven percent (7%) growth rate was utilized to a 1999 target year.

A level of service was used as the basis for roadway selection determination unless modified by the City Engineer. The Circulation System within the Foxfire Development follows the City of Victorville's Circulation Plan. The Circulation Analysis shows that Amethyst Road is a major arterial, Dos Palmas Road, Luna Road, and Cobalt Road are collector streets (Refer to Exhibit 13, Circulation).

The study recommends that the City monitor the key intersections in the vicinity of the site for warrants for traffic signals as development within the surrounding area occurs. This way the development of the roadway system can parallel the development of the project area and the surrounding areas providing for gradual expansion in both building construction and public improvements. It will also help the City avoid installation of unwarranted traffic signals. As an example, fees could be collected from the various developers to be applied towards specific master planned improvements, i.e., traffic signals which are projected to be warranted due to the accumulated traffic volumes from numerous developed areas. The City could then contract for their construction at such time as they are warranted.

• Public Works

Introduction

Future demand for residential opportunities in Foxfire Ranch, as well as other residential communities in the western portion of the City of Victorville, call for a systematic plan for the provision of public services. The Public Works Component addresses these needs relative to the future development of the project site and illustrate the possible methods and mechanisms through which public services can be provided.

The infrastructure systems are designed to provide adequate service for the maximum level of planned development. In the case of sewer and other utilities where major off-site improvements are required to properly serve the ultimate development, interim facilities may be able to serve the limited phases of development.

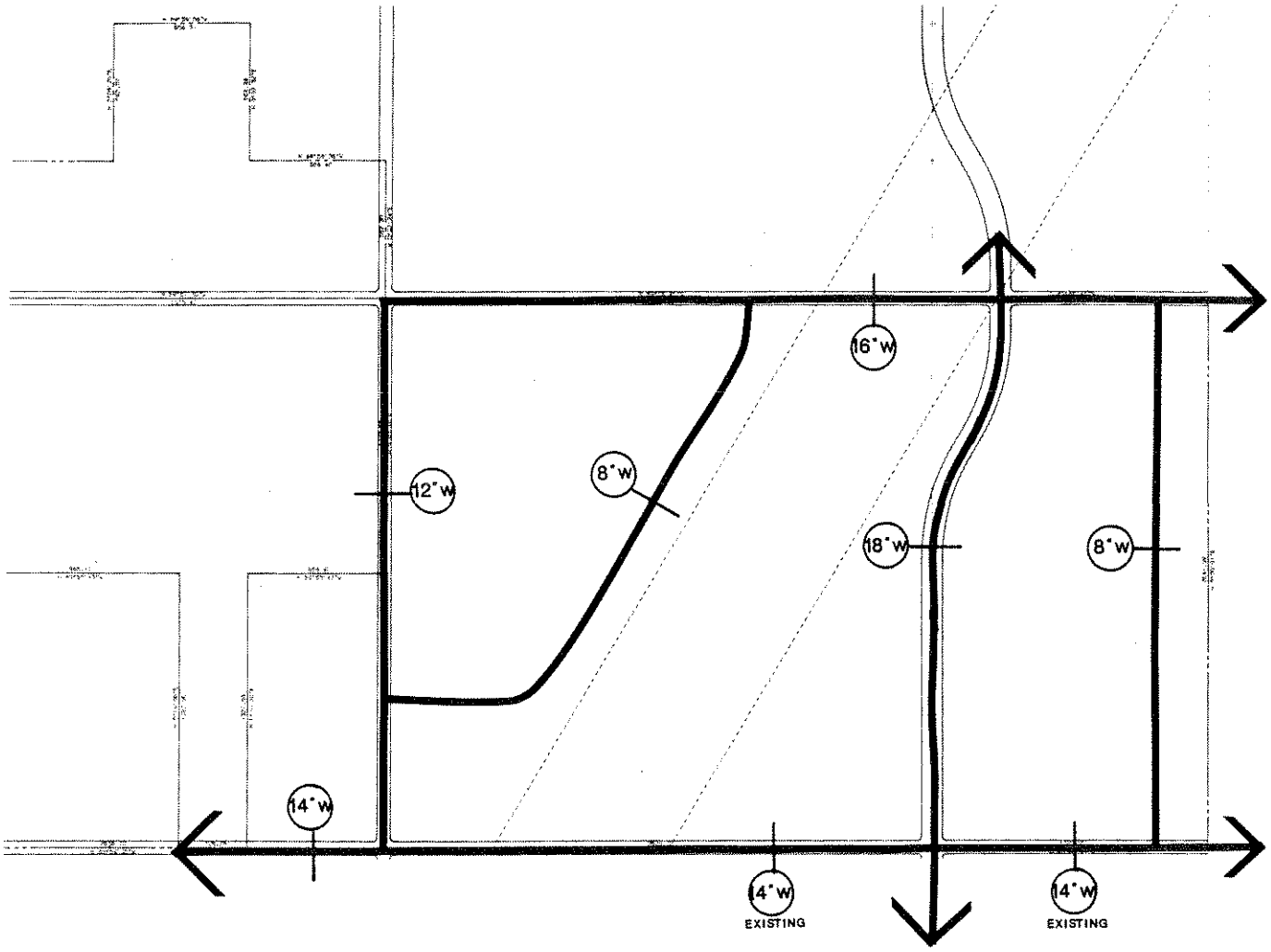
Water Service Concept Plan

Domestic water will be supplied to the residents of Foxfire Ranch by the Victor Valley County Water District. The VVCWD has a water facilities Master Plan and a related capital facilities assessment district which includes the entire Specific Plan area. The concept for the water system is shown in Exhibit 14.

The Water District (VVCWD) will fund or assist in funding all water service facilities lines greater than 12" in diameter which will be constructed through the project area. The Water District will also include all wells, storage and other transmission lines necessary to provide adequate domestic service as well as fire protection levels for all proposed land uses. Proposed pressures are more than adequate for the entire project site. In addition to the Master Planned transmission lines, 8" service mains will generally follow the major street system as established in the Fox Fire Ranch Circulation Plan. Sizing of the mains will be adjusted in response to different land use intensities within the service area.

Implementation

An Assessment District and/or use of other appropriate, approved methods, will provide financing for the master planned facilities. Any assessments are to be based on an acreage fee determined by spreading the estimated costs over the area of benefit.



KALEIDOSCOPE

North ▲ Not To Scale

WATER CONCEPT PLAN

12"w WATER PIPE DIAMETER

MASTER PLANNED MAIN

Sewer System Concept Plan

The Victor Valley Wastewater Reclamation Authority (VVWRA) will provide wastewater treatment service for the project site. It is a regional sewerage facility whose service area includes the Victorville Sanitary District. The VVWRA receives sewage from the Sanitary District's local collector system which connects to the VVWRA interceptor pipeline at two points along the Mojave River. The regional facility is located approximately seven miles north of Victorville at the north end of Shay Road adjacent to the Mojave River. This plant is currently operating at its allowable capacity of 4.8 million gallons per day (MGD). A 3.5 MGD expansion will be completed soon. However, this expansion is projected to be at capacity in approximately five years based on the current rate of growth in Victor Valley. Currently, the VVWRA Master Plan is being updated.

The recommended in-street extension of lines will serve as the backbone system for sewage collection within the project site as shown on Exhibit 15. This plan locates the ultimate on-site gravity system to service the needs of the entire project site. The on-site facilities would consist of minimum 8 inch or larger sewer lines. The sewer collection system will discharge the flow from the project to the northeastern corner, at Dos Palmas Road, following the general slope of the site.

Because a sewer connection to the existing public system does not exist at the discharge point, extension of off-site sewers will be required. The concept for the off-site sewer system is shown in Exhibit 16.

The sizing of the off-site trunk line would be a function of the area to be served. A Master Off-site Sewer Plan (Exhibit 15) has been prepared by C G Engineering in conjunction with Valley Spring and Mesa Verde Specific Plans.

Implementation

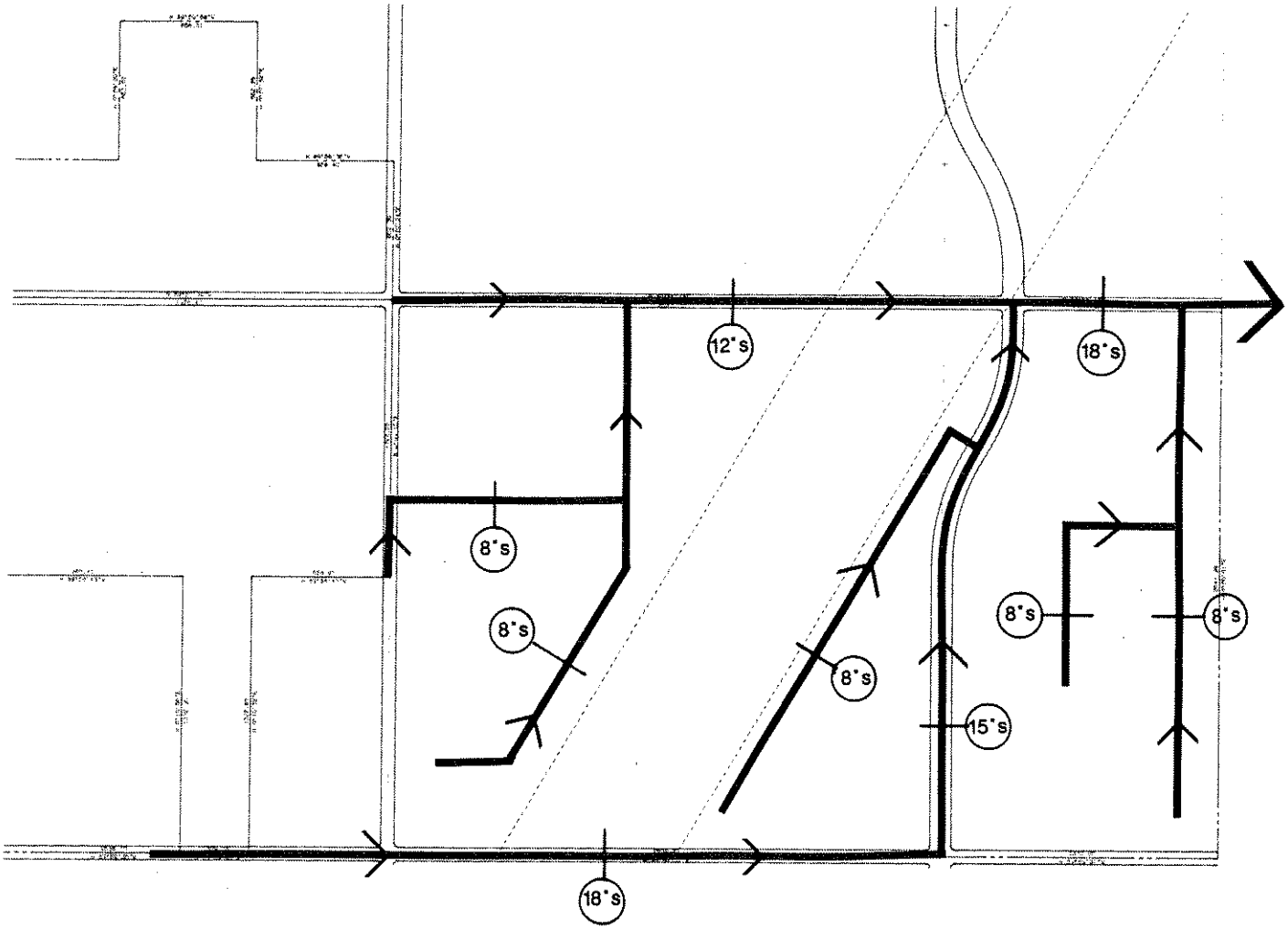
Exhibit 16 provides an off-site backbone system for the project area. As development plans are completed for the planning area, additional in-tract systems will be required to provide the sewer collection for the residences. All systems would be completed in accordance with standards of the City of Victorville.

The off-site improvements between Mojave Drive and the connection point near Village Drive and from Dahlia Road to Dos Palmas Road are to be undertaken in conjunction with the City to serve as Master Plan facilities. By this approach, the city will ensure control of the sizing, the areas to be served, and the final alignment to benefit the largest area on the western side of the City.

Financing of the off-site sewer facilities would be required through the various western area developers to provide the funding to complete the design and construction of the facilities. A reimbursement agreement based on pro-rata share can be executed between the various developers and the City of Victorville. Upon new developments or other users connecting and utilizing capacity in the trunk line, fees would be levied by the City upon these users. The costs for financing their proportionate share of the improvements would be returned to the developers.

The following conditions of approval may be recommended to be adopted for subdivision maps which establish individual lots for construction of buildings. These conditions may be waived by the City on a case-by-case basis.

1. Prior to recordation of the final subdivision map, the City Engineer shall certify that financial arrangements and agreements necessary for sewer services for this subdivision have been entered into with the City of Victorville.



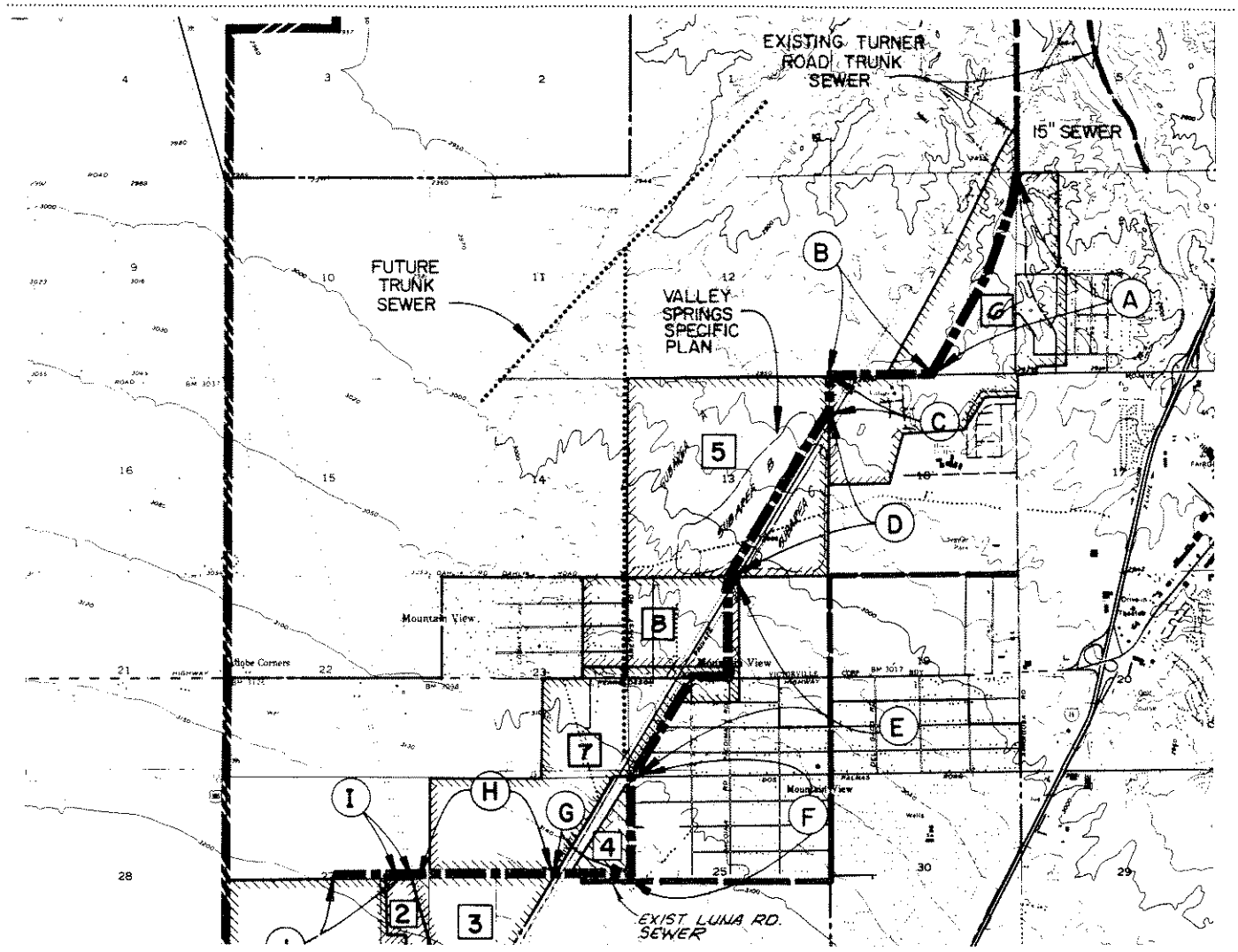
KALEIDOSCOPE

North ▲ Not To Scale

SEWER CONCEPT PLAN

PROPOSED TRUNK LINE

DIRECTION OF FLOW



OFF-SITE SEWER PLAN

2. No occupancy permits for any dwelling unit, except for model homes, shall be issued until sewage collection and conveyance facilities adequate for the subdivision are determined to be completed and operational by the City of Victorville. Within two years following the construction of a model home or the conveyance of such model home from the builder to an occupant, whichever shall occur first, said model home shall be connected to the community sewer service.

Drainage Concept Plan

The project site encompasses flat unimproved land which has a downward slope toward the northeast. Of the 217 acres, a 750-foot wide utility corridor of approximately 50 acres traverses the site from southwest to northeast. A moderate size gully exists within the utility corridor which accepts existing and developed flows from the south and west. Runoff from storms generally traverses the project in the utility corridor, or sheet flow into the existing county road system north and east of the project site.

The project incorporates drainage in several ways. The proposed street system, when constructed, will provide certain drainage controls to intercept and direct the street flow runoff from the proposed improved properties. The street pattern and open space utility corridor accommodates these drainage patterns. Conveyance of the storm runoff north to Dos Palmas Road will allow discharge into the existing drainage pattern. Splitting flow patterns in Cobalt Road, the utility corridor, Amethyst Road and San Mateo Road will minimize the effects of concentration.

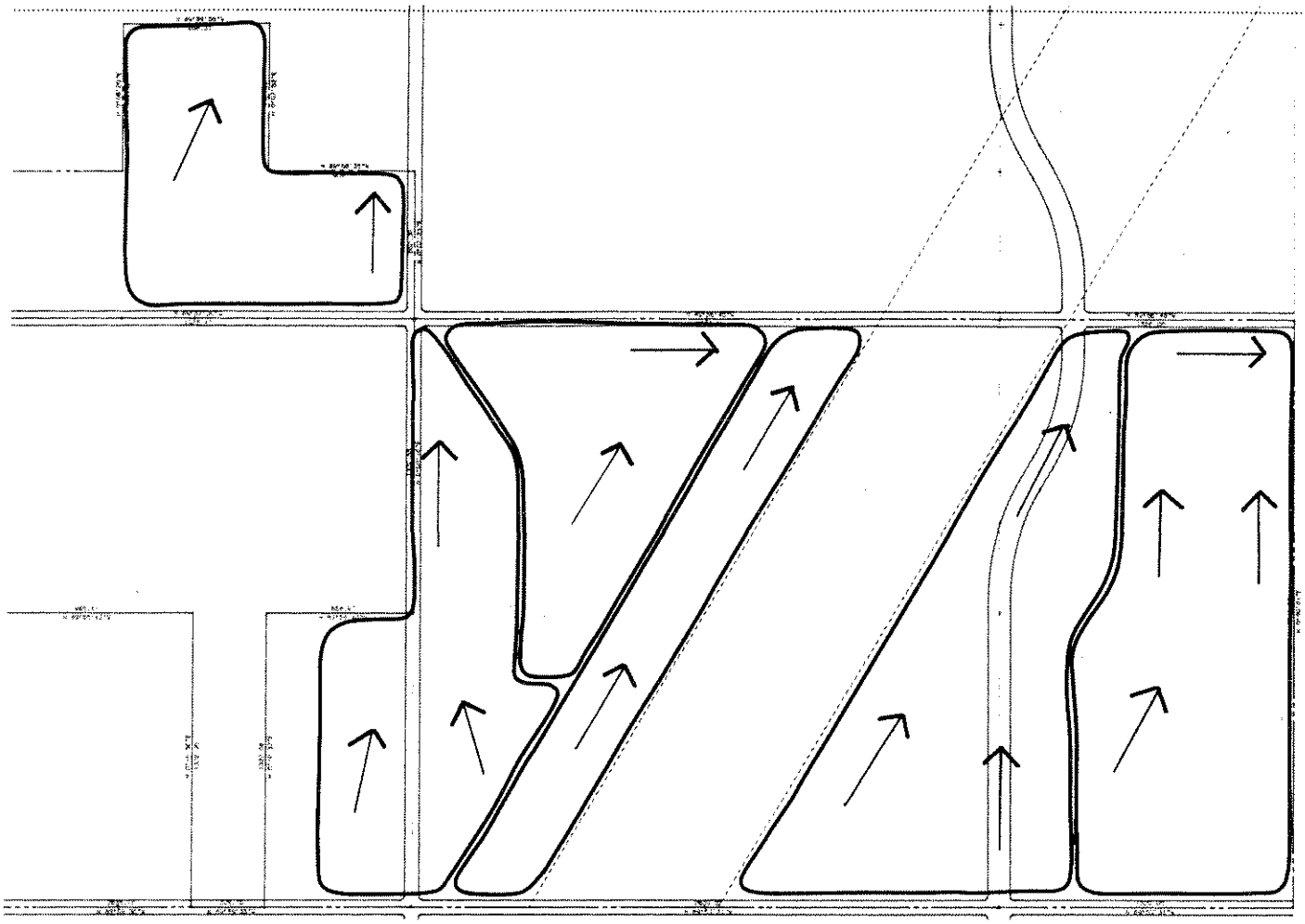
Off-site drainage conveyance will be in accordance with the Master Drainage Plan for Victorville being prepared by the San Bernardino County Flood Control District, and in a manner acceptable to the City of Victorville Engineering Department.

Implementation

Construction of the drainage improvements as shown in Exhibit 17 is necessary for the development of Foxfire Ranch. These drainage improvements and in-tract improvements needed for each subdivision will be constructed on an incremental basis, provided that the increased runoff is not allowed to adversely affect down stream properties.

Other Utilities

The Foxfire Ranch project lies within the service areas of Southern California Edison Company (electricity), Southwest Gas Corporation (natural gas), Continental Telephone of California (telephone), High Desert Cable Vision and Total TV (television cable) and Victorville Disposal, Inc. (solid waste). This utility network can be expanded to meet future demands of the project. All future utility line additions are proposed to be placed underground.



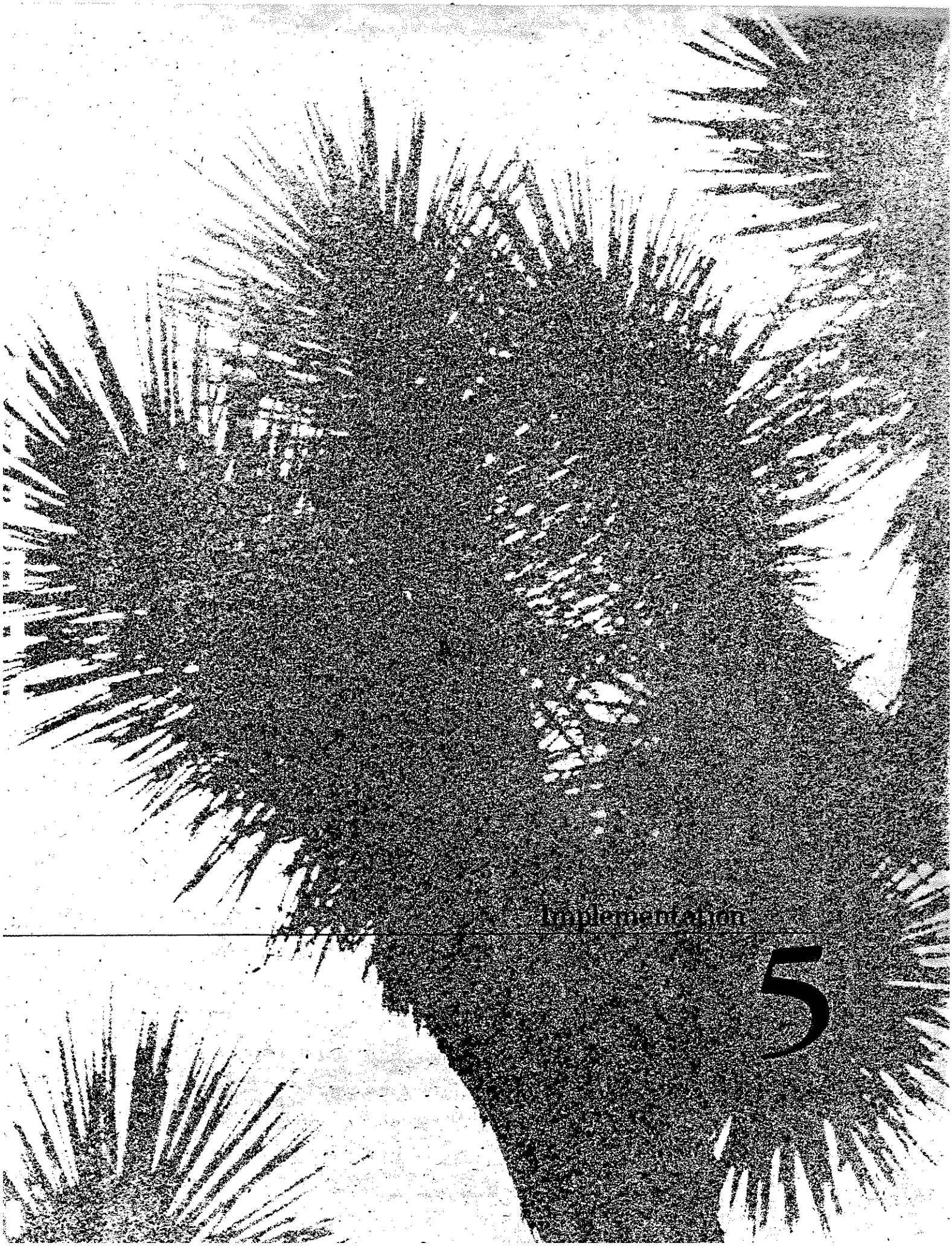
KALEIDOSCOPE

North ▲ Not To Scale

DRAINAGE CONCEPT PLAN

SUB AREA
DRAINAGE BOUNDARY

DIRECTION OF FLOW



Implementation

5

5 Implementation Measures

• Density Transfer

Introduction The Foxfire Ranch Specific Plan shall be implemented through Parcel, Tentative Tract and Final Maps pursuant to Title 17 of the Victorville Municipal Code titled "Subdivision" and Site Plan Review procedures pursuant to Chapter 18.71 of Title 18 of the Victorville Municipal Code titled "Zoning". The review procedures and requirements associated with each are specified below.

The Parcel Map, Tentative Tract Map and Site Plan review procedures are used to accomplish the objective of providing a logical and timely sequence of community and governmental review and input. The purpose of the Parcel Map, Tentative Tract Map is to provide a method and procedure to analyze and evaluate the significant features within Foxfire Ranch, to assure compliance with the provisions contained within this Specific Plan. The purpose of the Site Plan Review is to establish the procedure of review of any attached, multi-family residential. The Site Plan Review is also intended to assess on an on-going basis any impacts of this development project on the surrounding community.

A. GENERAL PROVISIONS

1. TRANSFERS OF DWELLING UNITS/RESIDENTIAL OVERLAY

Transfers of dwelling units between parcels and the residential overlay areas within Foxfire Ranch shall be permitted, and shall be subject to review and approval by the Planning Commission if they exceed the overall specific maximum density range. The following findings shall be made in administering such transfers and residential overlay:

a. The total number of dwelling units within Foxfire Ranch does not exceed 915.

b. The proposal is consistent with the criteria specified in this Specific Plan.

c. There are no material impacts to the Fox Fire Ranch circulation system of a nature which would necessitate amendments to the roadway cross sections.

d. There are no material impacts to surrounding planning areas, beyond those previously identified as part of this Specific Plan.

e. The transfer and/or residential overlay in question complies with all other provisions of this Specific Plan, except as noted above, and the resultant densities are consistent with the overall character of development envisioned as part of this Specific Plan.

- **Application Process**

B. LAND DIVISION REVIEW PROCEDURES

The Foxfire Ranch Specific Plan shall be implemented through the Parcel Map, the Tentative Tract Map, and Site Plan Review process as noted herein.

1. PARCEL MAP

A Parcel Map is intended for parcelization and financing purposes. It addresses only large parcels and is intended to facilitate the construction of the model home complexes. Conditions of approval for this Specific Plan, or any other plan or program, may not apply to this map. The Parcel Map submittal shall meet all requirements stipulated by the Subdivision Map Act and Title 17 of the Victorville Municipal Code titled "Subdivision".

2. TENTATIVE TRACT MAP

A Tentative Tract Map, as applicable, shall be filed for all projects within Fox Fire Ranch, subject to the provisions as stipulated in Chapters 17.04 through 17.108 et seq. of the City of Victorville Municipal Code Subdivision Ordinance. After map approval, the final map may be recorded and building permits may be issued. This process may include the parcelization of large tracts or lots for future use as residential development or cluster residential development site. Submittal requirements shall be as specified in the Victorville Municipal Codes.

C. PARCEL/TENTATIVE TRACT MAP REVIEW REQUIREMENTS

1. GENERAL PROVISIONS

Parcel and Tentative Tract Maps, and their review shall comply with the review requirements established in Title 17 of the Victorville Municipal Code titled "Subdivision". It is intended that Preliminary Plans include plans, programs, and other documentation and information per Chapter 17.61 of the Victorville Municipal Code titled "Subdivision" necessary to implement the provisions of this Specific Plan. Such information may be beyond the typical requirements for submittal of a Tentative Tract Map, as specified in Chapter 17.20 of the City's Subdivision Code.

A Parcel Map or large lot Tentative Tract Map may be processed when it is solely intended to be used for parcelization and/or financial purposes, and is intended to facilitate model home complexes.

2. PARCEL/TENTATIVE TRACT MAP SUBMITTALS

A Parcel or Tentative Tract Map, as applicable, shall be filed for all projects within "Foxfire Ranch" subject to the provisions as stipulated in the Victorville Municipal Codes.

Project data may be submitted as a part of a Preliminary Plan review process per Chapter 17.16 of Title 17 of the Victorville Municipal Code titled "Subdivision". After map approval, the Final Map may be recorded and building permits may be issued.

3. PARCEL/TENTATIVE TRACT MAP REVIEW PROCEDURE

The Parcel/Tentative Tract Map review process involves two steps: the pre-application conference and Tentative Tract Map submission review and approval.

a. Pre-application Conference

This is intended to provide the Planning Department with knowledge about the developer's intent and to provide the developer an understanding of what is required to develop under the Fox Fire Ranch Specific Plan. There are no particular requirements for submission of materials and plans by a developer at a pre-application conference. However, the more information the developer has, the more response he may get from the conference. Staff shall explain all relevant City Ordinances and Codes which relate to the Specific Plan.

Another function of the pre-application conference is to determine levels of information necessary to implement satisfactorily all provisions of this Specific Plan. Further, submittal and review schedules, meeting statutory, staff and workload requirements, shall also be established as part of the pre-application conference.

The Director of Planning may choose to form a pre-application conference team which routinely conducts this function. This team may include members of the planning staff, and others from related departments such as engineering, public works, traffic, and police and fire, and the City Manager's office.

b. Parcel/Tentative Tract Map Submission

All Parcel/Tentative Tract Map review requirements contained in City of Victorville Municipal Code Chapter 17.04 through 17.108, Subdivisions, shall apply upon formal submittal of a Parcel/Tentative Tract Map.

A Development Plan may be required as part of the Tentative Tract approval process and as contained in Chapter 17.23 of the City of Victorville Municipal Code titled "Subdivision".

D. SITE PLAN REVIEW REQUIREMENTS

1. GENERAL PROVISIONS

The purpose of the Site Plan Review process is to provide for review of detailed final plans for apartments, town homes, condominiums, and non-residential development within the Foxfire Ranch Specific Plan Area. This process assures that projects will be planned, established, and maintained in a manner that will be compatible with surrounding uses. It is further intended to assure compliance with all provisions of this Specific Plan. No development or construction, other than minor repairs which do not alter the physical or architectural characteristics of a structure shall be undertaken unless a site plan and related documents have been submitted to and approved by the City of Victorville in accordance with its established review procedures.

2. SITE PLAN SUBMITTALS

Project data may be submitted in conjunction within a Site Plan application. The exact format, content and order of project data shall be determined in consultation with the City of Victorville prior to submittal and as outlined within the Victorville Municipal Codes.

3. SITE PLAN REVIEW PROCEDURES

All Site Plans shall be submitted, reviewed and approved pursuant to Chapter 18.71 of Title 18 of the Victorville Municipal Code titled "Site Plan".

The Site Plan Review process involves two steps: the pre-application conference, and Site Plan submission for staff review. These are described further below.

a. Pre-application Conference

Those procedures specified in Section C-3-a, herein, shall apply.

b. Site Plan Submission for Staff Review

Those procedures as established by the City for the review of site plans shall apply (Chapter 18.71 Zoning).

E. ENFORCEMENT

Enforcement of these provisions shall be as stated below:

1. The Director of Planning shall have the duty to enforce the provisions of this Specific Plan.

2. Any use of a building or structure hereafter erected, built, maintained or used contrary to provisions of this Specific Plan, is deemed an illegal use.

3. Any person violating any provisions of this Specific Plan is guilty of a misdemeanor.

4. The Director of Planning shall have the duty to interpret the provisions of this Specific Plan where noted. All such interpretations shall be in writing and be permanently maintained. Any person aggrieved by the Director of Planning's interpretation may appeal that interpretation to the Planning Commission and if necessary to the City Council.

5. Unless otherwise specified all development within the Foxfire Ranch Specific Plan shall comply with the City of Victorville Municipal Codes. Terms used shall have the same meaning as defined in the City of Victorville Municipal Codes unless otherwise defined herein.

6. Any details or issues not specifically covered by this Specific Plan shall be subject to the regulations of the City of Victorville Municipal Codes.

7. All construction within the boundaries of the Specific Plan shall comply with all provisions of the Uniform Building Code and the various mechanical, electrical, plumbing, fire and security codes adopted by the City of Victorville.

8. If any regulation, condition, program or portion thereof of the Specific Plan is for any reason held invalid or unconstitutional by a court of competent jurisdiction, such portion shall be deemed a separate, distinct and independent provision and the invalidity of such provision shall not affect the validity of the remaining provisions hereof.

H. COMMUNITY FACILITIES AND OPEN SPACE:
CONSTRUCTION AND MAINTENANCE

Generally, the maintenance of all facilities designed for community wide public use such as parks, and/or detention/retention basins, paseos (local roadways) parkways (10-foot parkway buffer adjacent to eastern property boundary) and roadside planting belts (major arterials) may be funded through the creation of assessment districts. Facilities that are within detached or attached residential projects that are intended for residents of that project may be maintained by an homeowners' association. Land belonging to other private, public and quasi-public agencies will be maintained by the owners or through an assessment district if approved by that Agency and the City.

The areas identified in Exhibit 10a., and discussed within the Specific Plan which propose open space, as well as paseo and secondary paseos, shall be irrevocably offered for dedication to the City of Victorville prior to the recordation of any parcel or final map dividing land contained within the Foxfire Ranch Specific Plan.

• Municipal Finance Mechanisms

The following presents a summary of funding sources and mechanisms available for implementing the capital improvements proposed in the Foxfire Ranch Specific Plan.

The Foxfire Ranch Specific Plan may be implemented through a combination of public and private actions and investments. Both the public and/or private sectors may provide the infrastructure and other capital improvements of the plan. These include backbone roads, water, sewer and storm drainage improvements, public street lighting, special intersections, special streetscapes, open space, and maintenance.

A variety of funding sources are available for the implementation of the improvements proposed in the Foxfire Ranch Specific Plan. These improvements fall into three main categories:

- City of Victorville Capital Improvements Program
- Reimbursement Districts
- Assessment Districts

Each of these funding sources is briefly described below and is presented in greater detail in the Appendix.

City of Victorville Capital Improvements Program - The City of Victorville has a capital budget composed of funds from a variety of sources. All capital improvements must be approved as part of the City's annual budget. Some of the proposed capital improvements for Foxfire Ranch may be funded in this manner.

Reimbursement Districts - In the case of reimbursement districts, the developer enters into an agreement with the City whereby he will provide certain public improvements, at his expense, in the initial stages of the project. As further development occurs, the City

will assess the new projects which benefit from the original public improvements and reimburse the original developer.

Assessment Districts - In the case of an assessment district, liens are taken out against the properties upon which capital improvements are proposed. The bonds are held against these properties. Funds from the bonds are used to construct the capital improvements. As development occurs, the developers are assessed to repay the debt on the bonds. There are three specific types of assessment districts. These are:

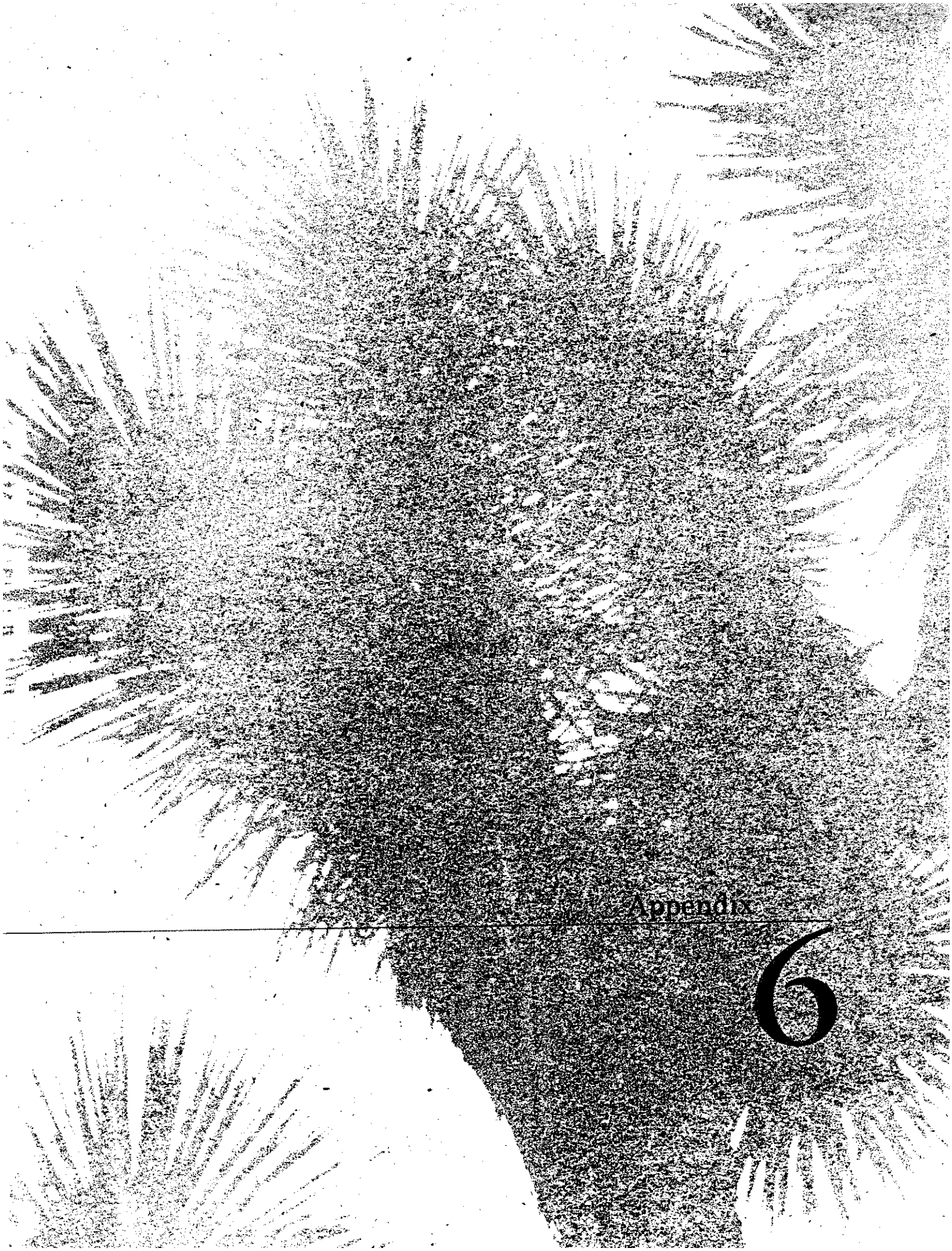
- The Improvement Act of 1911
- The Municipal Improvement Act of 1915
- The Improvement Bond Act of 1915
- Mello-Roos Community Facilities Act of 1982
- The 1972 Landscaping and Lighting Act

The 1911, 1913, and 1915 Acts operate similarly to the general description of assessment districts above.

The Mello-Roos provides for the establishment of a Community Facilities District to provide both public services and public capital facilities. Special taxes are levied against the area where the services and facilities are being provided.

The Landscaping and Lighting Act provides for the construction and planting of landscaping, lighting systems and materials, as well as the maintenance and operations costs for these elements within a specific district. Special assessments have been levied against the area where these improvements and maintenance occur.

Conclusion Upon approval of the Specific Plan by the Planning Commission and City Council, it is recommended that a feasibility study be initiated to establish a Foxfire Ranch Assessment District to fund selected improvements within the Specific Plan Area.



Appendix 6

Foxfire Ranch
Traffic Study
(Revised April 30, 1993)

Kunzman Associates
Transportation Planning • Traffic Engineering

Kunzman Associates
Transportation Planning • Traffic Engineering

April 30, 1993

Mr. Arthur Levine
Century Homes
1535 South "D" Street, Suite 200
San Bernardino, CA 92408

Dear Mr. Levine:

We are pleased to present this revised traffic impact analysis for the Foxfire Ranch development in the City of Victorville. This revision includes an update of existing conditions in the vicinity of the site and reflects the current land uses. We trust that the findings, which are listed in Section 1, will be of immediate as well as continuing value to you and the City of Victorville in evaluating the project's traffic impacts.

It has been a pleasure to serve your needs on this project. Should you have any questions, or if we can be of further assistance, please do not hesitate to call.

Sincerely,

KUNZMAN ASSOCIATES

Gary Hansen

Gary Hansen, P.E.
Expiration Date: 3-31-97

#1540e

cc: Steve Long

4650 Barranca Parkway • Irvine, CA 92714 • FAX (714) 559-0260 • Telephone (714) 559-4231

Foxfire Ranch
Traffic Study
(Revised April 30, 1993)

Kunzman Associates
Transportation Planning • Traffic Engineering

Table of Contents

Section — Page No.

1. Findings 2

   - Existing Traffic Conditions
   - Traffic Impacts
   - Mitigation Measures

2. Project Description 4

   - Location
   - Proposed Development

3. Existing Traffic Conditions 9

   - Surrounding Street System
   - Existing Travel Lanes and Intersection Controls
   - Daily Traffic Volumes
   - Existing Daily Volume to Capacity Ratios
   - Existing Intersection Capacity Utilization
   - City of Victorville Circulation Element
   - Traffic Signal Warrants
   - Planned Improvements

4. Project Traffic 19

   - Traffic Generation
   - Traffic Distribution and Assignment
   - Project Related Traffic

5. Existing Plus Project Traffic Conditions 31

   - Existing Plus Project Daily Traffic Volumes
   - Existing Plus Project Daily Volume to Capacity Ratios
   - Existing Plus Project Intersection Capacity Utilization

6. Year 1995 Traffic Conditions 35

   - Annual Growth Rate
   - Other Development
   - Cumulative Daily Volumes
   - Cumulative Intersection Capacity Utilization
   - Cumulative Traffic Mitigations

Appendices

Appendix A - Glossary of Transportation Terms

Appendix B - Explanation and Calculation of Intersection Capacity Utilization

List of Figures

Figure No.	Title	Page No.
1	Project Location	7
2	Traffic Zones	8
3	Existing Traffic Conditions	16
4	Existing Daily Volumes and Volume to Capacity Ratios	17
5	City of Victorville Circulation Element Street Designations	18
6	Traffic Distribution - Zone 1	25
7	Traffic Distribution - Zone 2	26
8	Traffic Distribution - Zone 3	27
9	Traffic Distribution - Zone 4	28
10	Traffic Distribution - Zone 5	29
11	Daily Project Traffic Volumes	30
12	Existing Plus Project Daily Volumes and Volume to Capacity Ratios	34
13	Talon Ranch Daily Traffic Volumes	39
14	Year 1995 Daily Volumes and Volume to Capacity Ratios	40

List of Tables

Table No.	Title	Page No.
1	Land Use By Traffic Zone	6
2	Level of Service Description	13
3	Existing Intersection Capacity Utilization and Lane Geometrics	14
4	Traffic Signal Warrants	15
5	ITE Trip Generation Rates	22
6	Estimated Total Project Traffic Generation	23
7	Adjusted Total Project Traffic Generation	24
8	Existing Plus Project Intersection Capacity Utilization - Existing Geometrics	33
9	Other Development Traffic Generation	37
10	Year 1995 Intersection Capacity Utilization	38

Foxfire Ranch

Traffic Study

This report contains the revised traffic impact analysis for the proposed Foxfire Ranch development in the City of Victorville. This revision is based on the current land uses of 902 single family dwellings, 3.5 acres of neighborhood commercial facilities, a high school and a 1.5 acre neighborhood park. The completion of this project was assumed to occur in 1995.

The traffic report contains documentation of existing traffic conditions, traffic generated by the project, distribution of the project traffic to roads in the vicinity of the site, an analysis of existing plus project conditions, and an analysis of traffic conditions in 1995 at project completion. Each of these topics is contained in a separate section of the report. The first section is "Findings", and subsequent sections expand upon the findings. In this way, information on any particular aspect of the study can be easily located by the reader.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided in Appendix A.

1. Findings

This section summarizes the existing traffic conditions, project traffic impacts, and the proposed mitigation measures.

Existing Traffic Conditions

a. The project site is vacant at present, and does not generate traffic.

b. The arterial system is incomplete at present and existing roadways in the vicinity of the site are only partially improved.

c. Existing roadways in the vicinity of the site are currently operating at Level of Service C or better except for U.S. 395 which is operating at Levels of Service E-F.

d. Existing intersections in the vicinity of the site are currently operating at Level of Service C or better during the evening peak hour.

e. Substantial additional development in the vicinity of the project has been approved or is currently in progress.

f. The existing daily volumes on U.S. 395, on Palmdale Road and on Bear Valley Road satisfy the traffic signal warrants for the intersections of these streets.

g. CalTrans has plans to widen Palmdale Road to four lanes easterly from U.S. 395 and make improvements at the intersection of U.S. 395/Palmdale Road (including a traffic signal) in 1994.

Traffic Impacts

a. The proposed land uses for the site include residential, commercial, high school and park land uses.

b. The project is estimated to generate approximately 13,700 daily vehicle trips, 1,320 of which are expected to occur during the evening peak hour.

c. With the addition of the following streets, the circulation system will be able to provide access to the site and accommodate project traffic volumes:

   1. Construction of Dos Palmas Road from Pacoima Road to Cobalt Road.

   2. Completion of Luna Road from Foxfire Ranch to U.S. 395 (may be in conjunction with other developments in the area).

   3. Construction of Cobalt Road from Luna Road to Dos Palmas Road.

   4. Construction of Amethyst Road from Luna Road to Palmdale Road (two inside lanes) as part of the City of Victorville's master planned streets based on the City's Development Impact Fee (DIF) Program.

d. The <u>cumulative</u> traffic volumes in 1995 (i.e. existing plus project plus growth plus other development) will have the following impacts:

   1. Require the widening of U.S. 395 to four lanes.

   2. Increase the need for a traffic signal at U.S. 395/Bear Valley Road (Note: existing volumes satisfy the signal warrants).

   3. Increase the congestion on Palmdale Road near I-15. However, traffic destined for commercial facilities along 7th Street or northbound on I-15 has the option of travelling north on Amargosa Road to Mojave Road to reach these destinations.

   4. Require the widening of Bear Valley Road to six (6) lanes between Amargosa Road and I-15.

<u>Mitigations</u>

The following measures are recommended to mitigate the impact of the project on traffic circulation:

a. Construct streets identified in item c in Traffic Impacts section.

b. Participate in off-site improvements to the existing circulation system as directed by the reviewing agency.

2. Project Description

This section discusses the project's location, the proposed development, and traffic characteristics of the proposed development.

Location

The Foxfire Ranch development includes parcels between Palmdale Road (SR-18) and the future extension of Luna Road in the City of Victorville. Figure 1 shows the location of the Foxfire Ranch parcels.

Proposed Development

The project includes 902 single family residential units, 3.5 acres of neighborhood commercial facilities, a high school and a 2.5 acre neighborhood park.

The following describes the proposed land uses from a traffic engineering viewpoint:

Single Family Detached Dwellings: The primary market for these units will be families with children. As a result, peak traffic volumes will occur during home-to-work and work-to-home trips. Child-related trips such as home-to-school or home-to-Little League are also a significant factor in the daily trip generation, but they have a smaller influence on peak hour volumes.

Neighborhood Commercial: Commercial developments of this type are characterized by a large number of short duration trips throughout the day. Their typical opening times produce minor traffic volumes during the morning peak hour. During the evening peak hour, people driving home from work stop to shop, creating a minor peak in commercially generated traffic volumes.

High School: A high school will generate more traffic than schools of lower grades. This is caused by student driving and larger school district boundaries. It is not anticipated that a significant number of student trips will occur during the evening peak hour.

Park: Neighborhood parks generate little vehicle traffic because most persons walk to them. Of the traffic they do generate, it is usually from within the community and during off-peak traffic hours.

The project area has been divided into five traffic zones to facilitate analysis. Table 1 lists the land uses in each zone and Figure 2 shows the zone boundaries.

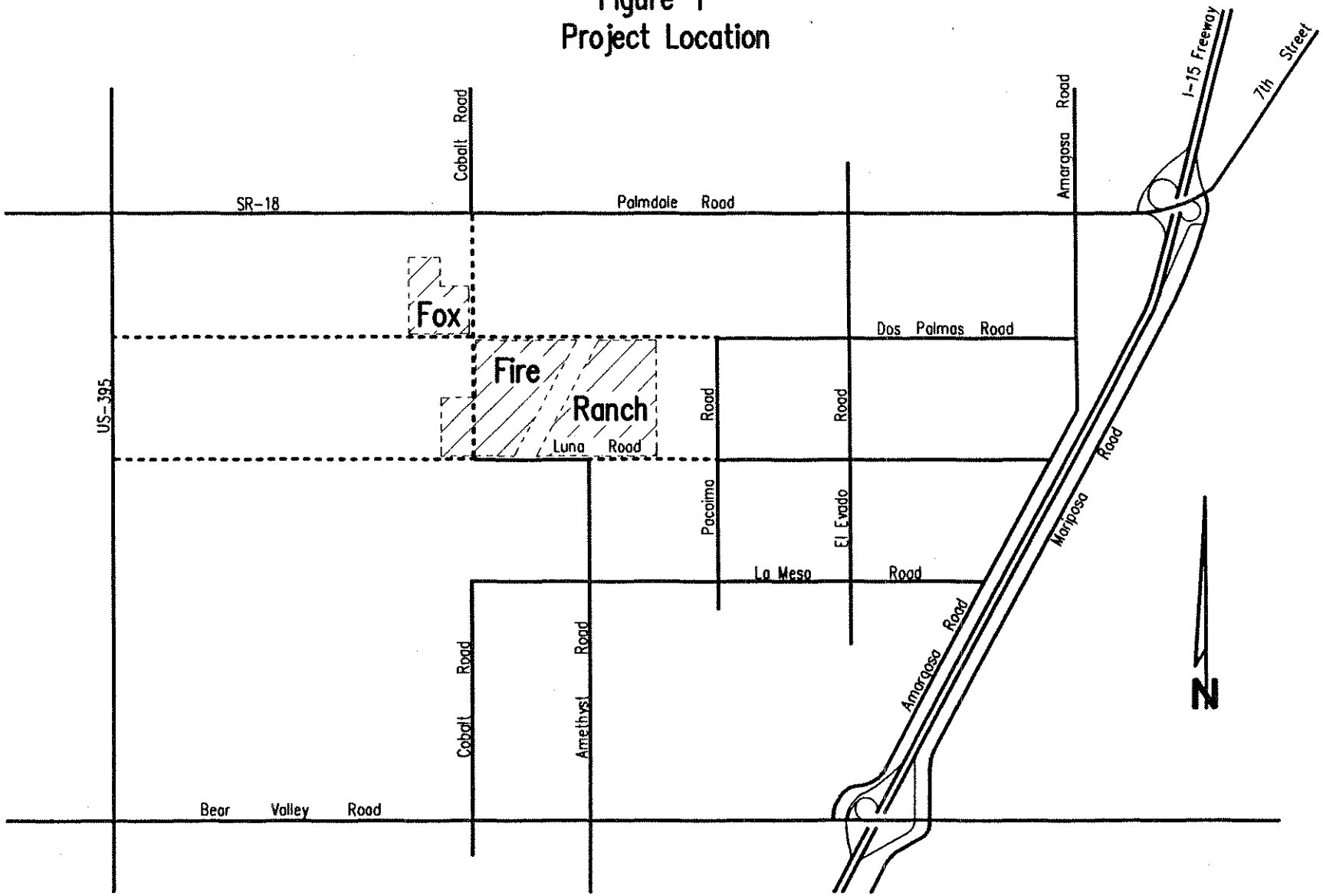
Table 1

LAND USE BY TRAFFIC ZONE

Zone	Land Use	Quantity
1	Single Family Residential High School	84 DU 10 AC
2	Single Family Residential	41 DU
3	Single Family Residential	373 DU
4	Single Family Residential	180 DU
5	Single Family Residential Neighborhood Commercial Neighborhood Park	224 DU 3.5 AC 2.5 AC

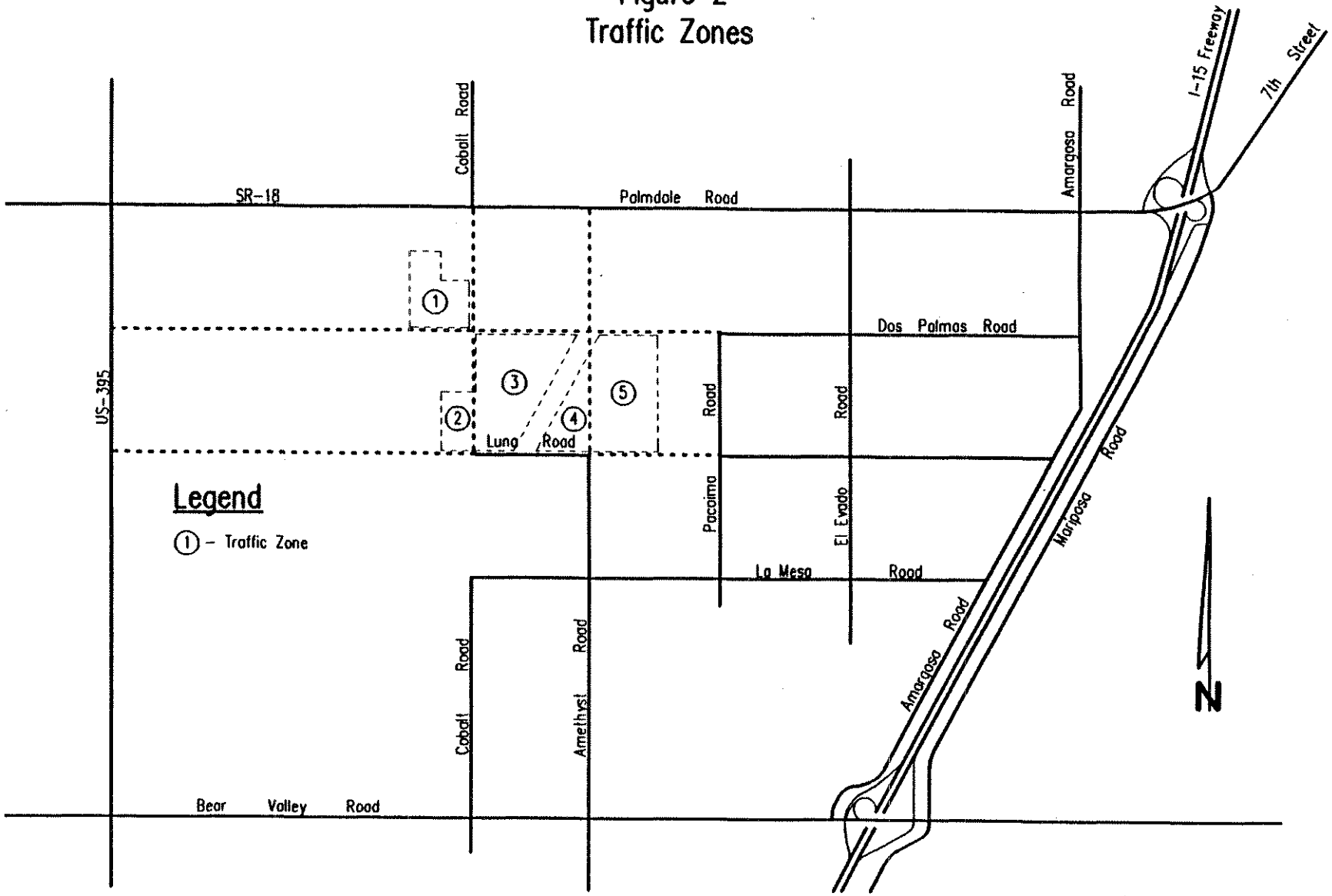
DU = dwelling unit
AC = acre

Figure 1
Project Location



Kunzman Associates

Figure 2
Traffic Zones



Kunzman Associates

3. Existing Traffic Conditions

The traffic conditions as they exist today are discussed below and illustrated in Figures 3 and 4.

Surrounding Street System

Existing roadways that will be utilized by the development include Palmdale Road, Dos Palmas Road, Cobalt Road, Amethyst Road, Luna Road, U.S. 395 and Bear Valley Road. In the vicinity of the project site, the following roadway conditions exist.

Palmdale Road: Palmdale Road (SR-18) extends westerly from I-15 and provides access to the cities of Palmdale and Lancaster. In the vicinity of the site, it is a two lane road which transitions to four lanes to the east of El Evado Road. Palmdale Road is designated as a super arterial (6 lanes divided) on the City's Circulation Element.

Dos Palmas Road: Dos Palmas Road is a two lane paved street between Pacoima Road and Amargosa Road. It has direct residential frontage with a moderate use of on-street parking.

Cobalt Road: Cobalt Road exists as a paved two lane street north of Palmdale Road and south of La Mesa Road. Cobalt Road is designated as a future two lane collector street.

Amethyst Road: Amethyst Road is designated as a future four lane street and is intended to be the major north-south arterial in the vicinity of the site. Varying street sections of Amethyst Road currently exist south of Luna Road.

Luna Road: Luna Road currently exists as a paved two lane street between Pacoima Road and Amargosa Road. It is designated as a future two lane collector street in the vicinity of the site.

U.S. 395: This state highway is a two lane roadway providing access to the I-15 Freeway to the south and to the City of Adelanto and the Owens Valley to the north. It is designated as a future freeway on the circulation element.

Bear Valley Road: Bear Valley Road is designated as a future super arterial and accommodates traffic generated in Victorville and in Hesperia. Bear Valley Road has a diamond type interchange with the I-15 Freeway.

Existing Travel Lanes and Intersection Controls

Figure 3 identifies the existing conditions for roadways near the site. The number of through lanes and the existing intersection controls are shown.

Daily Traffic Volumes

Figure 4 depicts the average daily two-way traffic volumes. Traffic volumes were obtained from the City of Victorville, from the County of San Bernardino and from CalTrans 1990 Traffic Volumes on State Highways.

Existing Daily Volume to Capacity Ratios

Roadway capacity is generally defined as the number of vehicles which can be reasonably expected to pass over a given section of road in a given time period. Congestion, high accident rates, the quality of traffic flow (Level of Service), and environmental acceptability all come into play in defining a particular roadway's effective capacity. It is possible to identify maximum desirable volumes for typical roadway types based on the number of roadway travel lanes. These daily volumes reflect estimates of the amount of daily traffic which will result in peak hour traffic volumes equal to the maximum desirable capacity of each roadway type. Two lane undivided roadways are estimated to have a maximum (i.e. Level of Service E) capacity of 12,500 vehicles per day, two lane divided roadways have a maximum capacity of 17,500 vehicles per hour, four lane undivided roadways are estimated to have a maximum capacity of 30,000 vehicles per day, four lane divided roadways are estimated to have a maximum capacity of 38,000 vehicles per day, and six lane divided roadways are estimated to have a maximum capacity of 59,000 vehicles per day. Six lane freeways are estimated to have a maximum daily capacity of 138,000 vehicles.

By dividing the existing daily volumes by the daily capacities listed above, daily volume to capacity ratios have been calculated and are shown in Figure 4. Table 2 equates volume to capacity ratio with Level of Service. Figure 4 shows that existing roadways and freeways in the vicinity of the site are operating at Level of Service C or better except for U.S. 395 which is operating at Levels of Service D-E.

Existing Intersection Capacity Utilization

The technique used to assess intersection operation is Intersection Capacity Utilization (ICU). To calculate an ICU the volume of traffic using the intersection is compared to the capacity of the intersection. ICU is usually expressed as a percent which represents that portion of the hour required to

provide sufficient capacity to accommodate intersection traffic if all approaches operate at capacity. The ICU's for existing intersections in the vicinity of the project are shown in Table 3 and are based upon manual peak hour turning movement counts taken on U.S. 395 in June, 1991. Other intersection volumes which were counted in 1989 were increased by 7 percent to reflect current conditions. Intersections in the vicinity of the site are currently operating at Level of Service C or better during the evening peak hour. An explanation of ICU and Level of Service is included in Appendix B.

Although the ICU calculations indicate that the intersections on Palmdale Road are operating at Level of Service C or better during the evening peak hour, there is some congestion on Palmdale Road. One factor contributing to this congestion is the proximity of signalized intersections on both sides of the freeway.

Comparison of daily volume to capacity ratios and corresponding Level of Service, and peak hour Intersection Capacity Utilization and corresponding Level of Service reveals a difference. The differences between daily link volume to capacity ratios and peak hour Intersection Capacity Utilization is particularly pronounced when cross traffic is light. Daily volume to capacity ratios assume that all cross streets require 50 percent of the time to satisfy their demand, and assume that the subject street has 50 percent of the time available to it. The daily volume to capacity ratios are a generalized indicator while peak hour Intersection Capacity Utilization actually represents what can be expected in the peak hour at intersections. Of the two indicators, the peak hour Intersection Capacity Utilization and corresponding Level of Service is the better measure of roadway performance.

The ICU is even more important an an indication of roadway performance on a street such as U.S. 395 in the vicinity of the site. This is because there are currently no intersections or vehicle conflicts on U.S. 395 between Palmdale Road and Bear Valley Road.

City of Victorville Circulation Element

Figure 5 exhibits the current street designations in the City of Victorville Circulation Element. This Figure shows the nature and extent of arterial highways which are needed to adequately serve the ultimate development depicted by the Land Use Element of the General Plan and also coordinates future arterials between local jurisdictions.

Figure 5 shows several future streets which, when completed, will have an impact on circulation in the vicinity of the site. Dos Palmas and Luna Roads are future east-west two lane

undivided streets. Amethyst Road is a future north-south four lane divided street and Cobalt Road is a future north-south two lane undivided street.

Traffic Signal Warrants

Traffic signal warrants adopted by CalTrans are based upon the eight highest hour volumes in a day. It is assumed by CalTrans that the eighth highest hour is 62.5 percent of the peak hour, and the peak hour is generally 10 percent of the daily traffic. Thus, the signal warrants can also be expressed in terms of the daily traffic volumes shown on Table 4. Rural traffic volume warrants are utilized when the 85th percentile speed of the major street traffic exceeds 40 miles per hour.

In order to satisfy the signal volume warrants, the volumes of both the major and minor street must meet or exceed those listed in Table 4. Determining the major street daily signal warrant volume involves calculating the number of daily vehicles approaching the intersection on both major street legs; usually the daily approach volume is 50 percent of the street's daily two-way volume on each leg. Finding the minor street daily signal warrant volume involves calculating the number of daily vehicles approaching the intersection on only the highest volume leg; usually the daily approach volume is 50 percent of the street's two-way daily volume. If the minor street forms a tee intersection with the major street, then the minor street volume is the highest volume because there is no other volume.

The existing daily volumes on U.S. 395, on Palmdale Road and on Bear Valley Road shown on Figure 4 exceed the values on Table 4 for both the Minimum Vehicular and Interruption of Continuous Traffic warrants (one approach lane on both streets - rural values).

Planned Improvements

CalTrans has plans for improvements on Palmdale Road and at the intersection of U.S. 395/Palmdale Road. By 1994, it is expected that:

1. Palmdale Road will be widened to four lanes easterly from U.S. 395 to Caheunga Road (the point at which Palmdale Road is currently four lanes).

2. At U.S. 395/Palmdale Road, there will be a traffic signal and the intersection will be widened to provide two through and one left turn lane on each approach.

Table 2

LEVEL OF SERVICE DESCRIPTION

Level of Service	Description	Volume to Capacity Ratio
A	Level of Service A occurs when progression is extremely favorable and vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0.60 and below
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	0.61 to 0.70
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	0.71 to 0.80
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	0.81 to 0.90
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	0.91 to 1.00
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	1.01 and up

Source: "Highway Capacity Manual" Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 1985, Pages 9-4 to 9-5.

Table 3

EXISTING INTERSECTION CAPACITY UTILIZATION
AND LANE GEOMETRICS

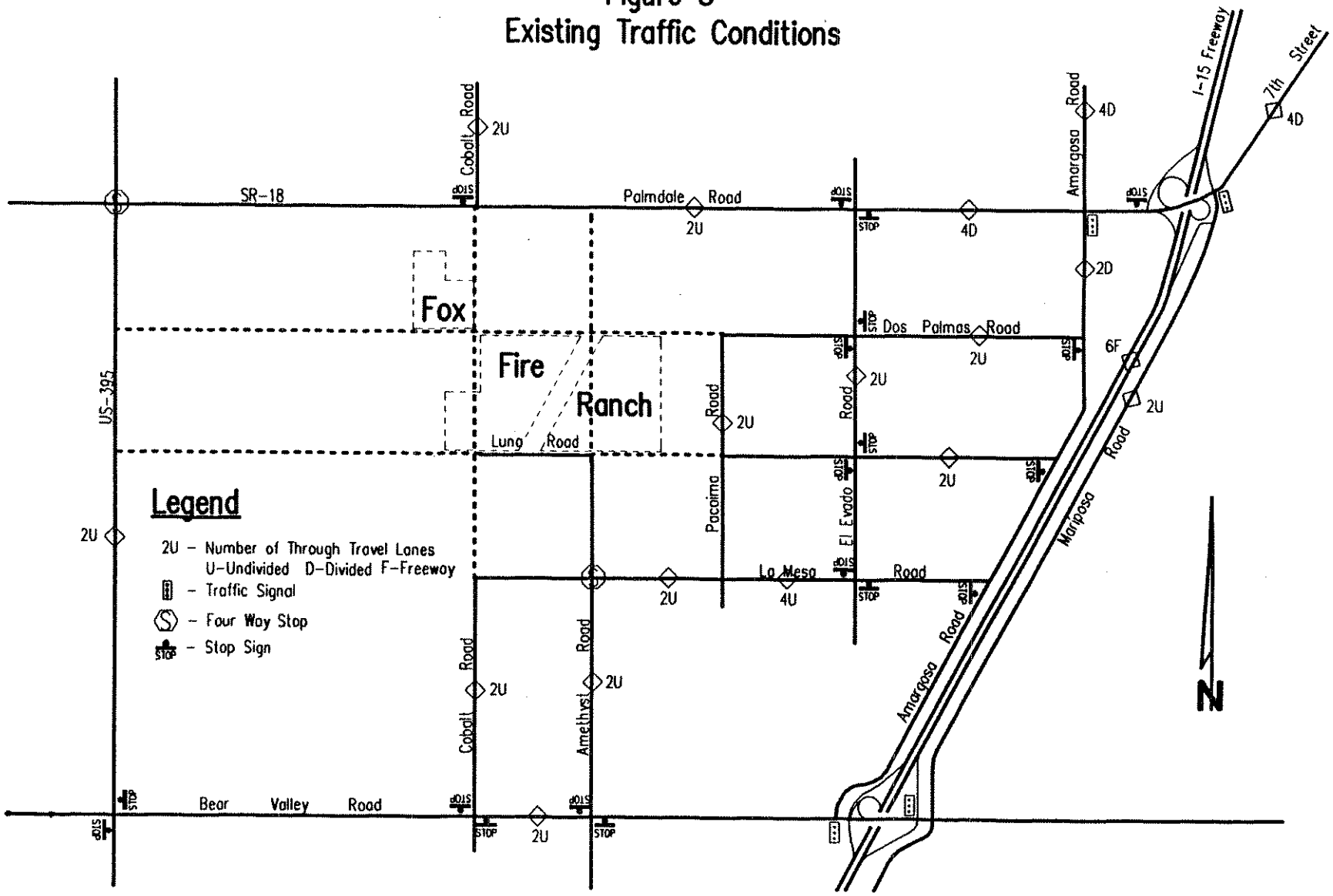
Intersection	Intersection Approach Lanes (1)												Evening Peak Hour ICU-LOS (2)
	North-bound			South-bound			East-bound			West-bound			
	T	R	L	T	R	L	T	R	L	T	R	L	
U.S. 395 (NS) at													
Palmdale Road (EW)	1	0	0	2	0	0	1	0	0	1	0	0	51-A
Bear Valley Road (EW)	1	0	1	1	0	1	1	0	0	1	0	0	47-A
Amargosa Road (NS) at													
Palmdale Road (EW)	2	0	1	2	0	1	2	1	1	2	1	1	54-A
Bear Valley Road (EW)	1	0	0	1	1	1	2	0	1	2	0	1	73-C
I-15 SB Ramps (NS) at													
Palmdale Road (EW)	*	*	*	*	1	1	2	1	*	2	*	*	62-B
Bear Valley Road (EW)	*	*	*	*	1	1	2	*	1	2	1	*	58-A

(1) When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width (19 feet or more) for right turning vehicles to travel outside the through lanes.

(2) Intersection Capacity Utilization (ICU) - Level of Service (LOS)

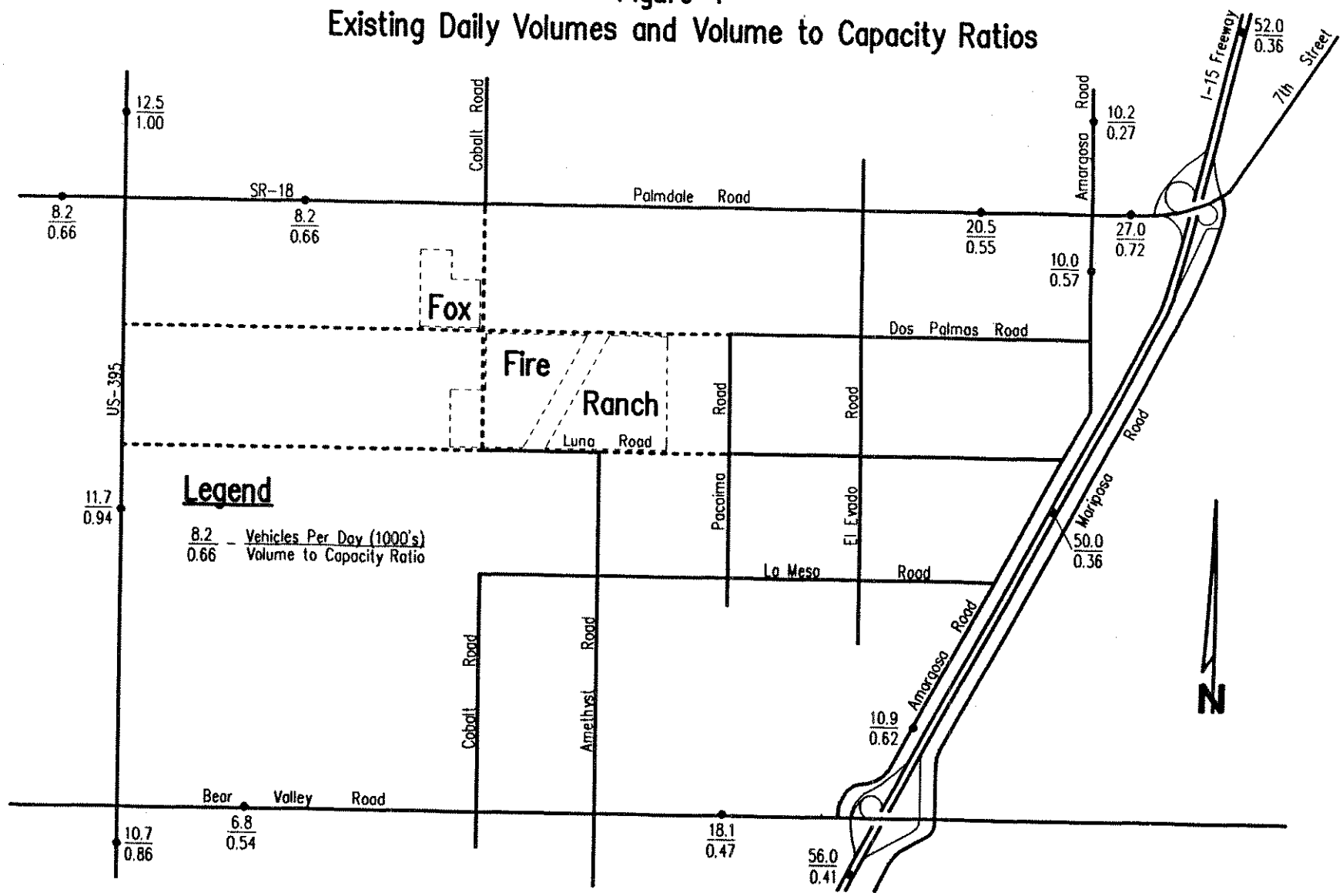
T = Through
R = Right
L = Left
SB = Southbound
* = Movement not permitted

Figure 3
Existing Traffic Conditions



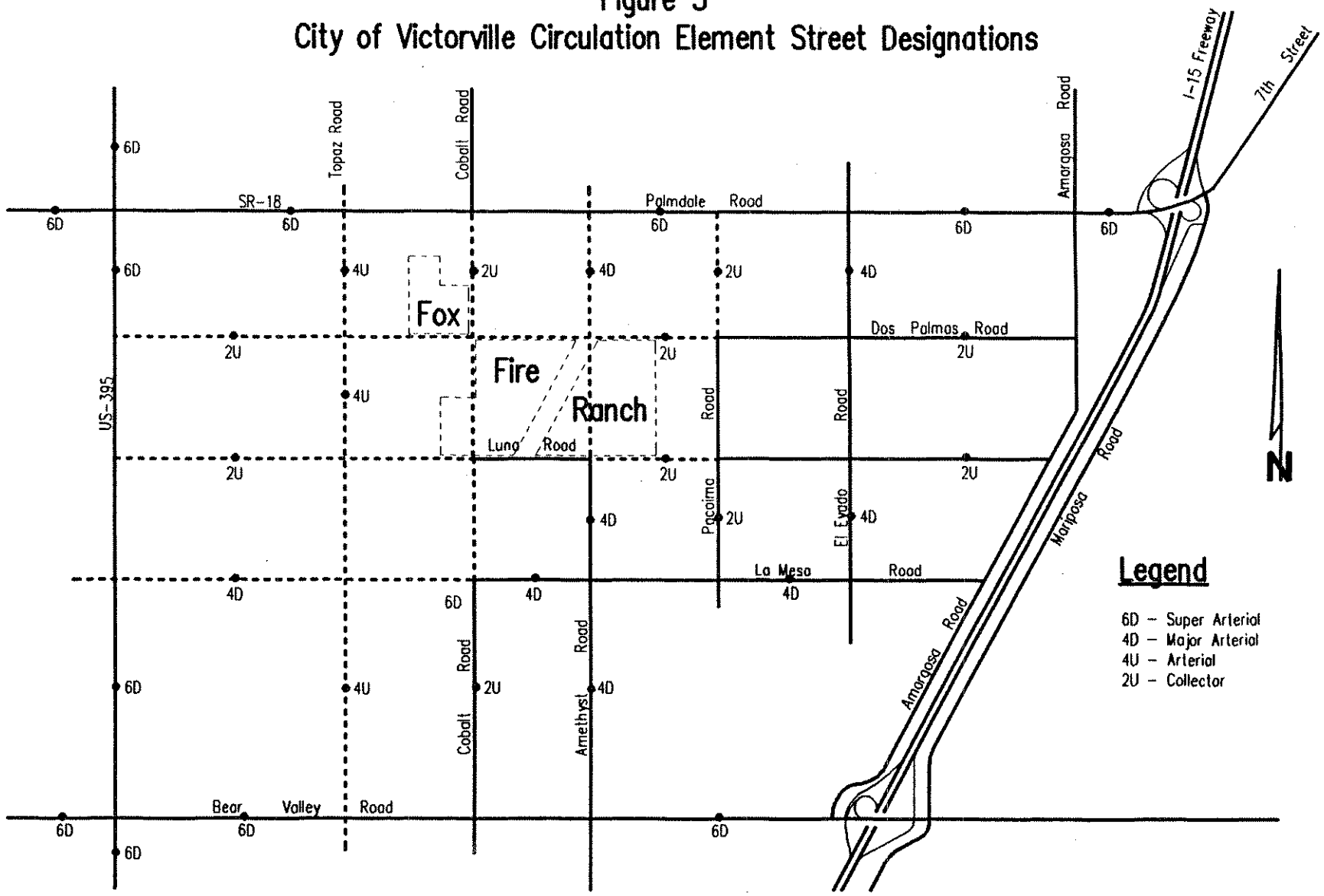
Kunzman Associates

Figure 4
Existing Daily Volumes and Volume to Capacity Ratios



Kunzman Associates

Figure 5
City of Victorville Circulation Element Street Designations



Kunzman Associates

Table 4

TRAFFIC SIGNAL WARRANTS

(Based on Estimated Average Daily Traffic - See Note 2)

URBAN ..... RURAL	Minimum Requirements EADT			
1. Minimum Vehicular Satisfied _____ Not Satisfied _____	Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor-street approach (one direction only)	
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban	Rural	Urban	Rural
1 ..... 1	8,000	5,600	2,400	1,680
2 or more 1	9,600	6,720	2,400	1,680
2 or more ..... 2 or more	9,600	6,720	3,200	2,240
1 ..... 2 or more	8,000	5,600	3,200	2,240
2. Interruption of Continuous Traffic Satisfied _____ Not Satisfied _____	Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor-street approach (one direction only)	
Number of lanes for moving traffic on each approach Major Street / Minor Street	Urban	Rural	Urban	Rural
1 ..... 1	12,000	8,400	1,200	850
2 or more 1	14,400	10,080	1,200	850
2 or more ..... 2 or more	14,400	10,080	1,600	1,120
1 ..... 2 or more	12,000	8,400	1,600	1,120
3. Combination Satisfied _____ Not Satisfied _____ No one warrant satisfied but following warrants fulfilled 80% or more ..... _____ (1) _____ (2)	2 Warrants		2 Warrants	

NOTE:

1. Heavier left turn movement from the major street may be included with minor street volume if a separate signal phase is to be provided for the left-turn movement.
2. To be used only for NEW INTERSECTIONS or other locations where actual traffic volumes cannot be counted.

Source: CalTrans, Traffic Manual, page 9-8

4. Project Traffic

To estimate project-related traffic volumes at various points on the street network, a three step process is utilized. First, the traffic which will be generated by the proposed development is determined. Secondly, the traffic volumes are geographically distributed to major attractions of trips, such as employment centers, commercial centers, recreational areas or residential areas. Finally, the trips are assigned to specific roadways and the project-related traffic volumes are determined on a route-by-route basis.

Traffic Generation

The traffic generated by the project is determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are expressed in terms of trip ends per person, trip ends per employee, trip ends per acre, trip ends per dwelling, or trip ends per thousand square feet of floor space. For instance, if a particular land use generates six outbound trips per acre in the morning peak hour, then six vehicles are expected to leave the site in the morning peak hour for each acre of development.

Significant research efforts have been made by CalTrans, the Institute of Transportation Engineers (ITE), Kunzman Associates, and others to establish the correlation between trips and land use. From this body of information, trip generation rates can be estimated with reasonable accuracy for various land uses. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and our life styles remain similar to what we know today. A major change in these variables may affect trip generation rates.

Table 5 lists the trip generation rates developed by ITE which were used to estimate the daily traffic, morning peak hour inbound and outbound traffic, and evening peak hour inbound and outbound traffic volumes for the proposed land uses. By multiplying the trip generation rates by the land use quantities, the traffic volumes are determined. Table 6 shows the estimated total peak hour and daily traffic volumes for each zone. The 10 acre high school site was assumed to have 2000 students and the traffic generated by the neighborhood park was assumed to be accounted for in the project residential traffic.

Traffic volumes shown in Table 6 include the total trips generated by zone for each individual land use. However, as some of the residential trips generated within the project will also be making trips to the project commercial and high school land uses, a double counting of some trips occurs.

Home based trip profile studies have shown that approximately 24 percent of the total residential trip generation is travel to and from local shopping facilities. This study assumed that 25 percent of these trips (or 6 percent of the total trip generation) would be to the project's commercial land use and thus be double counted. The trips (approximately 500 per day) were reduced at the commercial end.

Traffic engineering studies have been conducted which show that a significant percentage of the traffic entering and leaving a commercial center is generally recognized as being diverted from the passing traffic streams (i.e. passby trips) and therefore not considered as new traffic generated by the commercial center.

The percentage of passby trips is based on factors such as the size of the commercial center and the volume of traffic on adjacent arterial streets. The studies have shown that the passby trips usually vary between 25 and 60 percent of the total traffic generated by the commercial facility. This study is based on a conservative estimate of 25 percent of passby trips which were reduced on the commercial end.

It was assumed that approximately 20 percent of the high school students will live in the Foxfire Ranch and those school trips will be accounted for on the residential end.

Table 7 shows the adjusted total daily and peak hour trips for Foxfire Ranch.

Traffic Distribution and Assignment

Traffic distribution is the determination of the directional orientation of traffic. For this project, it is based on the geographical location of employment centers, commercial centers, recreational areas, and existing and future residential areas.

Traffic assignment is the determination of which specific route development traffic will use, once the generalized traffic distribution is determined. The basic factors affecting route selection are minimum time path and minimum distance path.

Figures 6 - 10 contain the directional distribution and assignment of the project traffic for zones 1 - 5.

Project Related Traffic

Based on the estimated traffic generation and distributions, project related daily traffic volumes are shown in Figure 11.

Table 5

ITE TRIP GENERATION RATES

Land Use	Units*	Morning Peak Hour		Evening Peak Hour		Daily
		In	Out	In	Out	
Single Family Residential	DU	0.19	0.55	0.66	0.35	9.55
Commercial (3.5 acre)	AC	18.95	11.11	54.56	59.02	1243.64
High School	ST	0.28	0.13	0.02	0.06	1.38

*DU = dwelling unit
AC = acre
ST = student

Source: Institute of Transportation Engineers, Trip Generation, Fifth Edition, 1991, Land Use Categories 210, 530, and 820.

Note: ITE trip generation rates for commercial land uses are stated in thousand square feet of building area. The ITE rates were converted to acres assuming a 0.25 floor to area ratio (FAR).

Table 6

ESTIMATED TOTAL PROJECT TRAFFIC GENERATION

Zone/Land Use	Morning Peak Hour		Evening Peak Hour		Daily
	In	Out	In	Out	
1/Single Family Dwellings	20	50	60	30	800
High School	560	260	40	120	2,800
Zone 1 Total	580	310	100	150	3,600
2/Single Family Dwellings	10	20	30	10	400
Zone 2 Total	10	20	30	10	400
3/Single Family Dwellings	70	210	250	130	3,600
Zone 3 Total	70	210	250	130	3,600
4/Single Family Dwellings	30	100	120	60	1,700
Zone 4 Total	30	100	120	60	1,700
5/Single Family Dwellings	40	120	150	80	2,100
Commercial	70	40	190	210	4,400
Zone 5 Total	110	160	340	290	6,500
Total	800	800	840	640	15,800

Note: Trips generated are rounded to nearest 10 for peak hour and 100 for daily.

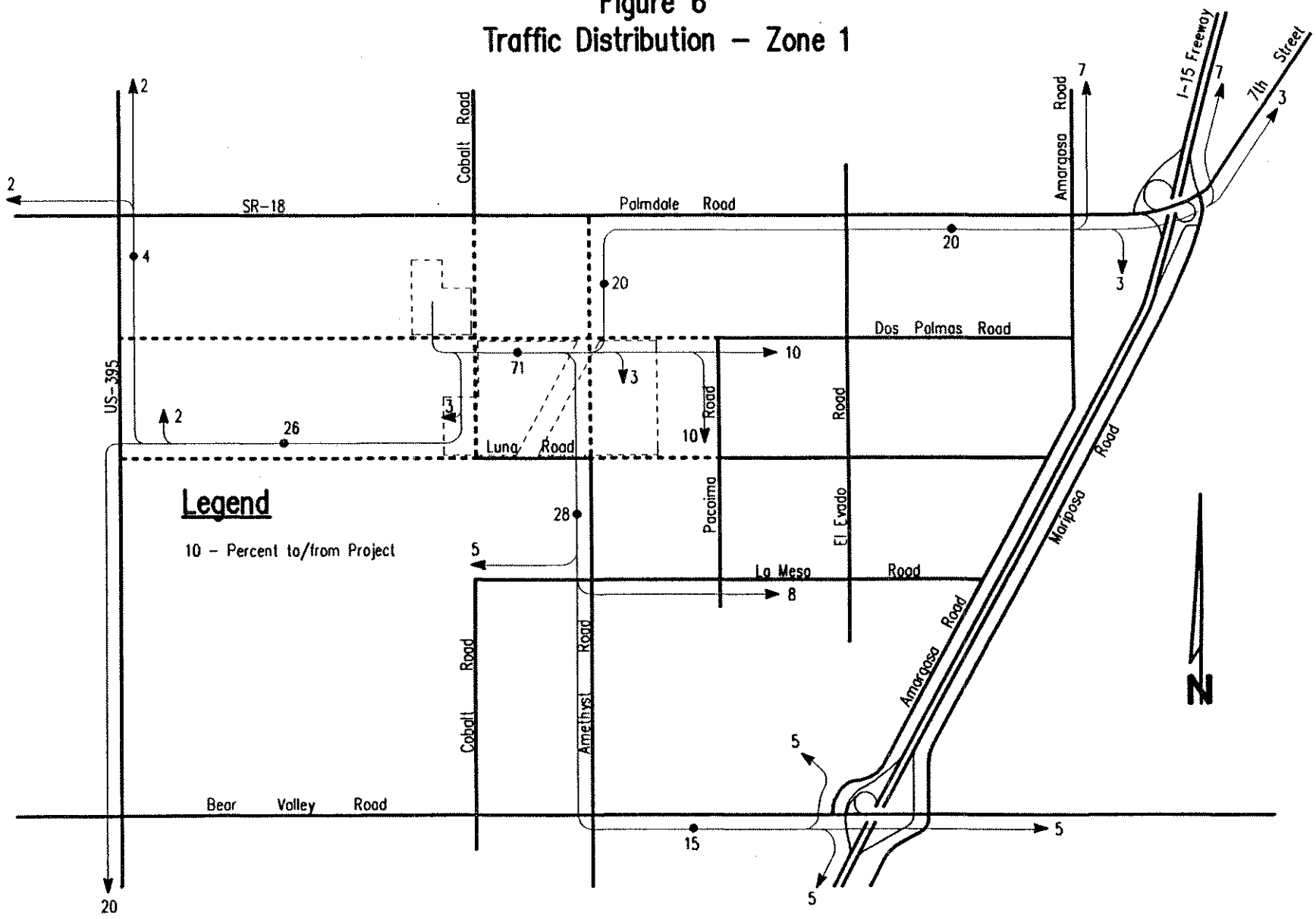
Table 7

ADJUSTED TOTAL PROJECT TRAFFIC GENERATION

Zone/Land Use	Morning Peak Hour		Evening Peak Hour		Daily
	In	Out	In	Out	
1/Single Family Dwellings	20	50	60	30	800
High School	450	210	30	100	2,200
Zone 1 Total	470	260	90	130	3,000
2/Single Family Dwellings	10	20	30	10	400
Zone 2 Total	10	20	30	10	400
3/Single Family Dwellings	70	210	250	130	3,600
Zone 3 Total	70	210	250	130	3,600
4/Single Family Dwellings	30	100	120	60	1,700
Zone 4 Total	30	100	120	60	1,700
5/Single Family Dwellings	40	120	150	80	2,100
Commercial	50	30	130	140	2,900
Zone 5 Total	90	150	280	220	5,000
Total	670	740	770	550	13,700

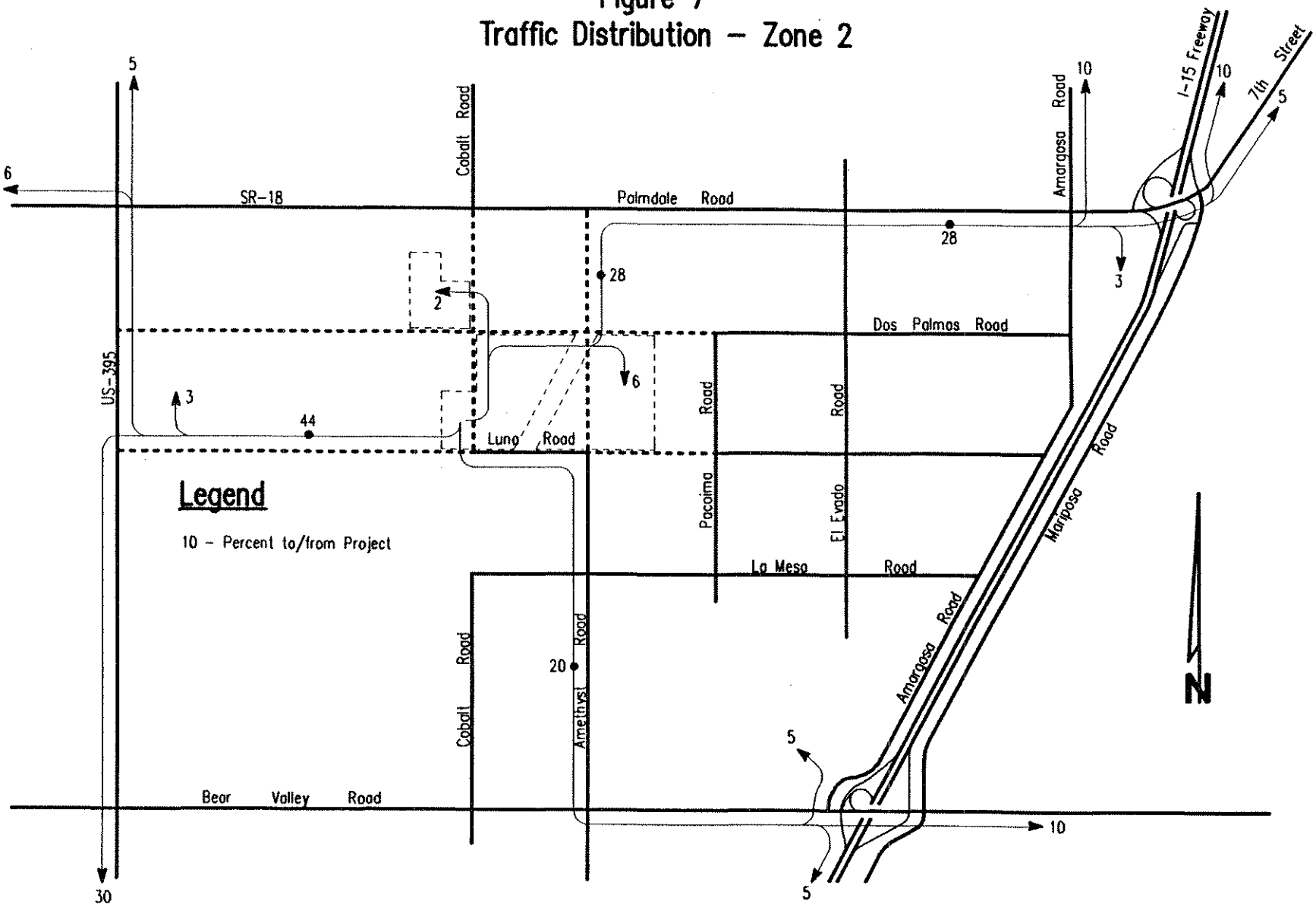
Note: Trips generated are rounded to nearest 10 for peak hour and 100 for daily.

Figure 6
Traffic Distribution – Zone 1



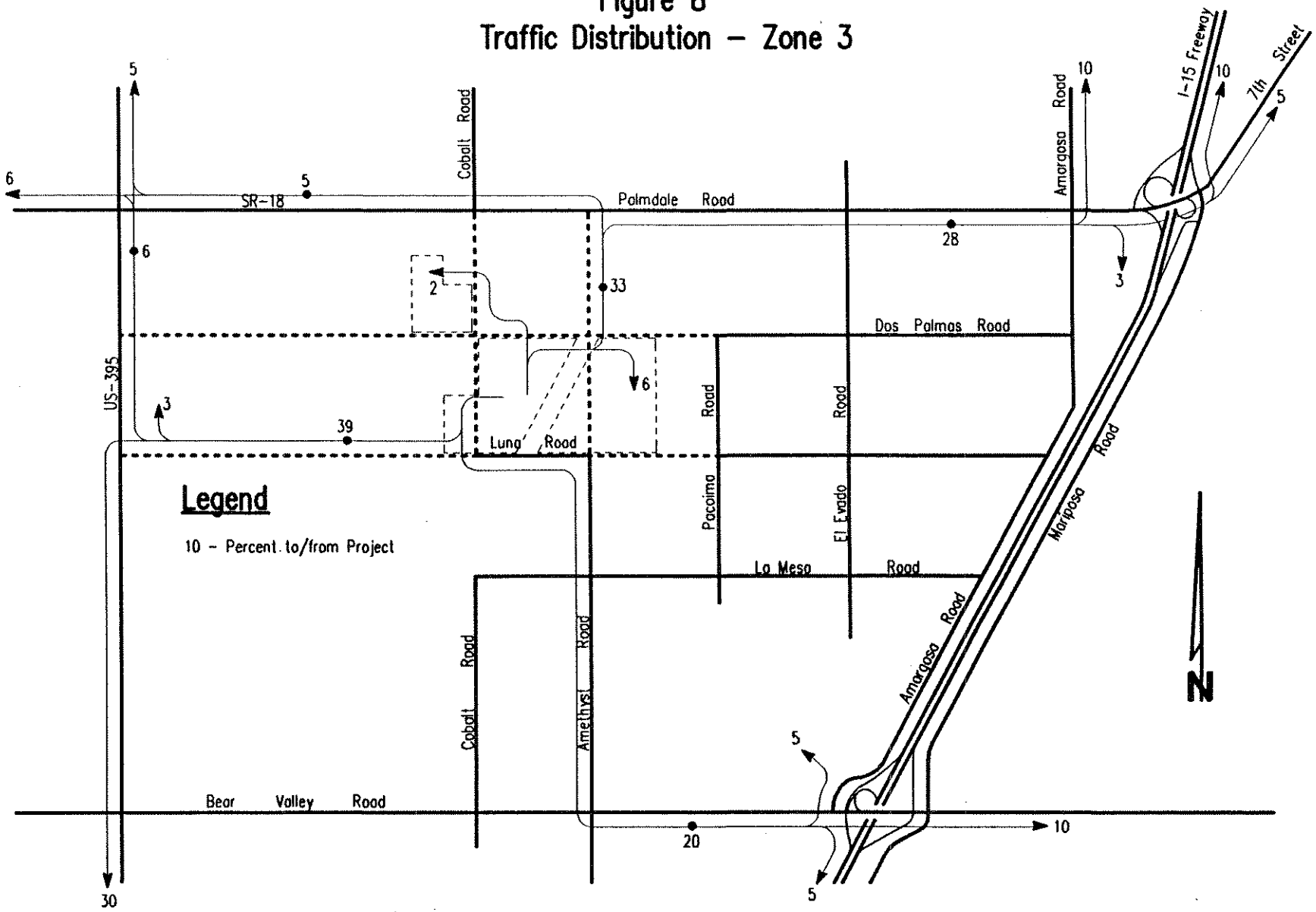
Kunzman Associates

Figure 7
Traffic Distribution – Zone 2



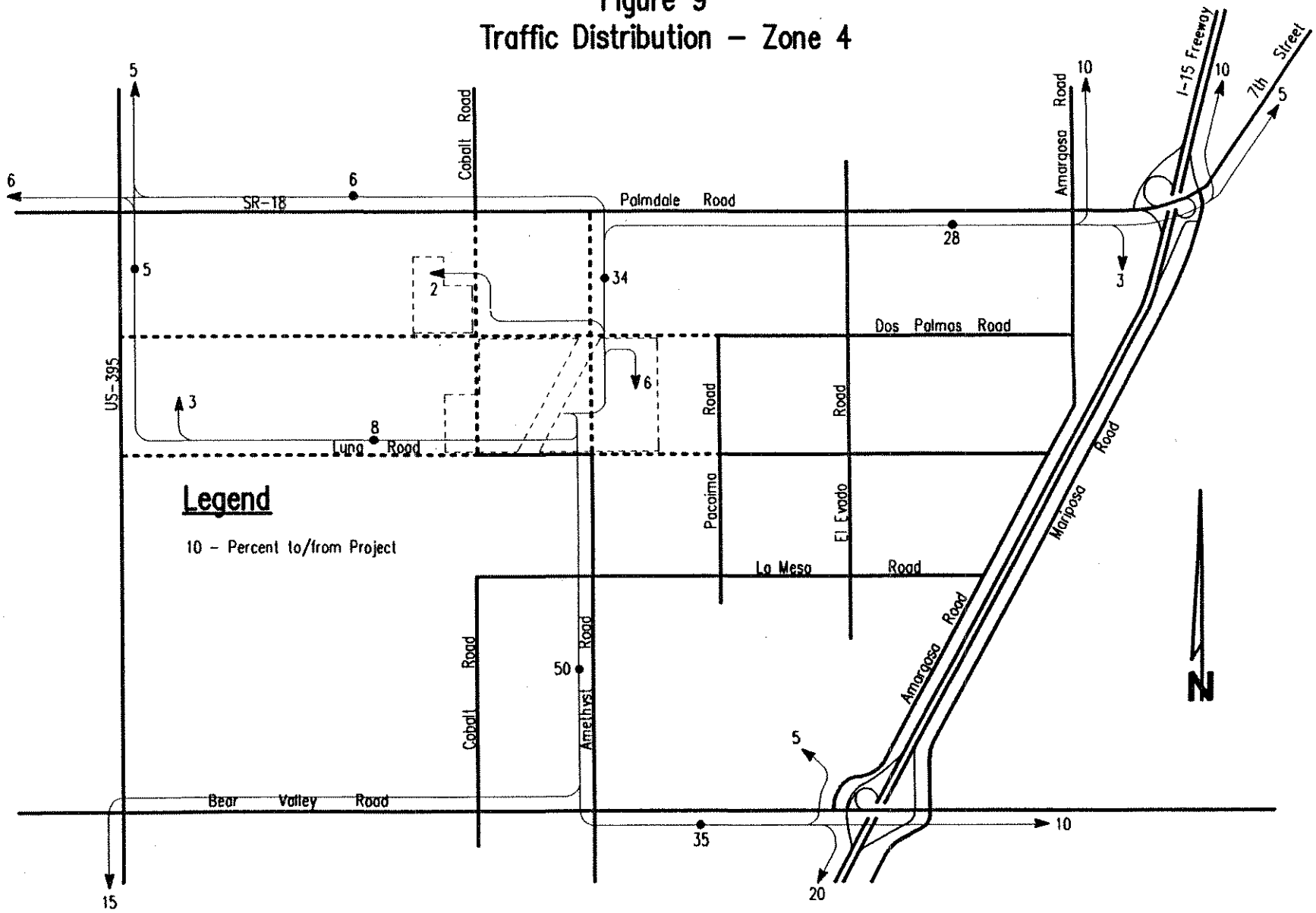
Kunzman Associates

Figure 8
Traffic Distribution – Zone 3



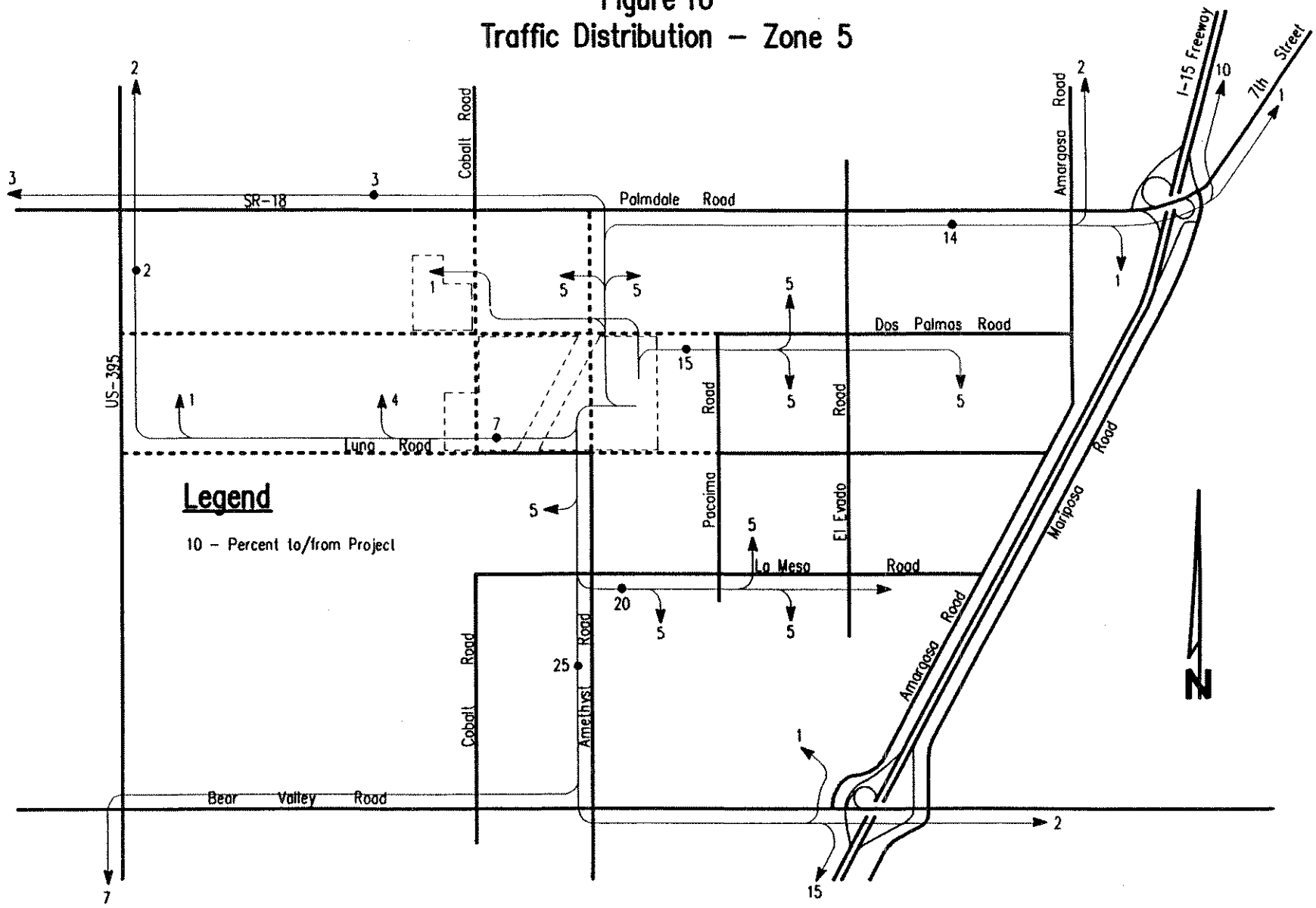
Kunzman Associates

Figure 9
Traffic Distribution – Zone 4



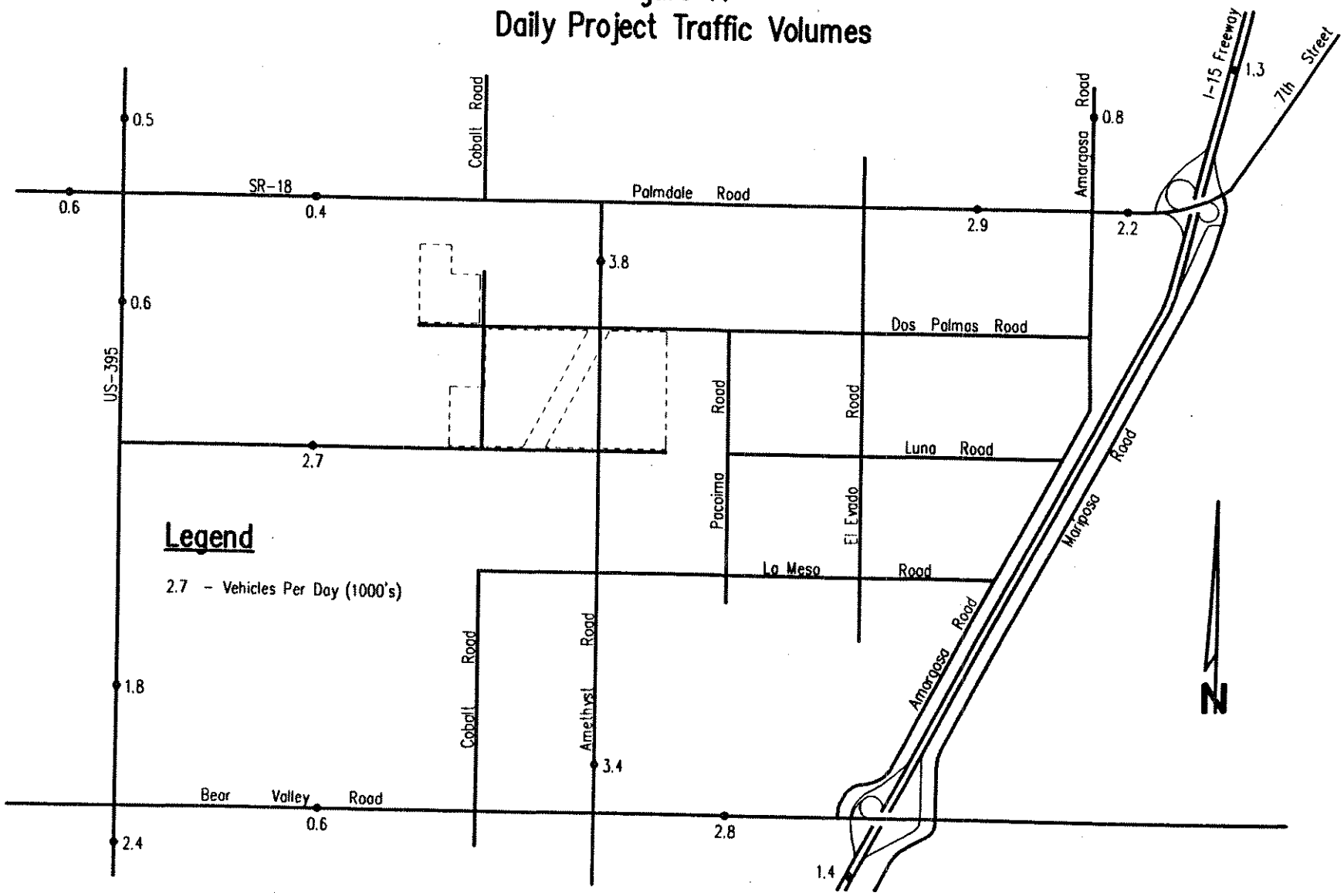
Kunzman Associates

Figure 10
Traffic Distribution – Zone 5



Kunzman Associates

Figure 11
Daily Project Traffic Volumes



Kunzman Associates

5. Existing Plus Project Traffic Conditions

This section analyzes the impact of existing plus project conditions. The following improvements were assumed as the minimum necessary to provide access to all parcels in Foxfire Ranch:

1. Construction of Dos Palmas Road from Pacoima Road to Cobalt Road.

2. Completion of Luna Road from Foxfire Ranch to U.S. 395 (in conjunction with other developments in the area).

3. Construction of Cobalt Road from Luna Road to Dos Palmas Road.

4. Construction of Amethyst Road from Luna Road to Palmdale Road (as part of the City of Victorville's master planned streets to be funded from the Development Impact Fee Program).

All roads off site were assumed to be constructed as two lane undivided streets. Street segments which bordered the project on both sides were assumed to be built to the Circulation Element designations shown on Figure 5.

Existing Plus Project Daily Traffic Volumes

Figure 12 shows the estimated daily traffic volumes for existing plus project traffic conditions.

Existing Plus Project Daily Volume to Capacity Ratios

Daily volume to capacity ratios have been calculated and are shown in Figure 12. The daily volume to capacity ratios are based on the maximum daily capacities discussed in Section 3 and existing street widths. The new street widths are as discussed in the beginning of this section. Based on daily volume to capacity ratios, roadways in the vicinity of the project site are projected to operate at Level of Service C or better for existing plus project traffic conditions except for U.S. 395 which is estimated to operate at Level of Service F.

Existing Plus Project Intersection Capacity Utilization

Intersection Capacity Utilization (ICU) values for the existing plus project traffic conditions have been calculated and are shown in Table 8. ICU calculations are based on the existing

geometrics at the intersections. Table 8 shows that intersections in the vicinity of the project are projected to continue to operate at a Level of Service C or better during the evening peak hour for existing plus project traffic conditions.

Table 8

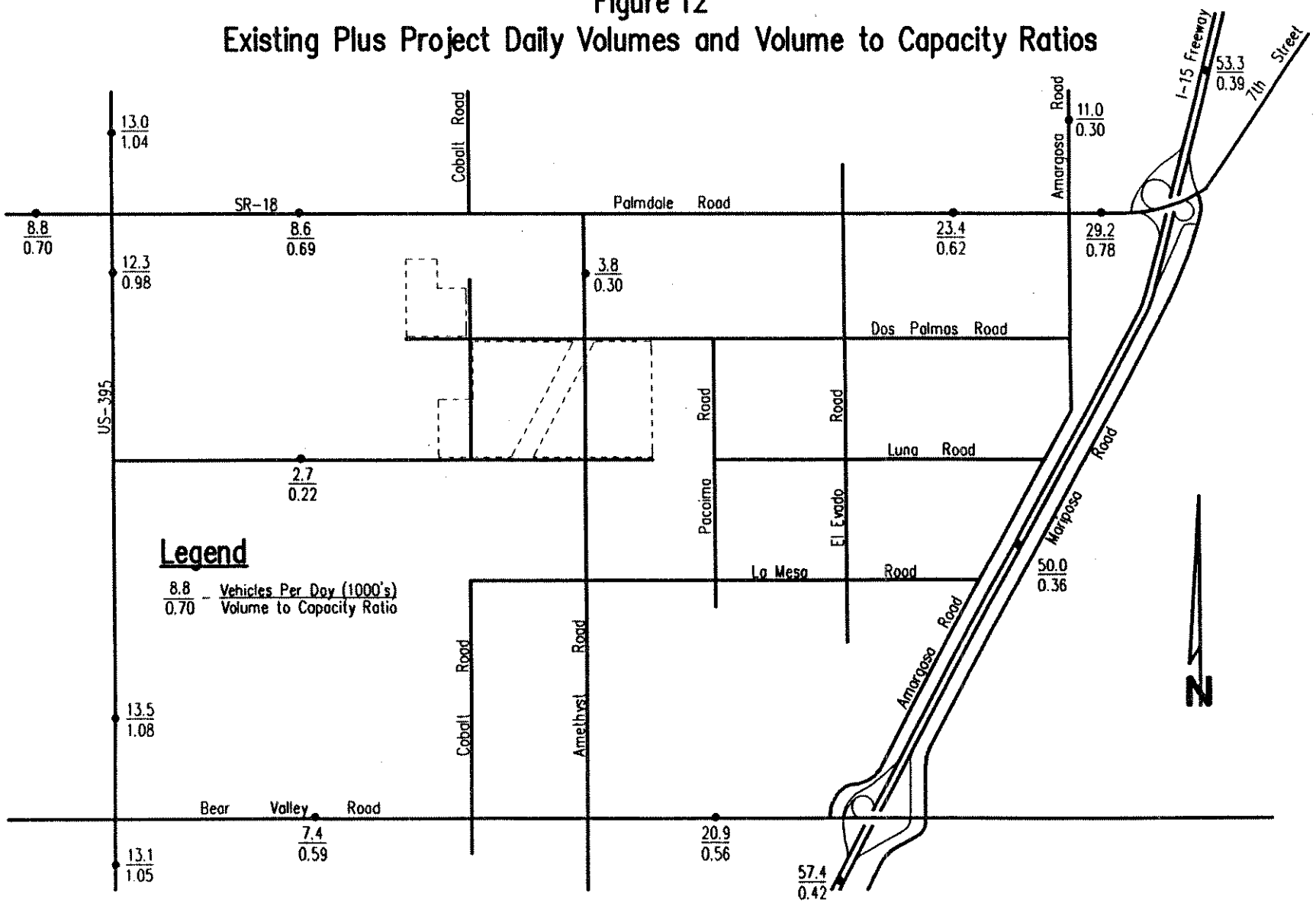
EXISTING PLUS PROJECT INTERSECTION
CAPACITY UTILIZATION - EXISTING LANE GEOMETRICS

Intersection	Evening Peak Hour ICU-LOS (1)
U.S. 395 at	
Palmdale Road	56-A
Bear Valley Road	57-A
Amargosa Road at	
Palmdale Road	56-A
Bear Valley Road	78-C
I-15 SB Ramps at	
Palmdale Road	64-B
Bear Valley Road	63-B

(1) Intersection Capacity Utilization (ICU)

SB = southbound

Figure 12
Existing Plus Project Daily Volumes and Volume to Capacity Ratios



Kunzman Associates

6. Year 1995 Traffic Conditions

This section discusses cumulative traffic (i.e. background plus project) conditions at completion of Foxfire Ranch in 1995. The background traffic includes existing traffic, growth in existing traffic due to increases in through traffic and traffic from other approved developments in the area.

Annual Growth Rate

An annual growth rate of 7 percent was used for the period 1991-1995 to reflect increases in through traffic. Although this is a higher rate than population projections for Victorville, it is less than recent historical growth on key arterial streets in the city.

Other Development

Talon Ranch is an approved development in the general vicinity of Foxfire Ranch and is assumed to be complete in 1997. Table 9 shows the peak hour and daily traffic volumes generated by Talon Ranch. The daily traffic on the streets in the vicinity of the site generated by Talon Ranch is shown on Figure 13.

Cumulative Daily Volumes

The 1995 cumulative daily volumes are illustrated on Figure 14 and include existing, growth in existing, 60 percent of Talon Ranch*, and Foxfire Ranch traffic.

Cumulative Intersection Capacity Utilization

The project's peak hour traffic was added to the 1995 background traffic volumes and the resultant ICU's are shown on Table 10.

Cumulative Traffic Mitigations

The volumes on Figure 14 and the ICU values on Table 10 indicate that the following improvements will be needed in order for all street segments and intersections to operate at Level of Service C or better:

1. Provision of four (4) lanes on U.S. 395.

* Talon Ranch was assumed to be 60 percent complete in 1995.

2. Widening of Palmdale Road to six (6) lanes between El Evado Road and I-15.

3. Provision of six (6) lanes on Bear Valley Road between Amargosa Road and I-15.

The daily volumes on Figure 10 satisfy the traffic signal warrants at the intersections of Palmdale Road/Amethyst Road and U.S. 395/Luna Road.

Table 9

OTHER DEVELOPMENT TRAFFIC GENERATION

Development	Morning Peak Hour		Evening Peak Hour		Daily
	In	Out	In	Out	
Talon Ranch	200	380	650	470	11,200

Source: "Talon Ranch Traffic Study", Kunzman Associates, January, 1992.

Table 10

YEAR 1995 INTERSECTION CAPACITY UTILIZATION - EXISTING LANE GEOMETRICS

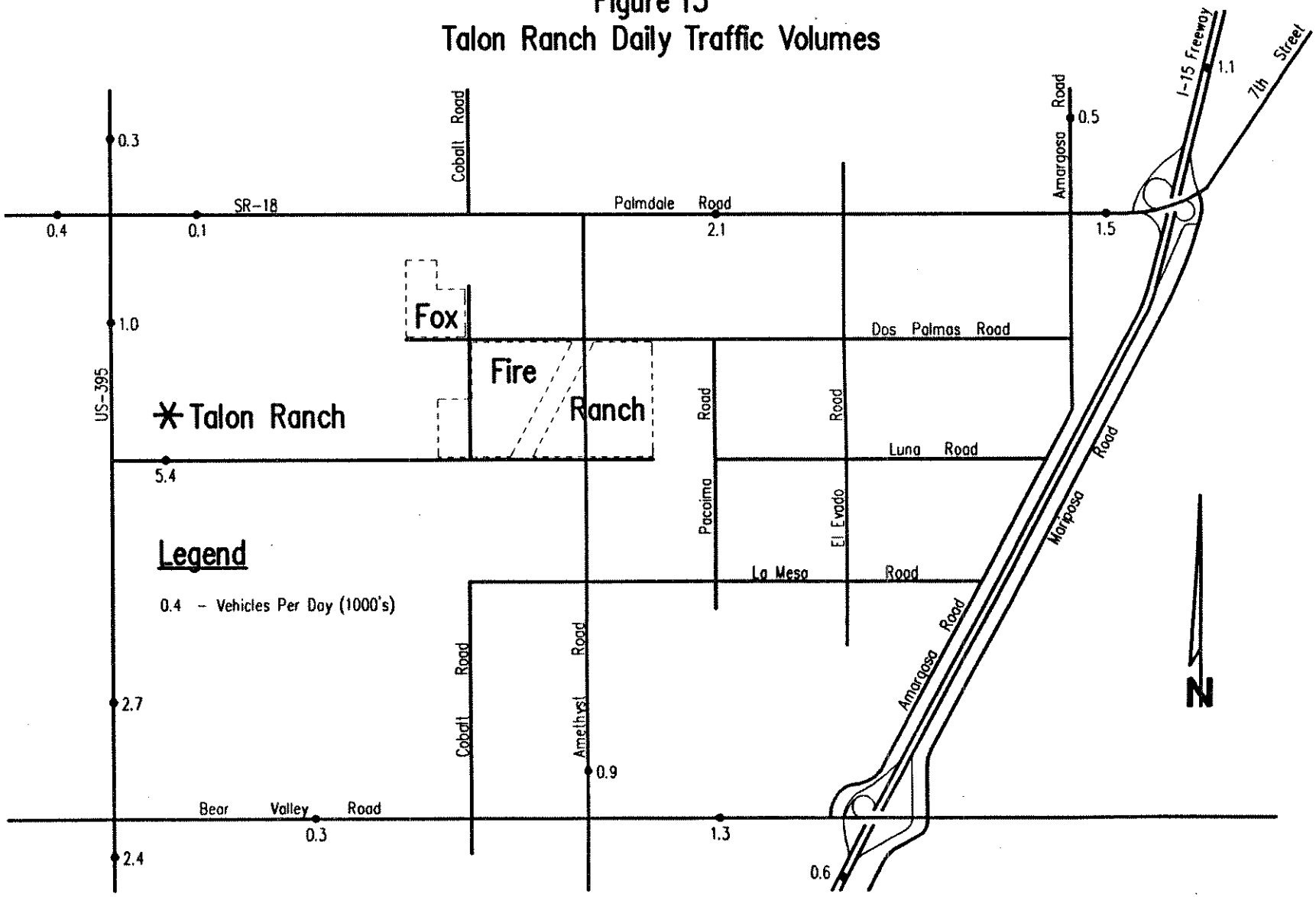
Intersection	Evening Peak Hour ICU-LOS (1)
U.S. 395 at	
Palmdale Road (2)	43-A
Bear Valley Road	70-B
Amargosa Road at	
Palmdale Road	73-C
Bear Valley Road	82-D
I-15 SB Ramps at	
Palmdale Road	84-D
Bear Valley Road	80-C

(1) Intersection Capacity Utilization (ICU)

(2) With scheduled intersection improvements which will provide two through and one left turn lane on each approach.

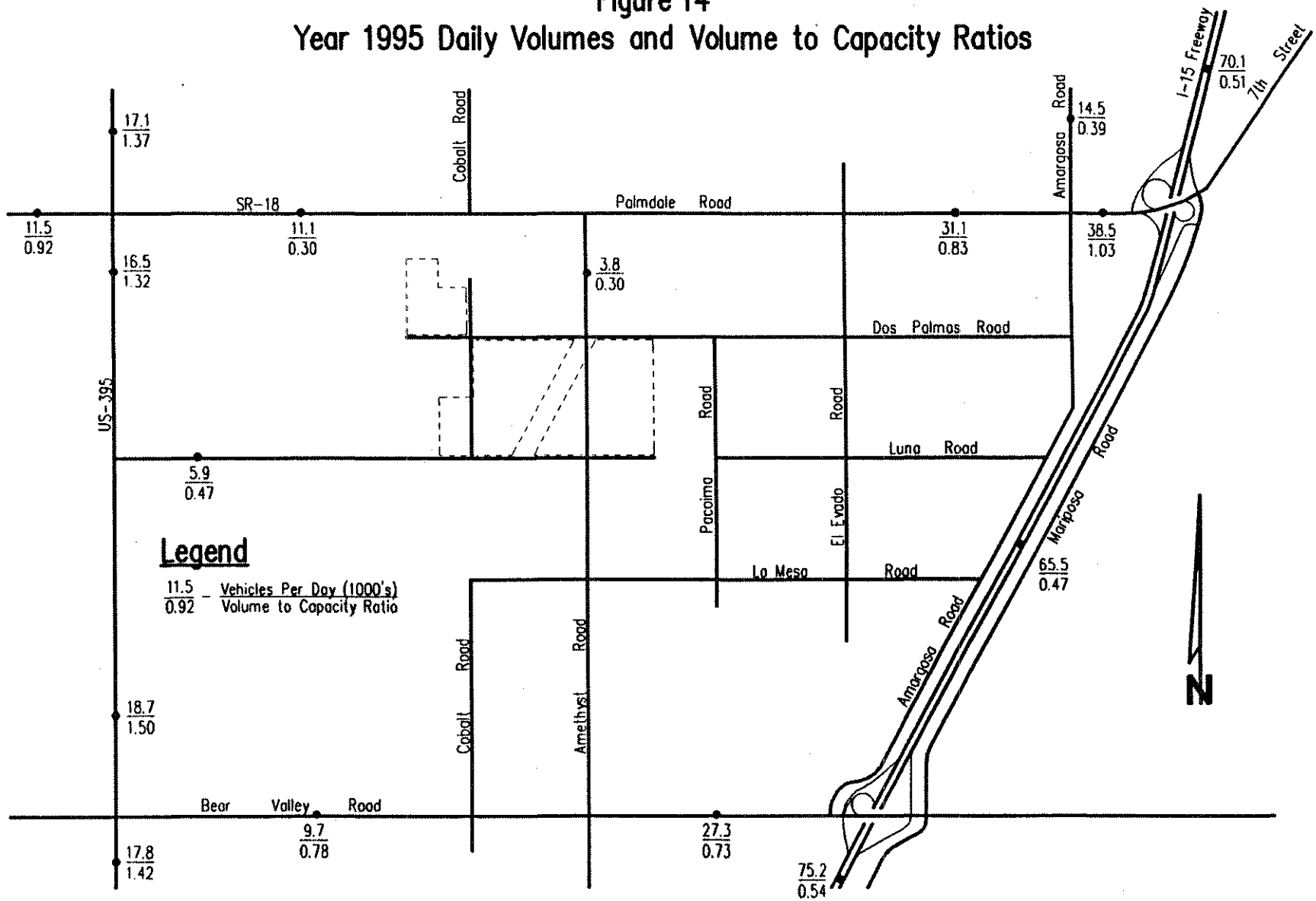
SB = southbound

Figure 13
Talon Ranch Daily Traffic Volumes



Kunzman Associates

Figure 14
Year 1995 Daily Volumes and Volume to Capacity Ratios



Kunzman Associates

Appendices

Appendix A - Glossary of Transportation Terms

Appendix B - Explanation and Calculation of Intersection Capacity Utilization

APPENDIX A

GLOSSARY OF TRANSPORTION TERMS

GLOSSARY OF TRANSPORTATION TERMS

COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
CalTrans:	California Department of Transportation
DU:	Dwelling Unit
EMA:	Environmental Management Agency
FAU:	Federal Aid Urban
FHWA:	Federal Highway Administration
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A constriction along a travelway which limits the amount of traffic which can proceed downstream from its location.

CAPACITY: The maximum number of vehicles which can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Same as yellow time.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CYCLE LENGTH: The time period in seconds required for one complete signal cycle.

CUL-DE-SAC STREET: A local street open at one end only, and with special provisions for turning around.

DAILY CAPACITY: The daily volume of traffic which will result in a volume during the peak hour equal to the capacity of the roadway.

DAILY TRAFFIC: Same as average daily traffic.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FIXED TIME SIGNAL: Same as pretimed signal.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections which are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LINK: The roadway segment between any two intersections.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire imbedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

ORIGIN-DESTINATION SURVEY: A survey to determine the point of origin and the point of destination for a given vehicle trip.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal which directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SIGNAL COORDINATION: Same as interconnected signal system.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal which directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination; i.e. each trip has two trip-ends. A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quality of trips produced and/or attracted attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other.

VEHICLE MILES: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length in miles.

APPENDIX B

EXPLANATION AND CALCULATION OF INTERSECTION CAPACITY UTILIZATION

EXPLANATION AND CALCULATION OF INTERSECTION CAPACITY UTILIZATION (ICU)

The ability of a roadway to carry traffic is referred to as capacity. The capacity is usually greater between intersections and less at intersections because traffic flows continuously between them and only during the green phase at them. Capacity at intersections is best defined in terms of vehicles per lane per hour of green. If capacity is 1600 vehicles per lane per hour of green, and if the green phase is 50 percent of the cycle and there are three lanes, then the capacity is 1600 times 50 percent times 3 lanes, or 2400 vehicles per hour.

The technique used to compare the volume and capacity at an intersection is known as Intersection Capacity Utilization (ICU). ICU, usually expressed as a percent, is the proportion of an hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity. If an intersection is operating at 80 percent of capacity, then 20 percent of the signal cycle is not used. The signal could show red on all indications 20 percent of the time and the signal would just accommodate approaching traffic.

ICU analysis consists of (a) determining the proportion of signal time needed to serve each conflicting movement of traffic, (b) summing the times for the movements, and (c) comparing the total time required to the total time available. For example, if for north-south traffic the northbound traffic is 1600 vehicles per hour, the southbound traffic is 1200 vehicles per hour, and the capacity of either direction is 3200 vehicles per hour, then the northbound traffic is critical and requires 1600/3200 or 50 percent of the signal time. If for the east-west traffic 30 percent of the signal time is required, then it can be seen that the ICU is 50 plus 30, or 80 percent. When left turn phases exist, they are incorporated into the analysis. The critical movements are usually the heavy left turn movements and the opposing through movements.

Level of service is used to describe the quality of traffic flow. Levels of Service A to C operate quite well. Level of Service C is typically the standard to which rural roads are designed, and level of Service D is the standard to which urban roadways are typically designed. Level of Service D is characterized by fairly restricted traffic flow. Level of Service E is the maximum volume a facility can accomodate and will result in possible stoppages of momentary duration. Level of Service F occurs when a facility is overloaded and is characterized by stop-and-go traffic with stoppages of long duration. A description of the various levels of traffic service appears on the following page, along with the relationship between ICU and level of traffic service.

The ICU calculation assumes that an intersection is signalized and that the signal is ideally timed. Although calculating ICU for an unsignalized intersection is invalid, the presumption is that a signal can be installed and the calculation shows whether the geometrics are capable of accommodating the expected volume with a signal. It is possible to have an ICU well below 100 percent, yet have severe traffic congestion. This would occur if one or more movements is not getting sufficient green time to satisfy its demand, and excess green time exists on other movements. This is an operational problem which should be remedied.

Capacity is often defined in terms of roadway width; however, standard lanes have approximately the same capacity whether they are 11 or 14 feet wide. Our data indicates a typical lane, whether a through lane or a left turn lane, has a capacity of approximately 1750 vehicles per hour, with nearly all locations showing a capacity greater than 1600 vehicles per hour per lane. This finding is published in the August, 1978 issue of ITE Journal in the article entitled, "Another Look at Signalized Intersection Capacity" by William Kunzman. For this study, a capacity of 1600 vehicles per hour per lane will be assumed for both through and left turn lanes.

The yellow time can either be assumed to be completely used and no penalty applied, or it can be assumed to be only partially usable. Total yellow time accounts for less than 10 percent of a cycle, and a penalty up

to three percent is reasonable. On the other hand, during peak hour traffic operation the yellow times are nearly completely used. If there are no left turn phases, the left turn vehicles completely use the yellow time. If there are left turn phases, the through traffic continues to enter the intersection on the yellow until just a split second before the red. In this study no penalty will be applied for the yellow because the capacities have been assumed to be only 1600 vehicles per hour per lane when in general they are 1750.

The ICU technique is an ideal tool to quantify existing as well as future intersection operation. The impact of adding a lane can be quickly determined by examining the effect the lane has on the intersection capacity utilization.

ICU parallels another calculation procedure known as the Critical Lane Method with one exception. Critical Lane Method dimensions capacity in terms of standardized vehicles per hour per lane. A Critical Lane Method result of 800 vehicles per hour means that the intersection operates as though 800 vehicles were using a single lane continuously. If one assumes a lane capacity of 1600 vehicles per hour, then a Critical Lane Method calculation resulting in 800 vehicles per hour is the same as an ICU calculation of 50 percent since 800/1600 is 50 percent. It is our opinion that the Critical Lane Method is inferior to the ICU method simply because a statement such as "The Critical Lane Method value is 800 vehicles per hour" means little to most persons, whereas a statement such a "the Intersection Capacity Utilization is 50 percent" communicates clearly. A Critical Lane Method of ICU correspondence table is as follows, assuming a lane capacity of 1600 vehicles per hour.

Critical Lane Method Result	Corresponding ICU Result
800 vehicles per hour	50 percent
960 vehicles per hour	60 percent
1120 vehicles per hour	70 percent
1280 vehicles per hour	80 percent
1440 vehicles per hour	90 percent
1600 vehicles per hour	100 percent

LEVEL OF SERVICE DESCRIPTION

Level of Service	Description	Stopped Delay Per Vehicle (Seconds)	Intersection Capacity Utilization (Percent)
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 5.0	0 to 60
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	5.1 to 15.0	61 to 70
C	Level of Service generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	15.1 to 25.0	71 to 80
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	25.1 to 40.0	81 to 90
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	40.1 to 60.0	91 to 100
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	60.1 +	100 +

Source: "Highway Capacity Manual" Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 1985, Pages 9-4 to 9-5.

INTERSECTION: US 395 (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING CONDITIONS
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	1	1600	260	0	260	23*
NR	0	0	30	0	30	0
NL	0	0	70	0	70	4
ST	2	3200	400	0	400	18
SR	0	0	70	0	70	0
SL	0	0	100	0	100	6*
ET	1	1600	220	0	220	19*
ER	0	0	70	0	70	0
EL	0	0	20	0	20	1
WT	1	1600	190	0	190	18
WR	0	0	50	0	50	0
WL	0	0	50	0	50	3*
ICU						51
LEVELS OF SERVICE						A

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: US 395 (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING CONDITIONS
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	1	1600	260	0	260	19*
NR	0	0	40	0	40	0
NL	1	1600	20	0	20	1
ST	1	1600	330	0	330	24
SR	0	0	50	0	50	0
SL	1	1600	140	0	140	9*
ET	1	1600	100	0	100	8
ER	0	0	10	0	10	0
EL	0	0	20	0	20	1*
WT	1	1600	130	0	130	18*
WR	0	0	120	0	120	0
WL	0	0	30	0	30	2
ICU						47
LEVELS OF SERVICE						A

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: AMARGOSA ROAD (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING CONDITIONS 1
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	2	3200	210	0	210	12*
NR	0	0	170	0	170	0
NL	1	1600	60	0	60	4
ST	2	3200	250	0	250	11
SR	0	0	100	0	100	0
SL	1	1600	190	0	190	12*
ET	2	3200	630	0	630	20*
ER	1	1600	60	0	60	4
EL	1	1600	90	0	90	6
WT	2	3200	570	0	570	18
WR	1	1600	170	0	170	11
WL	1	1600	160	0	160	10*
ICU						54
LEVELS OF SERVICE						A

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: AMARGOSA ROAD (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING CONDITIONS
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	1	1600	30	0	30	7*
NR	0	0	30	0	30	0
NL	0	0	50	0	50	3
ST	1	1600	60	0	60	4
SR	1	1600	70	0	70	4
SL	1	1600	360	0	360	23*
ET	2	3200	660	0	660	22
ER	0	0	30	0	30	0
EL	1	1600	60	0	60	4*
WT	2	3200	830	0	830	39*
WR	0	0	420	0	420	0
WL	1	1600	30	0	30	2
ICU						73
LEVELS OF SERVICE						C

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: I-15 SB RAMPS (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING CONDITIONS
Existing Geoemtrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	0	0	0	0	0	0*
NR	0	0	0	0	0	0
NL	0	0	0	0	0	0
ST	0	0	0	0	0	0
SR	1	1600	270	0	270	17
SL	1	1600	130	0	130	8*
ET	2	3200	1720	0	1720	54*
ER	1	1600	170	0	170	11
EL	0	0	0	0	0	0
WT	2	3200	1160	0	1160	36
WR	0	0	0	0	0	0
WL	0	1600	0	0	0	0*
ICU						62
LEVELS OF SERVICE						B

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: I-15 SB RAMPS (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING CONDITIONS
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	0	0	0	0	0	0*
NR	0	0	0	0	0	0
NL	0	0	0	0	0	0
ST	0	0	0	0	0	0
SR	1	1600	220	0	220	14
SL	1	1600	300	0	300	19*
ET	2	3200	990	0	990	31
ER	0	0	0	0	0	0
EL	1	1600	90	0	90	6*
WT	2	3200	1070	0	1070	33*
WR	1	1600	360	0	360	23
WL	0	1600	0	0	0	0
ICU						58
LEVELS OF SERVICE						A

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: US 395 (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING PLUS PROJECT CONDITIONS 2
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	1	1600	260	10	270	24*
NR	0	0	30	0	30	0
NL	0	0	70	10	80	5
ST	2	3200	400	20	420	19
SR	0	0	70	0	70	0
SL	0	0	100	10	110	7*
ET	1	1600	220	20	240	22*
ER	0	0	70	20	90	0
EL	0	0	20	0	20	1
WT	1	1600	190	10	200	19
WR	0	0	50	10	60	0
WL	0	0	50	0	50	3*
ICU						56
LEVELS OF SERVICE						A

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: US 395 (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING PLUS PROJECT CONDITIONS 2
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	1	1600	260	100	360	28*
NR	0	0	40	40	80	0
NL	1	1600	20	0	20	1
ST	1	1600	330	70	400	28
SR	0	0	50	0	50	0
SL	1	1600	140	0	140	9*
ET	1	1600	100	0	100	8
ER	0	0	10	0	10	0
EL	0	0	20	0	20	1*
WT	1	1600	130	0	130	19*
WR	0	0	120	0	120	0
WL	0	0	30	20	50	3
ICU						57
LEVELS OF SERVICE						A

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: AMARGOSA ROAD (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING PLUS PROJECT CONDITIONS 2
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	2	3200	210	0	210	12*
NR	0	0	170	0	170	0
NL	1	1600	60	0	60	4
ST	2	3200	250	0	250	13
SR	0	0	100	50	150	0
SL	1	1600	190	0	190	12*
ET	2	3200	630	80	710	22*
ER	1	1600	60	0	60	4
EL	1	1600	90	30	120	8
WT	2	3200	570	120	690	22
WR	1	1600	170	0	170	11
WL	1	1600	160	0	160	10*
ICU						56
LEVELS OF SERVICE						A

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: AMARGOSA ROAD (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING PLUS PROJECT CONDITIONS 2
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	1	1600	30	0	30	7*
NR	0	0	30	0	30	0
NL	0	0	50	0	50	3
ST	1	1600	60	0	60	4
SR	1	1600	70	30	100	6
SL	1	1600	360	0	360	23*
ET	2	3200	660	90	750	24
ER	0	0	30	0	30	0
EL	1	1600	60	20	80	5*
WT	2	3200	830	130	960	43*
WR	0	0	420	0	420	0
WL	1	1600	30	0	30	2
ICU						78
LEVELS OF SERVICE						C

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: I-15 SB RAMPS (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING PLUS PROJECT CONDITIONS 2
Existing Geoemtrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	0	0	0	0	0	0*
NR	0	0	0	0	0	0
NL	0	0	0	0	0	0
ST	0	0	0	0	0	0
SR	1	1600	270	70	340	21
SL	1	1600	130	0	130	8*
ET	2	3200	1720	70	1790	56*
ER	1	1600	170	0	170	11
EL	0	0	0	0	0	0
WT	2	3200	1160	30	1190	37
WR	0	0	0	0	0	0
WL	0	1600	0	0	0	0*
ICU						64
LEVELS OF SERVICE						B

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: I-15 SB RAMPS (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: EXISTING PLUS PROJECT CONDITIONS 2
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	EXISTING VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	0	0	0	0	0	0*
NR	0	0	0	0	0	0
NL	0	0	0	0	0	0
ST	0	0	0	0	0	0
SR	1	1600	220	0	220	14
SL	1	1600	300	0	300	19*
ET	2	3200	990	30	1020	34
ER	0	0	0	60	60	0
EL	1	1600	90	0	90	6*
WT	2	3200	1070	130	1200	38*
WR	1	1600	360	0	360	23
WL	0	1600	0	0	0	0
ICU						63
LEVELS OF SERVICE						B

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: US 395 (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: YEAR 1995 CUMULATIVE CONDITIONS 1
With CalTrans Improvements

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	OTHER VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	2	3200	340	10	350	12
NR	0	0	40	0	40	0
NL	1	1600	90	10	100	6*
ST	2	3200	520	20	540	20*
SR	0	0	90	0	90	0
SL	1	1600	130	10	140	9
ET	2	3200	290	20	310	13*
ER	0	0	90	20	110	0
EL	1	1600	30	0	30	2
WT	2	3200	250	10	260	11
WR	0	0	70	10	80	0
WL	1	1600	70	0	70	4*
ICU						43
LEVELS OF SERVICE						A

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: US 395 (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: YEAR 1995 CUMULATIVE CONDITIONS 1
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	OTHER VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	1	1600	340	100	440	33*
NR	0	0	50	40	90	0
NL	1	1600	30	0	30	2
ST	1	1600	430	70	500	36
SR	0	0	70	0	70	0
SL	1	1600	180	0	180	11*
ET	1	1600	130	0	130	11
ER	0	0	10	0	10	0
EL	0	0	30	0	30	2*
WT	1	1600	170	0	170	24*
WR	0	0	160	0	160	0
WL	0	0	40	20	60	4
ICU						70
LEVELS OF SERVICE						B

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: AMARGOSA ROAD (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: YEAR 1995 CUMULATIVE CONDITIONS 1
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	OTHER VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	2	3200	280	0	280	16*
NR	0	0	220	0	220	0
NL	1	1600	80	0	80	5
ST	2	3200	330	0	330	16
SR	0	0	130	50	180	0
SL	1	1600	250	0	250	16*
ET	2	3200	830	80	910	28*
ER	1	1600	80	0	80	5
EL	1	1600	120	30	150	9
WT	2	3200	750	120	870	27
WR	1	1600	220	0	220	14
WL	1	1600	210	0	210	13*
ICU						73
LEVELS OF SERVICE						C

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: AMARGOSA ROAD (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: YEAR 1995 CUMULATIVE CONDITIONS 1
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	OTHER VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	1	1600	40	0	40	9*
NR	0	0	40	0	40	0
NL	0	0	70	0	70	4
ST	1	1600	80	0	80	5
SR	1	1600	90	30	120	8
SL	1	1600	470	0	470	29*
ET	2	3200	860	90	950	31
ER	0	0	40	0	40	0
EL	1	1600	80	20	100	6*
WT	2	3200	1090	130	1220	38*
WR	1	1600	550	0	550	34
WL	1	1600	40	0	40	3
ICU						82
LEVELS OF SERVICE						D

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: I-15 SB RAMPS (NS) AND PALMDALE ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: YEAR 1995 CUMULATIVE CONDITIONS 1
Existing Geoemtrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	OTHER VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	0	0	0	0	0	0*
NR	0	0	0	0	0	0
NL	0	0	0	0	0	0
ST	0	0	0	0	0	0
SR	1	1600	350	70	420	26
SL	1	1600	170	0	170	11*
ET	2	3200	2250	70	2320	73*
ER	1	1600	220	0	220	14
EL	0	0	0	0	0	0
WT	2	3200	1520	30	1550	48
WR	0	0	0	0	0	0
WL	0	1600	0	0	0	0*
ICU						84
LEVELS OF SERVICE						D

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

INTERSECTION: I-15 SB RAMPS (NS) AND BEAR VALLEY ROAD (EW)
RUN TITLE: FOXFIRE RANCH TRAFFIC STUDY (8/92)

LAND USE: YEAR 1995 CUMULATIVE CONDITIONS 1
Existing Geometrics

INTERSECTION VOLUMES AND CAPACITY UTILIZATION

MOVEMENTS	LANES	CAPACITY	OTHER VOLUME	PROJECT VOLUME	TOTAL VOLUME	V/C RATIO(%)
			PM	PM	PM	PM
NT	0	0	0	0	0	0*
NR	0	0	0	0	0	0
NL	0	0	0	0	0	0
ST	0	0	0	0	0	0
SR	1	1600	290	0	290	18
SL	1	1600	390	0	390	24*
ET	2	3200	1300	30	1330	43
ER	0	0	0	60	60	0
EL	1	1600	120	0	120	8*
WT	2	3200	1400	130	1530	48*
WR	1	1600	470	0	470	29
WL	0	1600	0	0	0	0
ICU						80
LEVELS OF SERVICE						C

ICU IS THE SUM OF THE CRITICAL MOVEMENTS, DENOTED BY AN ASTERISK (*)

THE TURNING MOVEMENTS ADD TO THE THROUGH VOLUMES
WHEN THERE ARE NO TURNING LANES.

N: NORTH, S: SOUTH, E: EAST, W: WEST
T: THROUGH, R: RIGHT, L: LEFT

Foxfire Ranch
Focused Traffic Study
(May, 1993)

Kunzman Associates

Transportation Planning • Traffic Engineering

Kunzman Associates
Transportation Planning • Traffic Engineering

May 10, 1993

Mr. Arthur Levine
Century Homes
1535 South "D" Street, Suite 200
San Bernardino, CA 92408

Dear Mr. Levine:

We are pleased to present this focused traffic impact analysis for the Foxfire Ranch development in the City of Victorville. The impacts on the primary access routes to Foxfire Ranch in 1996 and in 1999 are evaluated. We trust that the findings, which are listed in Section 1, will be of immediate as well as continuing value to you and the City of Victorville in evaluating the project's traffic impacts.

It has been a pleasure to serve your needs on this project. Should you have any questions, or if we can be of further assistance, please do not hesitate to call.

Sincerely,

KUNZMAN ASSOCIATES

Gary Hansen

Gary Hansen, P.E.
Expiration Date: 3-31-97

REGISTERED PROFESSIONAL ENGINEER
GARY R. HANSEN
No. 323
TRAFFIC
STATE OF CALIFORNIA

#1540f

cc: Steve Long

4650 Barranca Parkway • Irvine, CA 92714 • FAX (714) 559-0260 • Telephone (714) 559-4231

Foxfire Ranch
Focused Traffic Study
(May, 1993)

Kunzman Associates
Transportation Planning • Traffic Engineering

Table of Contents

Section — Page No.

1. Findings 2

   - Existing Traffic Conditions
   - Traffic Impacts
   - Future Traffic Conditions

2. Project Description 4

   - Location
   - Entitlements
   - Development Schedule

3. Existing Traffic Conditions 7

   - Surrounding Street System
   - Existing Travel Lanes and Intersection Controls
   - 1992 Daily Traffic Volumes
   - Daily Volume to Capacity Ratios
   - Existing Intersection Levels of Service
   - Planned Improvements

4. Project Traffic 16

   - Traffic Generation
   - Traffic Distribution and Assignment

5. Year 1996 Traffic Conditions 24

   - Annual Growth Rate
   - Cumulative Daily Volumes
   - Cumulative Daily Volume to Capacity Ratios
   - Cumulative Intersection Levels of Service

6. Year 1999 Cumulative Conditions 27

   - Annual Growth Rate
   - Cumulative Daily Volumes
   - Cumulative Daily Volume to Capacity Ratios
   - Cumulative Intersection Levels of Service

Appendix

Appendix A - Calculation of Intersection Levels of Service

List of Figures

Figure No.	Title	Page No.
1	Project Location	6
2	Existing Traffic Conditions	13
3	1992 Daily Volumes and Volume to Capacity Ratios	14
4	Existing Evening Peak Hour Turning Movement Volumes	15
5	Future Project Traffic Distribution	21
6a	Project Traffic Distribution - 1996	22
6b	Project Traffic Distribution - 1999	23
7	1996 Cumulative Daily Traffic Volumes and Volume to Capacity Ratios	26
8	1999 Cumulative Daily Traffic Volumes and Volume to Capacity Ratios	29

List of Tables

Table No.	Title	Page No.
1	Level of Service Description	11
2	1992 Intersection Levels of Service	12
3	ITE Trip Generation Rates	18
4a	Estimated Project Traffic Generation - 1996	19
4b	Estimated Project Traffic Generation - 1999	20
5	1996 Cumulative Intersection Levels of Service	25
6	1999 Cumulative Intersection Levels of Service	28

Foxfire Ranch

Traffic Study

This report contains a focused traffic impact analysis for the Foxfire Ranch development in the City of Victorville. The impacts on the access routes to Foxfire Ranch in the future with a partial circulation system are evaluated.

The traffic report contains documentation of existing traffic conditions, traffic generated by the project, distribution of the project traffic to roads in the vicinity of the site, an analysis traffic conditions in 1996, and an analysis of traffic conditions in 1999 at project completion. Each of these topics is contained in a separate section of the report. The first section is "Findings", and subsequent sections expand upon the findings. In this way, information on any particular aspect of the study can be easily located by the reader.

1. Findings

This section summarizes the existing traffic conditions, project traffic impacts, and the future traffic conditions.

Existing Traffic Conditions

a. The project currently has approximately 30 occupied dwellings.

b. The arterial system is incomplete at present and existing roadways in the vicinity of the site are only partially improved.

c. The primary access roads (i.e. Amethyst Road, El Evado Road and La Mesa Road) to the site are currently operating at Level of Service A.

d. Minor street movements at the intersections of the access roads and the surrounding arterial street system are currently operating at Levels of Service E-F during the evening peak hour. However, with the installation of planned signals (by the end of 1993) all intersections will operate at Level of Service B during the evening peak hour.

e. CalTrans has plans to widen Palmdale Road to four lanes easterly from U.S. 395 and make improvements at the intersection of U.S. 395/Palmdale Road by 1994.

Traffic Impacts

a. The proposed land uses for the site include residential, commercial, high school and park land uses.

b. In 1996, Foxfire Ranch is expected to generate approximately 3,400 daily vehicle trips, 350 of which are expected to occur during the evening peak hour.

c. At completion in 1999, the project is estimated to generate approximately 13,700 daily vehicle trips, 1,320 of which are expected to occur during the evening peak hour.

Future Traffic Conditions

a. In 1996, all intersections and roadway segments analyzed will operate at Level of Service C or better. Therefore, no mitigations are needed.

b. In 1999 with the extension of Amethyst Road to Palmdale Road and with the installation of a signal at Palmdale Road/Amethyst Road, all intersections and roadway segments analyzed will operate at Level of Service C or better.

2. Project Description

This section discusses the project's location, the land use entitlements, and traffic characteristics of the planned land uses.

Location

The Foxfire Ranch development includes parcels between Palmdale Road (SR-18) and Luna Road in the City of Victorville. Figure 1 shows the location of the Foxfire Ranch parcels.

Entitlements

The project has been approved for 902 single family residential units, 3.5 acres of neighborhood commercial facilities, a high school and a 2.5 acre neighborhood park.

The following describes the approved land uses from a traffic engineering viewpoint:

Single Family Detached Dwellings: The primary market for these units will be families with children. As a result, peak traffic volumes will occur during home-to-work and work-to-home trips. Child-related trips such as home-to-school or home-to-Little League are also a significant factor in the daily trip generation, but they have a smaller influence on peak hour volumes.

Neighborhood Commercial: Commercial developments of this type are characterized by a large number of short duration trips throughout the day. Their typical opening times produce minor traffic volumes during the morning peak hour. During the evening peak hour, people driving home from work stop to shop, creating a minor peak in commercially generated traffic volumes.

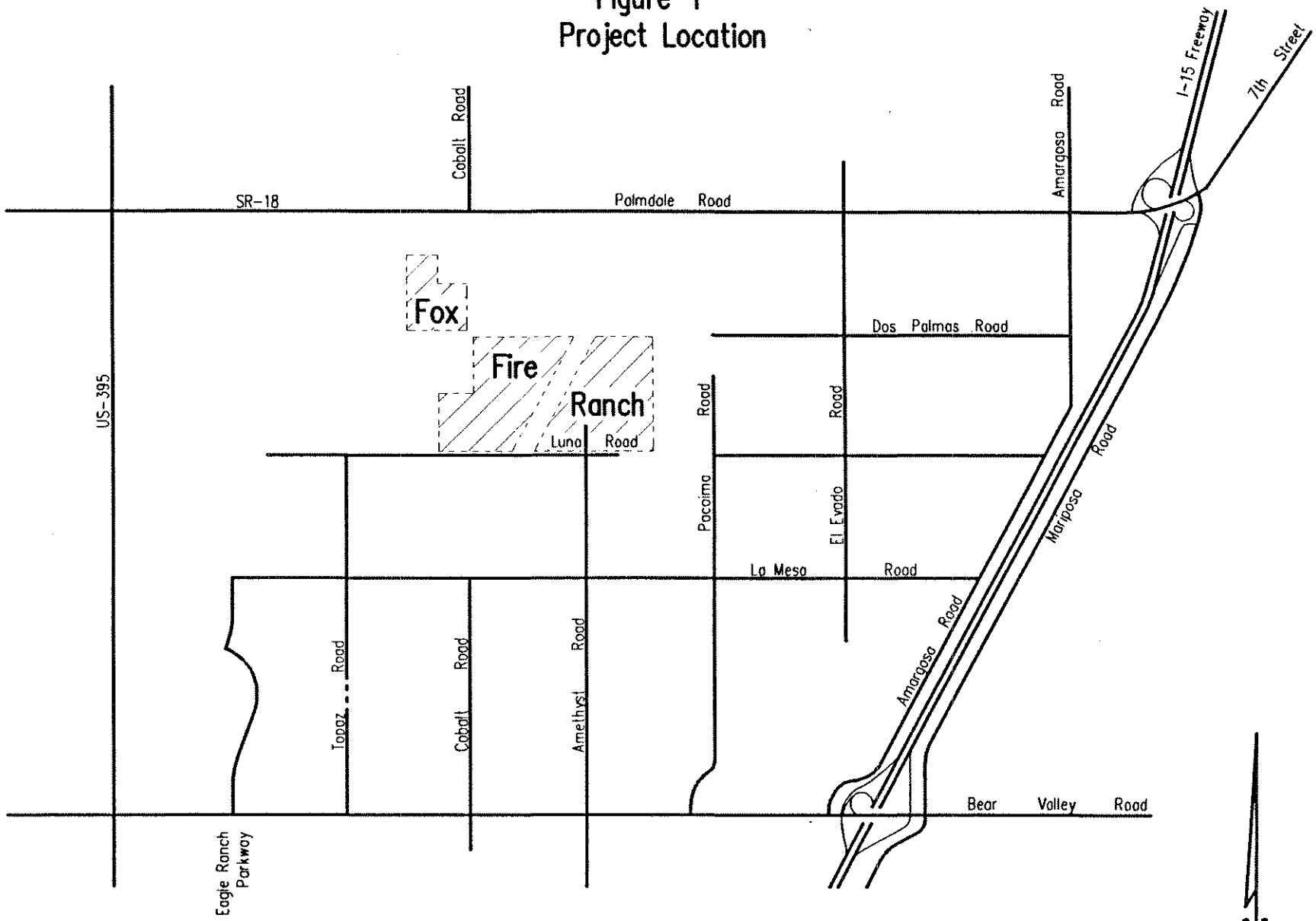
High School: A high school will generate more traffic than schools of lower grades. This is caused by student driving and larger school district boundaries. It is not anticipated that a significant number of student trips will occur during the evening peak hour.

Park: Neighborhood parks generate little vehicle traffic because most persons walk to them. Of the traffic they do generate, it is usually from within the community and during off-peak traffic hours.

Development Schedule

Currently there are approximately 30 occupied single family dwellings in Foxfire Ranch. For the purposes of this analysis it was assumed that 320 additional single family dwellings would be built and occupied by 1996 with the balance of residential and non-residential land uses being complete in 1999.

Figure 1
Project Location



Kunzman Associates

3. Existing Traffic Conditions

The traffic conditions as they exist today are discussed below and illustrated in Figures 2, 3 and 4.

Surrounding Street System

Existing roadways that will be utilized by the development include Palmdale Road, Dos Palmas Road, Topaz Road, Amethyst Road, Luna Road, La Mesa Road, U.S. 395 and Bear Valley Road. In the vicinity of the project site, the following roadway conditions exist.

Palmdale Road: Palmdale Road (SR-18) extends westerly from I-15 and provides access to the cities of Palmdale and Lancaster. In the vicinity of the site, it is a two lane road which transitions to four lanes to the east of El Evado Road. Palmdale Road is designated as a super arterial (6 lanes divided) on the City's Circulation Element.

Dos Palmas Road: Dos Palmas Road is a two lane paved street between Pacoima Road and Amargosa Road. It has direct residential frontage with a moderate use of on-street parking.

Topaz Road: Topaz Road exists as a paved two lane street between Luna Road and Bear Valley Road except for a short section in the Southern California Edison easement. Topaz Road is designated as a future four lane arterial street.

Amethyst Road: Amethyst Road is designated as a future four lane street and is intended to be the major north-south arterial in the vicinity of the site. Varying street sections of Amethyst Road currently exist south of Luna Road.

Luna Road: Luna Road currently exists from Amethyst Road to west of Topaz Road. It is designated as a two lane collector street.

La Mesa Road: This future major arterial extends easterly from Eagle Ranch to Armargosa Road. Currently it provides the best east-west access in the vicinity of the site.

U.S. 395: This state highway is a two lane roadway providing access to the I-15 Freeway to the south and to the City of Adelanto and the Owens Valley to the north. It is designated as a future super arterial on the circulation element.

Bear Valley Road: Bear Valley Road is designated as a future super arterial and accommodates traffic generated in Victorville and in Hesperia. Bear Valley Road has a diamond type interchange with the I-15 Freeway.

Existing Travel Lanes and Intersection Controls

Figure 2 identifies the existing conditions for roadways near the site. The number of through lanes and the existing intersection controls are shown.

1992 Daily Traffic Volumes

Figure 3 depicts the average daily two-way traffic volumes on the streets analyzed. The traffic volumes were obtained from the City of Victorville.

Daily Volume to Capacity Ratios

Roadway capacity is generally defined as the number of vehicles which can be reasonably expected to pass over a given section of road in a given time period. Congestion, high accident rates, the quality of traffic flow (Level of Service), and environmental acceptability all come into play in defining a particular roadway's effective capacity. It is possible to identify maximum desirable volumes for typical roadway types based on the number of roadway travel lanes. These daily volumes reflect estimates of the amount of daily traffic which will result in peak hour traffic volumes equal to the maximum desirable capacity of each roadway type. Two lane undivided roadways are estimated to have a maximum (i.e. Level of Service E) capacity of 12,500 vehicles per day four lane undivided roadways are estimated to have a maximum capacity of 25,000 vehicles per day, four lane divided roadways are estimated to have a maximum capacity of 37,500 vehicles per day.

By dividing the 1992 daily volumes by the daily capacities listed above, volume to capacity ratios have been calculated and are shown in Figure 3. Table 1 equates volume to capacity ratio with Level of Service. Figure 3 shows that the roadways analyzed are currently operating at Level of Service A.

Existing Intersection Levels of Service

Figure 4 shows the evening peak hour turning movement volumes at the intersections analyzed.

The peak hour levels of service at unsignalized intersections were calculated using the methodology in Chapter 10 of the 1985 Highway Capacity Manual (HCM).

The peak hour levels of service at the signalized intersections were calculated using the delay method in Chapter 9 of the HCM. This method views and intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity times 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value of 1.00 is generally assigned for ideal conditions and values less than 1.00 are generally assigned as a less than desirable condition occurs. For instance, the truck factor is 1.00 for 0 percent truck traffic and 0.99 for 2 percent truck traffic.

Once the lane group volume is known and the lane group capacity is estimated using the 1985 HCM techniques, a volume to capacity ratio can be calculated for the lane group. With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length (delay is approximately proportional to cycle length)

2. Amount of red time faced by a lane group

3. Amount of yellow time for that lane group

4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per

vehicle is then used to estimate Level of Service. The Level of Services are defined in terms of delay as follows:

Level of Service	Average Stopped Delay Per Vehicle (Seconds)
A	0 to 5.00
B	5.01 to 15.00
C	15.01 to 25.00
D	25.01 to 40.00
E	40.01 to 60.00
F	60.01 and up

Table 2 lists the existing levels of service during the evening peak hour and shows that the signalized intersection is operating at Level of Service B. Some minor street movements at the two intersections controlled by STOP signs are operating at Levels of Service E-F.

Planned Improvements

CalTrans has plans for improvements on Palmdale Road and at the intersection of U.S. 395/Palmdale Road. By 1994, it is expected that:

1. Palmdale Road will be widened to four lanes easterly from U.S. 395 to Caheunga Road (the point at which Palmdale Road is currently four lanes).

2. At U.S. 395/Palmdale Road, the intersection will be widened to provide two through and one left turn lane on each approach.

The City of Victorville is in the process of awarding contracts for the construction of traffic signals at two intersections. By the end of 1993, Palmdale Road/El Evado Road and Armargosa Road/La Mesa Road will be signalized. The resulting levels of service during the evening peak hour are shown on Table 2. (Note: as directed by the City of Victorville, a portion of the traffic currently using Palmdale Road/El Evado Road was shifted to Armargosa Road/La Mesa Road after signalization).

Table 1

LEVEL OF SERVICE DESCRIPTION

Level of Service	Description	Volume to Capacity Ratio
A	Level of Service A occurs when progression is extremely favorable and vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0.60 and below
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	0.61 to 0.70
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	0.71 to 0.80
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	0.81 to 0.90
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	0.91 to 1.00
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	1.01 and up

Source: "Highway Capacity Manual" Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 1985, Pages 9-4 to 9-5.

Table 2

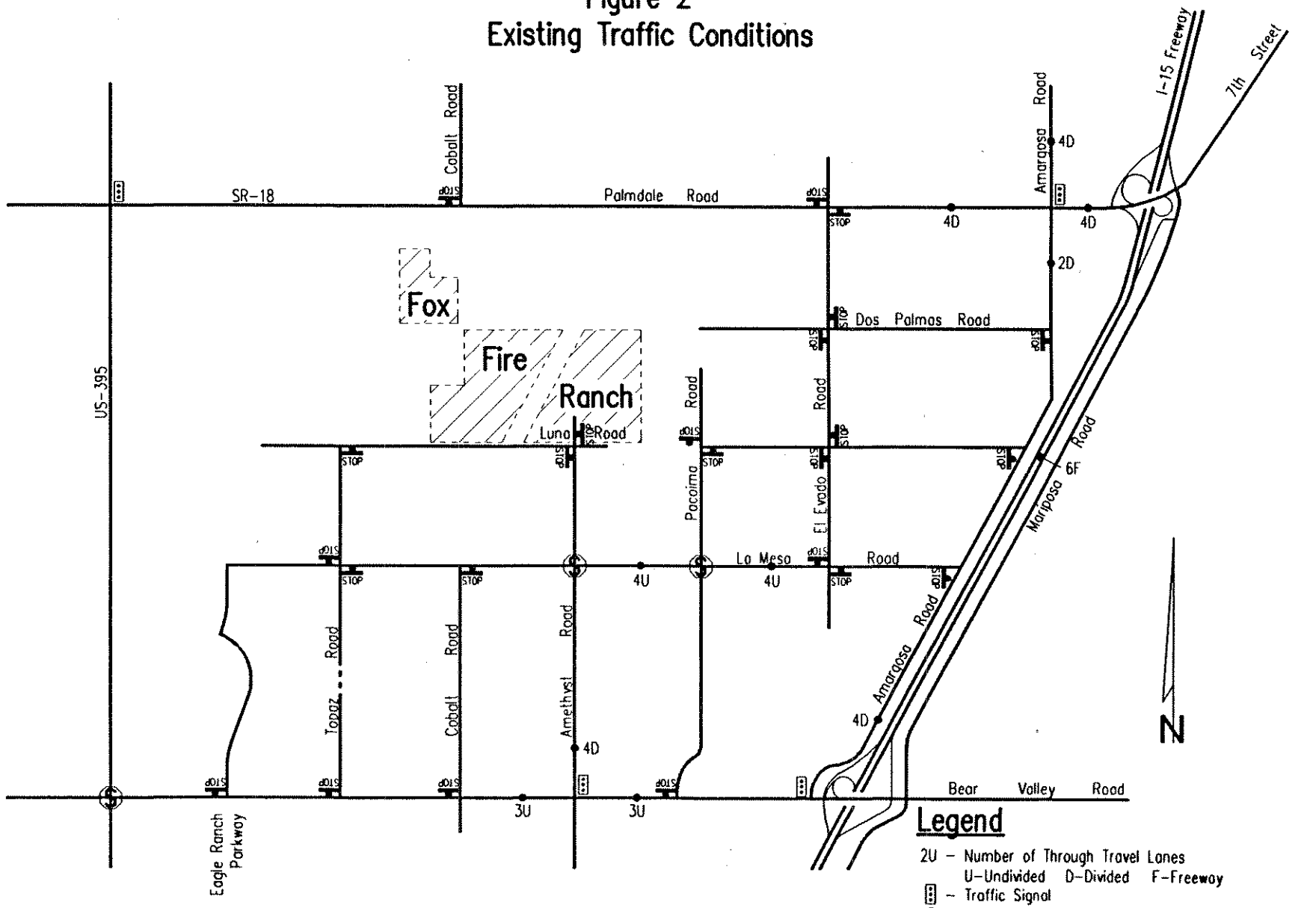
EXISTING INTERSECTION LEVELS OF SERVICE

Intersection	Traffic Control Device	Evening Peak Hour		
		Delay (sec/veh)	Reserve Capacity	Level of Service
Palmdale Road (EW) at El Evado Road (NS)	Two-Way Stop			
Eastbound Left			556	A
Westbound Left			308	B
Northbound Through			46	E
Northbound Right			596	A
Northbound Left			7	F
Southbound Through			46	E
Southbound Right			736	A
Southbound Left			8	F
	(Signal)*	(14.6)		(B)
Bear Valley Road (EW) at Amethyst Road (NS)	Signal	12.8		B
Armargosa Road (NS) at La Mesa Road (EW)	Two-Way Stop			
Northbound Left			555	A
Eastbound Right			434	A
Eastbound Left			18	E
	(Signal)*	(10.3)		(B)

NS = North-South
EW = East-West

* Scheduled for installation by end of 1993.

Figure 2
Existing Traffic Conditions



Legend

2U – Number of Through Travel Lanes
U–Undivided D–Divided F–Freeway

– Traffic Signal

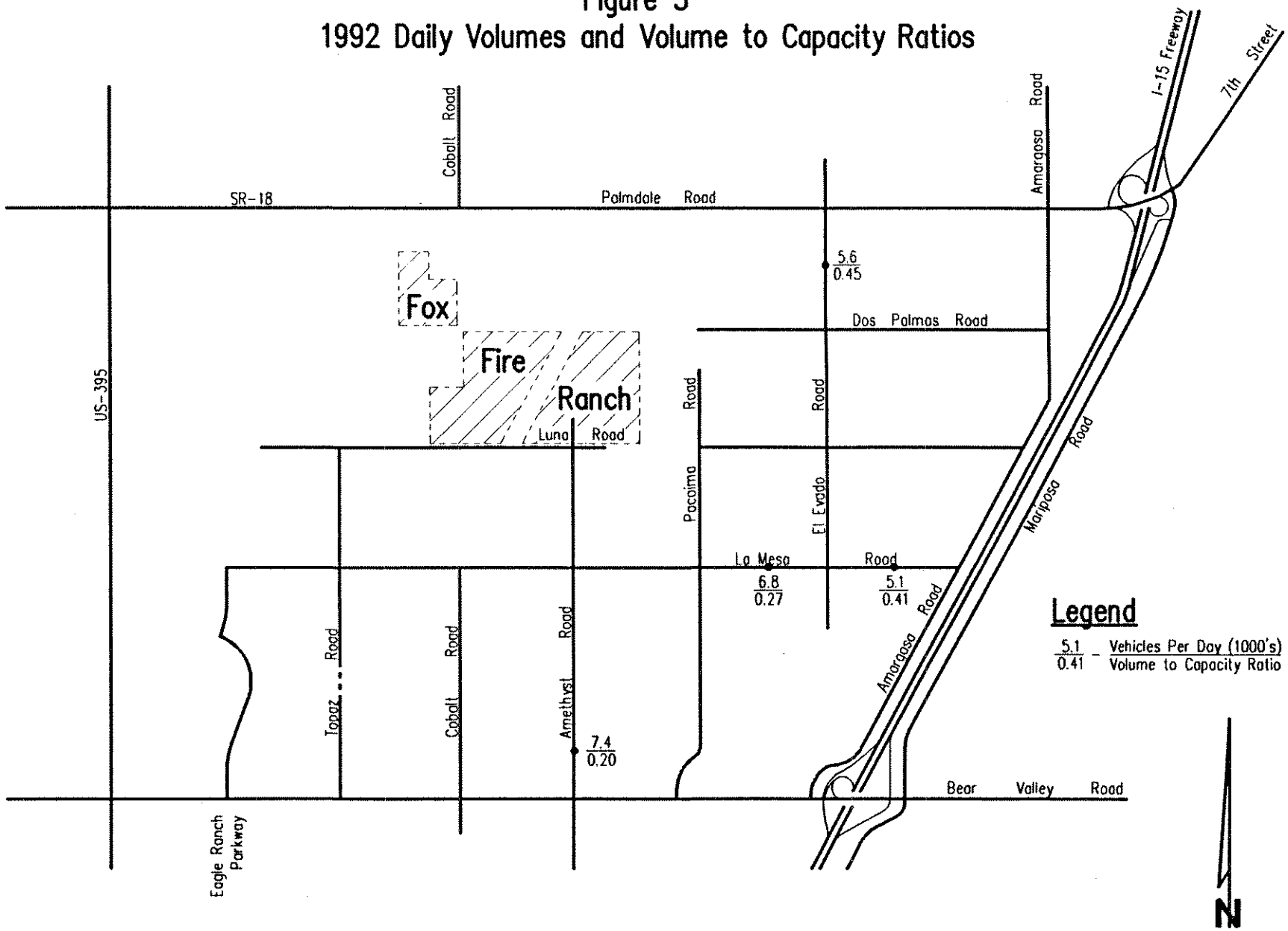
– Stop Sign

– Four Way Stop

All streets are two lane undivided unless otherwise noted

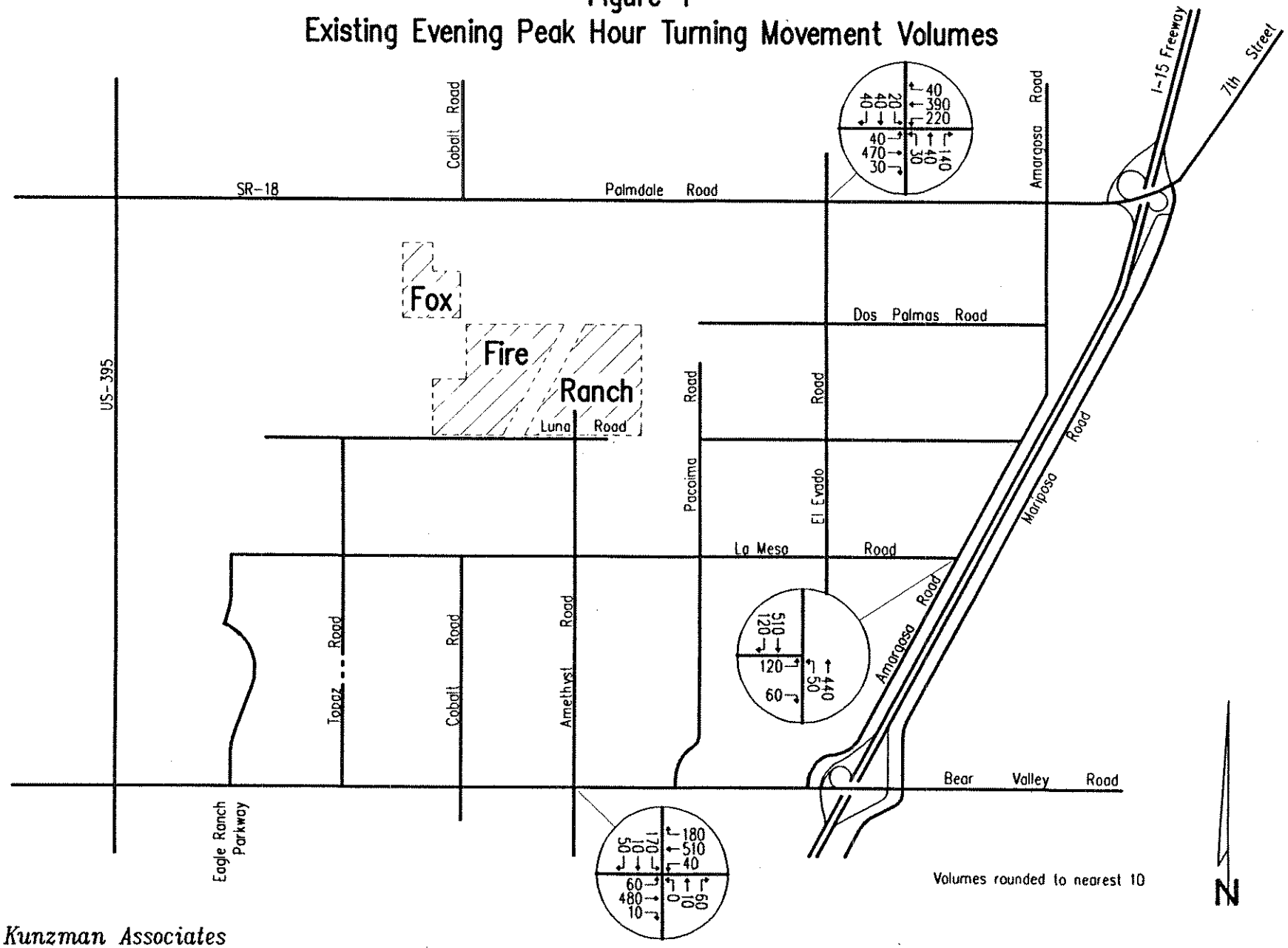
Kunzman Associates

Figure 3
1992 Daily Volumes and Volume to Capacity Ratios



Kunzman Associates

Figure 4
Existing Evening Peak Hour Turning Movement Volumes



Kunzman Associates

4. Project Traffic

To estimate project-related traffic volumes at various points on the street network, a three step process is utilized. First, the traffic which will be generated by the proposed development is determined. Secondly, the traffic volumes are geographically distributed to major attractions of trips, such as employment centers, commercial centers, recreational areas or residential areas. Finally, the trips are assigned to specific roadways and the project-related traffic volumes are determined on a route-by-route basis.

Traffic Generation

The traffic generated by the project is determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are expressed in terms of trip ends per person, trip ends per employee, trip ends per acre, trip ends per dwelling, or trip ends per thousand square feet of floor space. For instance, if a particular land use generates six outbound trips per acre in the morning peak hour, then six vehicles are expected to leave the site in the morning peak hour for each acre of development.

Significant research efforts have been made by CalTrans, the Institute of Transportation Engineers (ITE), Kunzman Associates, and others to establish the correlation between trips and land use. From this body of information, trip generation rates can be estimated with reasonable accuracy for various land uses. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and our life styles remain similar to what we know today. A major change in these variables may affect trip generation rates.

Table 3 lists the trip generation rates developed by ITE which were used to estimate the daily traffic, morning peak hour inbound and outbound traffic, and evening peak hour inbound and outbound traffic volumes for the approved land uses. By multiplying the trip generation rates by the land use quantities, the traffic volumes are determined. Tables 4a and 4b show the estimated peak hour and daily traffic volumes in 1996 and in 1999 (project completion). The 10 acre high school site was assumed to have 2000 students and the traffic generated by the neighborhood park was assumed to be accounted for in the project residential traffic.

Traffic Distribution and Assignment

Traffic distribution is the determination of the directional orientation of traffic. For this project, it is based on the geographical location of employment centers, commercial centers, recreational areas, and existing and future residential areas.

Traffic assignment is the determination of which specific route development traffic will use, once the generalized traffic distribution is determined. The basic factors affecting route selection are minimum time path and minimum distance path.

Figure 5 shows the directional distribution and assignment of the project traffic with future connections to Palmdale Road and to U.S. 395. Figure 6a shows the distributions in 1996 (without any new streets) and Figure 6b shows the distribution in 1999 (with the extension of Amethyst Road to Palmdale Road).

Table 3

ITE TRIP GENERATION RATES

Land Use	Units*	Morning Peak Hour		Evening Peak Hour		Daily
		In	Out	In	Out	
Single Family Residential	DU	0.19	0.55	0.66	0.35	9.55
Commercial (3.5 acre site)	AC	18.95	11.11	54.56	59.02	1243.64
High School	ST	0.28	0.13	0.02	0.06	1.38

*DU = dwelling unit
AC = acre
ST = student

Source: Institute of Transportation Engineers, Trip Generation, Fifth Edition, 1991, Land Use Categories 210, 530, and 820.

Note: ITE trip generation rates for commercial land uses are stated in thousand square feet of building area. The ITE rates were converted to acres assuming a 0.25 floor to area ratio (FAR).

Table 4a

ESTIMATED PROJECT TRAFFIC GENERATION - 1996

Land Use	Morning Peak Hour		Evening Peak Hour		Daily
	In	Out	In	Out	
Single Family Dwellings					
Existing (30 DU)	10	20	20	10	300
Future (320 DU)	60	180	210	110	3,100
Total	70	200	230	120	3,400

DU - dwelling units

* Total of 350 includes 30 existing dwellings

Note: Trips generated are rounded to nearest 10 for peak hour and 100 for daily.

Table 4b

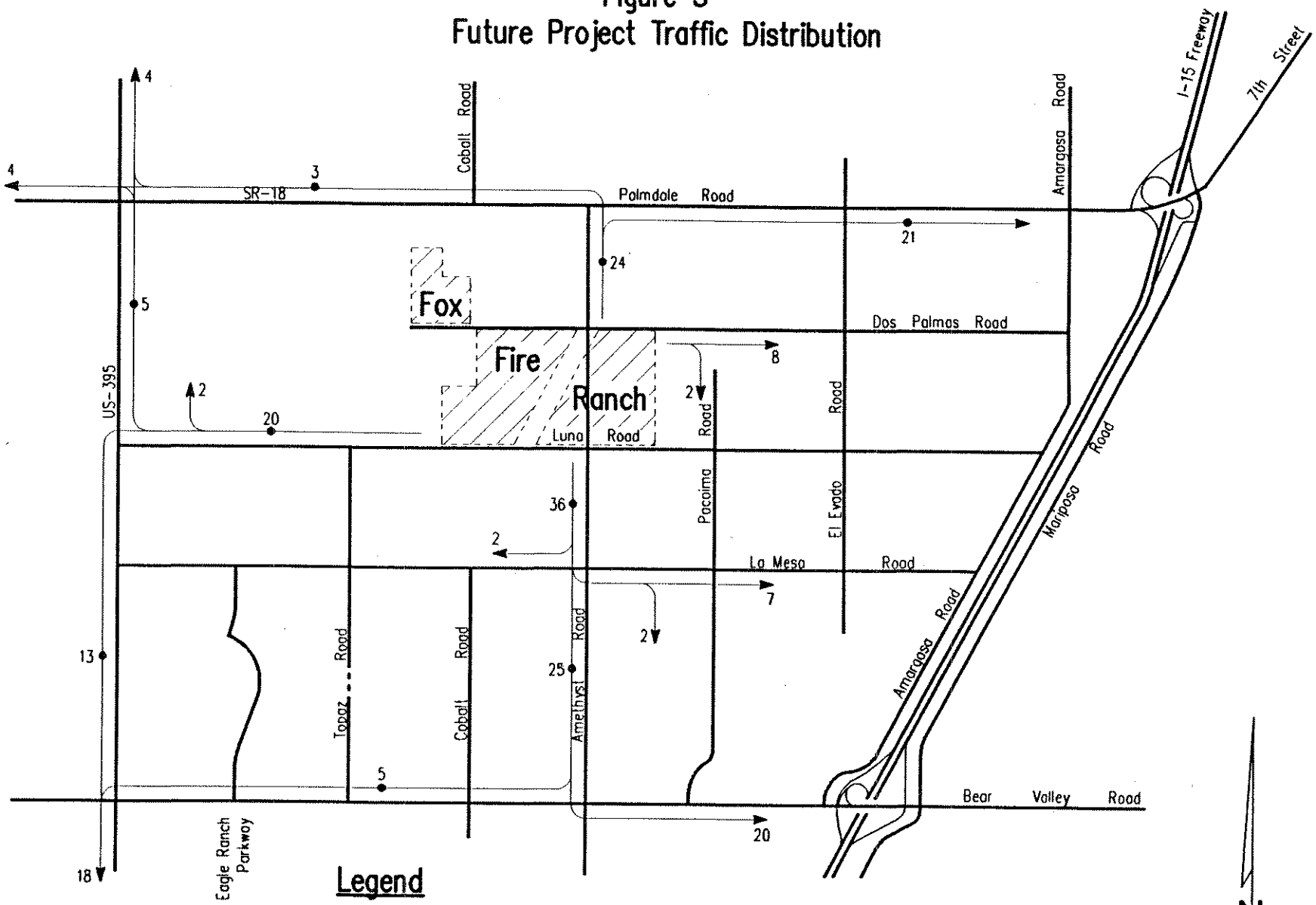
ESTIMATED PROJECT TRAFFIC GENERATION - 1999*

Land Use	Morning Peak Hour		Evening Peak Hour		Daily
	In	Out	In	Out	
Single Family Dwellings	170	500	610	310	8,600
Commercial	50	30	130	140	2,900
High School	450	210	30	100	2,200
Total	670	740	770	550	13,700

* At project completion - traffic volumes taken from Table 7 on Page 24 in the report "Foxfire Ranch Traffic Study" prepared by Kunzman Associates in August, 1992.

Note: Trips generated are rounded to nearest 10 for peak hour and 100 for daily.

Figure 5
Future Project Traffic Distribution



Legend

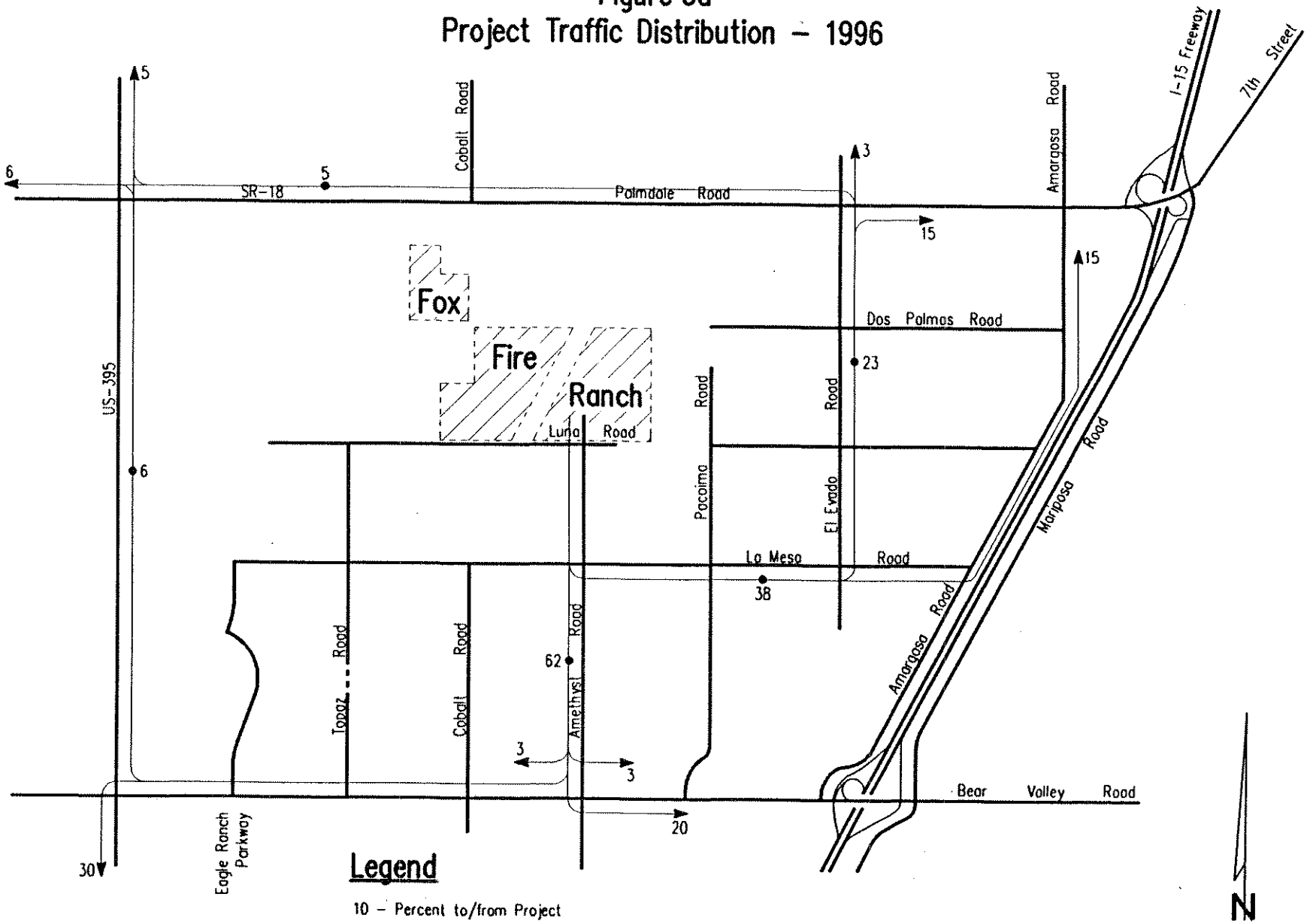
10 – Percent to/from Project

Note: 10 percent are internal to Foxfire Ranch and immediate vicinity

Source: "Foxfire Ranch Traffic Study," Kunzman Associates, August 1992

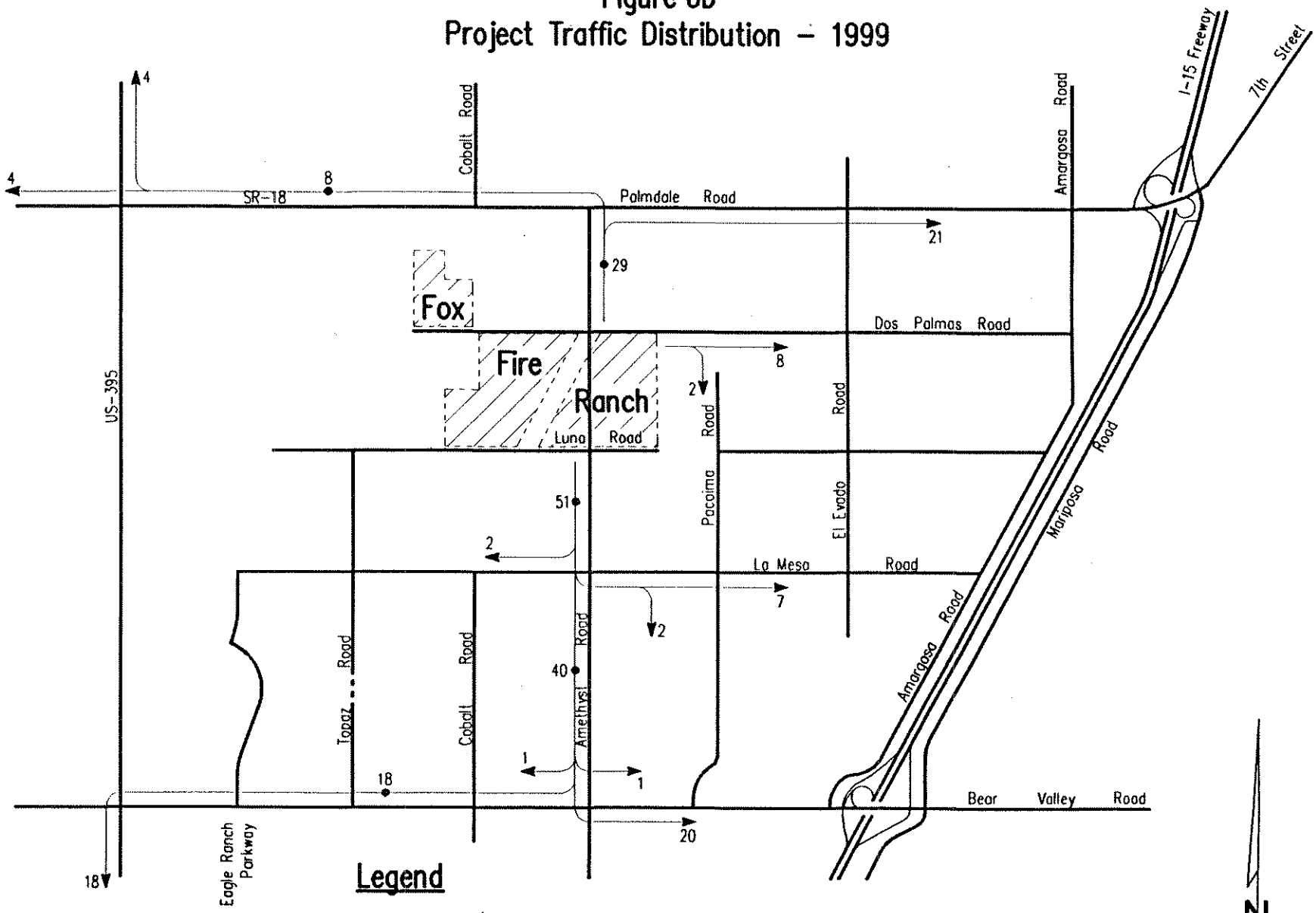
Kunzman Associates

Figure 6a
Project Traffic Distribution – 1996



Kunzman Associates

Figure 6b
Project Traffic Distribution – 1999



Legend

10 – Percent to/from Project

Note: 10 percent are internal to Foxfire Ranch and immediate vicinity

Kunzman Associates

5. Year 1996 Traffic Conditions

This section discusses cumulative traffic (i.e. background plus project) conditions in 1996. The background traffic includes existing traffic, growth in existing traffic due to increases in through traffic and traffic from other approved developments in the area. The analysis in this section is based on the construction and occupancy of 320 new single family dwellings in Foxfire Ranch. It was also assumed that no new connections would be built to Palmdale Road, to U.S. 395 or to Bear Valley Road.

Annual Growth Rate

An annual growth rate of 7 percent was used to reflect increases in existing traffic due to other development. Although this is a higher rate than population projections for Victorville, it is less than recent historical growth on key streets in the city.

Cumulative Daily Volumes

The 1996 cumulative daily volumes are illustrated on Figure 7 and include existing, growth in existing and Foxfire Ranch traffic.

Cumulative Daily Volume to Capacity Ratios

Figure 7 also shows daily volume to capacity ratios for cumulative traffic in 1996. The ratios are based on existing street sections and the daily capacities discussed in Section 3. The streets analyzed are expected to operate at Level of Service B or better in 1996.

Cumulative Intersection Levels of Service

The project's peak hour traffic was added to the 1996 background traffic volumes and the resultant levels of service are shown on Table 5. The intersections analyzed are expected to operate at Level of Service C or better during the evening peak hour in 1996.

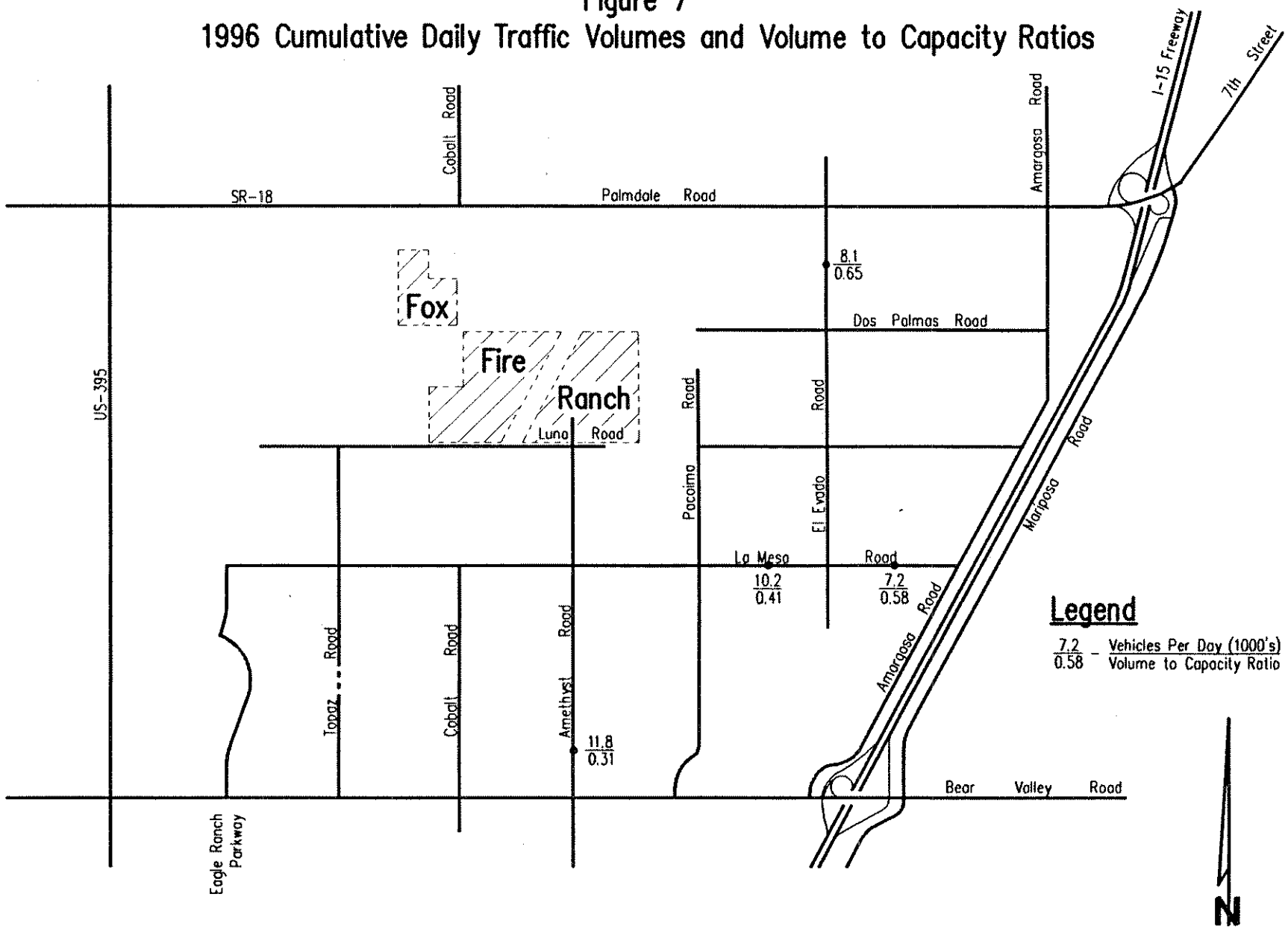
Table 5

1996 CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Traffic Control Device	Evening Peak Hour		
		Delay (sec/veh)	Reserve Capacity	Level of Service
Palmdale Road (EW) at El Evado Road (NS)	Signal	15.1		C
Bear Valley Road (EW) at Amethyst Road (NS)	Signal	13.5		B
Armargosa Road (NS) at La Mesa Road (EW)	Signal	12.2		B

NS = North-South
EW = East-West

Figure 7
1996 Cumulative Daily Traffic Volumes and Volume to Capacity Ratios



Kunzman Associates

6. Year 1999 Traffic Conditions

This section discusses cumulative traffic (i.e. background plus project) conditions at project completion in 1999.

Annual Growth Rate

The annual growth rate of 7 percent was used to increase background traffic from 1996 to 1999.

Cumulative Daily Volumes

The 1999 cumulative daily volumes are illustrated on Figure 8 and include existing growth in existing Foxfire Ranch traffic. Figure 8 shows the extension of Amethyst Road to Palmdale Road. The daily volume assigned to Amethyst Road is the projected increase on El Evado Road due to areawide growth and that portion of Foxfire Ranch traffic shown on Figure 6b.

Cumulative Daily Volume to Capacity Ratios

Figure 8 also shows daily volume to capacity ratios which are based on existing street sections and on the assumption that Amethyst Road will be initially extended to Palmdale Road as a two lane road.

The ratios on Figure 8 indicate that the streets analyzed are expected to operate at Level of Service B or better in 1999.

Cumulative Intersection Levels of Service

The project's peak hour traffic was added to the 1999 background traffic volumes and the resultant levels of service are shown on Table 6. Existing intersections are expected to operate at Level of Service C or better during the evening peak hour in 1999. However, a signal will be needed at Palmdale Road/Amethyst Road to mitigate the Levels of Service E-F shown on Table 6.

Table 6

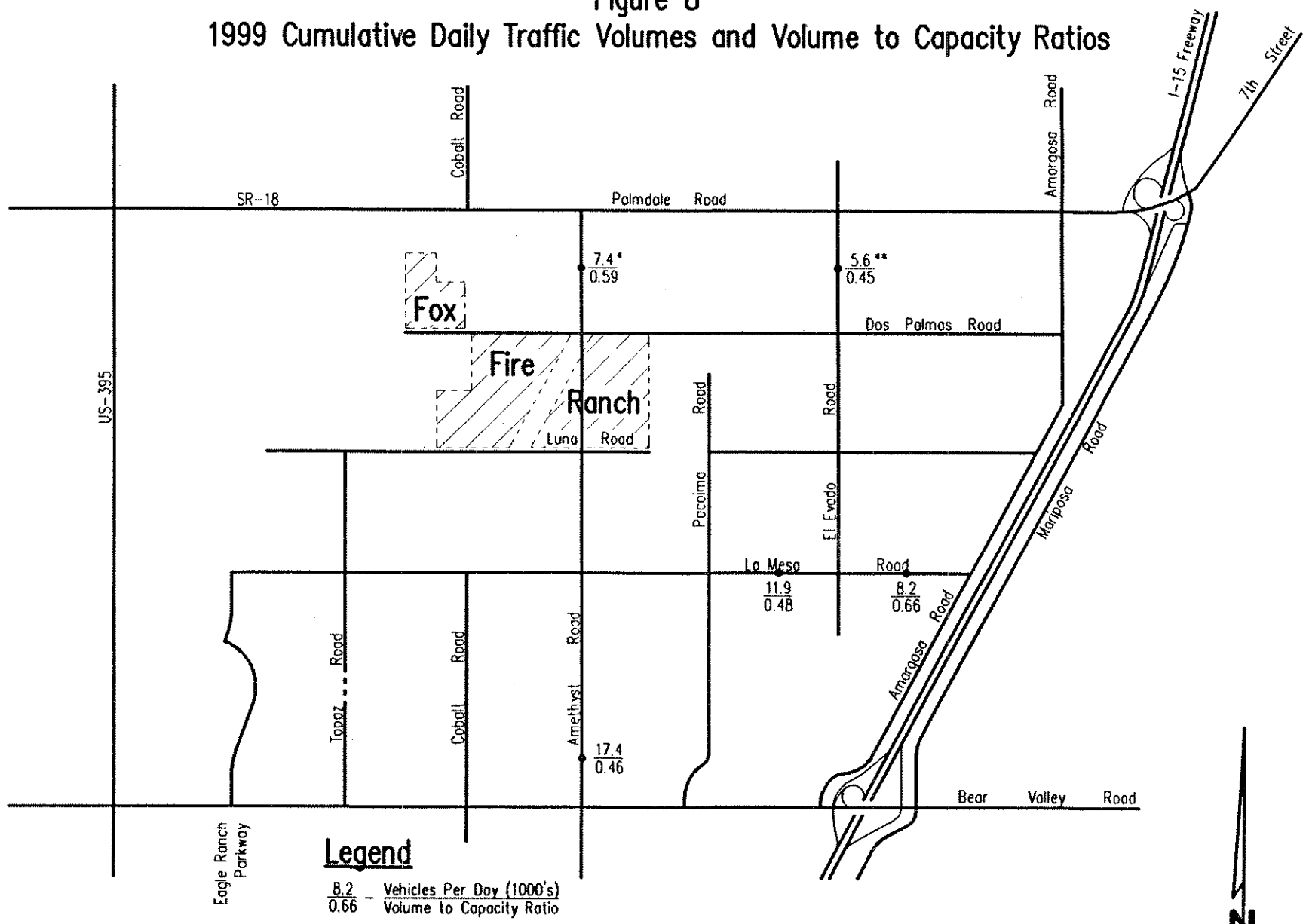
1999 CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Traffic Control Device	Evening Peak Hour		
		Delay (sec/veh)	Reserve Capacity	Level of Service
Palmdale Road (EW) at Amethyst Road (NS)	Two-Way Stop(1)			
Westbound Left			31	E
Northbound Right			456	A
Northbound Left			-66	F
	(Signal)	(10.6)		(B)
El Evado Road (NS)	Signal	12.8		B
Bear Valley Road (EW) at Amethyst Road (NS)	Signal	17.1		C
Armargosa Road (NS) at La Mesa Road (EW)	Signal	16.3		C

NS = North-South
EW = East-West

(1) Assumed initial traffic control device.

Figure 8
1999 Cumulative Daily Traffic Volumes and Volume to Capacity Ratios



Legend

$\frac{8.2}{0.66}$ – Vehicles Per Day (1000's) / Volume to Capacity Ratio

* Includes growth on El Evado Road plus project traffic
** 1992 Daily Volume

Kunzman Associates

Appendix

Appendix A - Calculation of Intersection Levels of Service

APPENDIX A

CALCULATION OF INTERSECTION
LEVELS OF SERVICE

The levels of service at the signalized intersections were calculated using the delay method in Chapter 9 of the 1985 Highway Capacity Manual (HCM). This method views an intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity times 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value less than 1.00 is generally assigned as a less than desirable condition occurs.

The 12 adjustment factors are as follows:

1. Peak hour factor (to account for peaking within the peak hour)
2. Lane utilization factor (to account for not all lanes loading equally)
3. Lane width
4. Percent of heavy trucks
5. Approach grade
6. Parking
7. Bus stops at intersections
8. Area type (CBD or other)
9. Right turns
10. Left turns
11. Pedestrian activity
12. Signal progression

The maximum lane capacity and the 12 adjustment factors to it are all unknowns for which approximate estimates have been recommended in the 1985 Highway Capacity Manual. For the most part, the recommended values are not based on statistical analysis but rather on educated estimates. Unfortunately, the estimates for these 13 variables used in calculating capacity are not reliable as will be discussed below.

Once the lane group volume is known and the lane group capacity is known, a volume to capacity ratio can be calculated for the lane group.

With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula provided by the 1985 Highway Capacity Manual, which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length
2. Amount of red time faced by a lane group
3. Amount of yellow time for that lane group
4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per vehicle is then used to judge Level of Service. The Level of Services are defined in terms of delay as follows:

Level of Service	Average Stopped Delay Per Vehicle (Seconds)
A	0 to 5.00
B	5.01 to 15.00
C	15.01 to 25.00
D	25.01 to 40.00
E	40.01 to 60.00
F	60.01 and up

Experience has shown that when a maximum lane capacity of 1800 vehicles per hour is used (as recommended by HCM) and none of the 12 penalty factors are applied, then the calculated delay significantly overstates the actual observed delay. The delay calculation for instance assumes that yellow time is totally unused. Yet experience shows that most of the yellow time is used. Additionally, lane capacities are actually over 2,000 vehicles per hour, not 1,800 vehicles per hour. Our data show that if yellow times are subtracted from usable green time as recommended by HCM, then a maximum lane capacity assumption of 2,050 vehicles per hour will result in a calculated delay approximately equal to the observed delay. If yellow times are NOT subtracted from usable green time, then a maximum lane capacity of 1800 vehicles per hour is reasonable.

The Levels of Service at unsignalized intersections have been calculated using the methods described in Chapter 10 of the 1985 Highway Capacity Manual (HCM).

LEVEL OF SERVICE DESCRIPTION

Level of Service	Description	Stopped Delay Per Vehicle (Seconds)
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 5.0
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	5.1 to 15.0
C	Level of Service generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	15.1 to 25.0
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	25.1 to 40.0
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	40.1 to 60.0
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	60.1 +

Source: "Highway Capacity Manual" Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 1985, Pages 9-4 to 9-5.

WORKSHEET FOR FOUR-LEG INTERSECTIONS

Intersection: Conditions: Existing - 1993
MAJOR STREET: PALMDALE ROAD (EW)
MINOR STREET: EL EVADO ROAD (NS)

SHARED-LANE CAPACITY

$$Csh = \frac{Vi+Vj}{(Vi/Cmi)+(Vj/Cmj)}$$ where 2 movements share a lane

$$Csh = \frac{Vi+Vj+Vk}{(Vi/Cmi)+(Vj/Cmj)+(Vk/Cmk)}$$ where 3 movements share a lane

MINOR STREET APPROACH MOVEMENTS 7,8,9

Movement	V(pcph)	Cm(pcph)	Csh(pcph)	Cr=Csh-V	LOS
PM 7	33	40	40	7	E
PM 8	44	90	90	46	E
PM 9	154	750	750	596	A

MINOR STREET APPROACH MOVEMENTS 10,11,12

PM 10	22	30	30	8	E
PM 11	44	90	90	46	E
PM 12	44	780	780	736	A

MAJOR STREET LEFT TURNS 1,4

Movement	V(pcph)	Cm(pcph)	Cr=Csh-V	LOS
PM 1	44	600	556	A
PM 4	242	550	308	B

TURNING MOVEMENT VOLUMES:

```
                          40     40     20
  ^                        |      |      |
 /|\                 A  <-      V      ->  A
  |                 40 --                   --  40
  |                470 -->                 <--  390
  |                 30 --                   --  220
  |                    V  <-      A      ->  V
                          |      |      |
  N                       30     40    140
                                     FOXFIRE RANCH (5/93)
```

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. PALMDALE ROAD (EW) and EL EVADO ROAD (NS)
Traffic Condition: 1993 - with Signalization
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	40	30	30	40	40	20	470	30	40	390	40	220	
(2) Number of Lanes, N	1	1	1	1	1	1	2	1	1	2	1	1	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	1	0	0	1	0	0	1	0	0	1	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	1	0	0	1	0	0	2	0	0	2	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.05	1.00	1.00	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	44	33	33	44	44	22	548	33	44	455	44	244	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	1531	1599	1782	1531	1599	3564	1531	1599	3564	1531	1599	
(29) Flow Ratio, v/s = [(27)/(28)]	0.02	0.02	0.02	0.02	0.03	0.01	0.15	0.02	0.03	0.13	0.03	0.15	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.09	0.09	0.09	0.09	0.09	0.09	0.15	0.09	0.09	0.13	0.09	0.15	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.09	0.00	0.00	0.00	0.00	0.09	0.15	0.00	0.00	0.00	0.00	0.15	.493
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.19	0.50	0.19	0.19	0.38	0.19	0.31	0.50	0.19	0.26	0.45	0.31	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	337	764	302	337	579	302	1111	767	302	922	686	495	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.13	0.04	0.11	0.13	0.08	0.07	0.49	0.04	0.15	0.49	0.06	0.49	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	19.2	7.3	19.1	19.2	11.3	19.0	16.2	7.3	19.3	18.3	8.9	16.7	16.51
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	16.3	6.2	19.1	16.3	9.6	19.0	13.8	6.2	19.3	15.6	7.6	16.7	14.62
(37) Level of Service, LoS = [See Note 4]	C	B	C	C	B	C	B	B	C	C	B	C	B

See Notes on last page.

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. BEAR VALLEY ROAD (EW) and AMETHYST ROAD (NS)
Traffic Condition: Existing Conditions - 1993
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	10	60	0	10	50	170	480	10	60	510	180	40	
(2) Number of Lanes, N	1	0	1	1	1	1	2	1	1	2	1	1	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	0	0	1	0	0	1	0	0	1	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	2	0	0	2	0	0	2	0	0	2	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.10	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.05	1.00	1.00	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	84	0	0	11	56	189	560	11	67	595	200	44	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	0	1599	1782	1531	1599	3564	1531	1599	3564	1531	1599	
(29) Flow Ratio, v/s = [(27)/(28)]	0.05	0.00	0.00	0.01	0.04	0.12	0.16	0.01	0.04	0.17	0.13	0.03	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.09	0.00	0.09	0.09	0.09	0.12	0.16	0.09	0.09	0.17	0.13	0.09	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.09	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.09	0.17	0.00	0.00	.471
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.20	0.00	0.20	0.20	0.40	0.25	0.33	0.53	0.20	0.35	0.60	0.20	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	353	0	316	353	606	400	1187	813	316	1261	925	316	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.24	0.00	0.00	0.03	0.09	0.47	0.47	0.01	0.21	0.47	0.22	0.14	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	19.3	0.0	18.3	18.5	10.8	18.8	15.3	6.3	19.2	14.5	5.2	18.9	14.49
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	16.4	0.0	18.3	15.7	9.2	18.8	13.0	5.4	19.2	12.3	4.4	18.9	12.80
(37) Level of Service, LoS = [See Note 4]	C	A	C	C	B	C	B	B	C	B	A	C	B

See Notes on last page.

WORKSHEET FOR T-INTERSECTIONS

Intersection: Conditions: Existing - 1993
MAJOR STREET: ARMARGOSA ROAD (NS)
MINOR STREET: LA MESA ROAD (EW)

SHARED-LANE CAPACITY

$$Csh = \frac{Vi+Vj}{(Vi/Cmi)+(Vj/Cmj)}$$ where 2 movements share a lane

Movement	V(pcph)	Cm(pcph)	Csh(pcph)	Cr=Csh-V	LOS
PM 7	132	150	150	18	E
PM 9	66	500	500	434	A
PM 4	55	610	610	555	A

TURNING MOVEMENT VOLUMES:

```
                          120   510     0
  ^                        |     |     |
 /|\                       |     |     |
  |              A    <-   V     ->  A
  |          120 --                     --    0
  |            0 -->                   <--    0
  |           60 --                     --    0
  |              V    <-   A     ->  V
  |                       |     |     |
  N                      50   490     0
```

FOXFIRE RANCH (5/93)

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. ARMARCOSA ROAD (NS) and LA MESA ROAD (NS)
Traffic Condition: 1993 - with Signalization
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	440	0	50	510	120	0	0	60	230	0	0	0	
(2) Number of Lanes, N	1	0	1	1	1	0	0	1	1	0	0	0	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	0	0	1	0	0	1	0	0	0	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	2	0	0	0	0	0	2	0	0	0	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.10	1.00	1.00	1.00	1.10	1.10	1.00	1.00	1.10	1.10	1.10	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	489	0	56	567	133	0	0	67	256	0	0	0	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	0	1599	1782	1531	0	0	1531	1599	0	0	0	
(29) Flow Ratio, v/s = [(27)/(28)]	0.27	0.00	0.03	0.32	0.09	0.00	0.00	0.04	0.16	0.00	0.00	0.00	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.27	0.00	0.09	0.32	0.09	0.00	0.00	0.09	0.16	0.00	0.00	0.00	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.00	0.00	0.09	0.32	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	.571
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.48	0.00	0.16	0.56	0.84	0.00	0.00	0.16	0.28	0.00	0.00	0.00	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	856	0	261	992	1281	0	0	250	447	0	0	0	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.57	0.00	0.21	0.57	0.10	0.00	0.00	0.27	0.57	0.00	0.00	0.00	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	11.3	0.0	20.7	8.8	0.8	0.0	0.0	21.0	18.9	0.0	0.0	0.0	11.50
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	9.6	0.0	20.7	7.5	0.7	0.0	0.0	17.8	18.9	0.0	0.0	0.0	10.34
(37) Level of Service, LoS = [See Note 4]	B	A	C	B	A	A	A	C	C	A	A	A	B

See Notes on last page.

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. PALMDALE ROAD (EW) and EL EVADO ROAD (NS)
Traffic Condition: Cumulative 1996
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	60	60	50	60	50	30	620	50	50	510	50	320	
(2) Number of Lanes, N	1	1	1	1	1	1	2	1	1	2	1	1	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	1	0	0	1	0	0	1	0	0	1	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	1	0	0	1	0	0	2	0	0	2	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.05	1.00	1.00	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	67	67	56	67	56	33	723	56	56	595	56	356	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	1531	1599	1782	1531	1599	3564	1531	1599	3564	1531	1599	
(29) Flow Ratio, v/s = [(27)/(28)]	0.04	0.04	0.03	0.04	0.04	0.02	0.20	0.04	0.03	0.17	0.04	0.22	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.09	0.09	0.09	0.09	0.09	0.09	0.20	0.09	0.09	0.17	0.09	0.22	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.09	0.00	0.00	0.00	0.00	0.09	0.20	0.00	0.00	0.00	0.00	0.22	.612
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.15	0.52	0.15	0.15	0.31	0.15	0.33	0.48	0.15	0.27	0.43	0.36	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	272	790	244	272	467	244	1182	741	244	972	651	581	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.25	0.08	0.23	0.25	0.12	0.14	0.61	0.07	0.23	0.61	0.09	0.61	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	21.4	7.0	21.3	21.4	14.3	20.9	16.7	7.9	21.3	18.9	9.8	16.2	17.02
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	18.2	5.9	21.3	18.2	12.1	20.9	14.2	6.7	21.3	16.1	8.3	16.2	15.09
(37) Level of Service, LoS = [See Note 4]	C	B	C	C	B	C	B	B	C	C	B	C	C

See Notes on last page.

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. BEAR VALLEY ROAD (EW) and AMETHYST ROAD (NS)
Traffic Condition: Cumulative 1996
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	10	80	0	10	110	240	630	10	160	670	290	50	
(2) Number of Lanes, N	1	0	1	1	1	1	2	1	1	2	1	1	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	0	0	1	0	0	1	0	0	1	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	2	0	0	2	0	0	2	0	0	2	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.10	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.05	1.00	1.00	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	109	0	0	11	122	267	735	11	178	782	322	56	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	0	1599	1782	1531	1599	3564	1531	1599	3564	1531	1599	
(29) Flow Ratio, v/s = [(27)/(28)]	0.06	0.00	0.00	0.01	0.08	0.17	0.21	0.01	0.11	0.22	0.21	0.03	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.09	0.00	0.09	0.09	0.09	0.17	0.21	0.09	0.11	0.22	0.21	0.09	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.09	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.11	0.22	0.00	0.00	.590
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.16	0.00	0.16	0.16	0.35	0.28	0.35	0.51	0.19	0.37	0.65	0.16	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	282	0	253	282	530	451	1244	776	301	1323	1001	253	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.39	0.00	0.00	0.04	0.23	0.59	0.59	0.01	0.59	0.59	0.32	0.22	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	22.0	0.0	20.2	20.3	13.3	19.1	15.8	7.0	23.3	14.9	4.4	21.0	15.18
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	18.7	0.0	20.2	17.3	11.3	19.1	13.4	5.9	23.3	12.7	3.7	21.0	13.52
(37) Level of Service, LoS = [See Note 4]	C	A	C	C	B	C	B	B	C	B	A	C	B

See Notes on last page.

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. ARMARGOSA ROAD (NS) and LA MESA ROAD (NS)
Traffic Condition: Cumulative 1996
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	580	0	70	670	190	0	0	80	320	0	0	0	
(2) Number of Lanes, N	1	0	1	1	1	0	0	1	1	0	0	0	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	0	0	1	0	0	1	0	0	0	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	2	0	0	0	0	0	2	0	0	0	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.10	1.00	1.00	1.00	1.10	1.10	1.00	1.00	1.10	1.10	1.10	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	644	0	78	744	211	0	0	89	356	0	0	0	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	0	1599	1782	1531	0	0	1531	1599	0	0	0	
(29) Flow Ratio, v/s = [(27)/(28)]	0.36	0.00	0.05	0.42	0.14	0.00	0.00	0.06	0.22	0.00	0.00	0.00	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.36	0.00	0.09	0.42	0.14	0.00	0.00	0.09	0.22	0.00	0.00	0.00	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.00	0.00	0.09	0.42	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	.733
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.49	0.00	0.13	0.57	0.87	0.00	0.00	0.13	0.30	0.00	0.00	0.00	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	879	0	203	1015	1336	0	0	195	485	0	0	0	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.73	0.00	0.38	0.73	0.16	0.00	0.00	0.46	0.73	0.00	0.00	0.00	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	13.7	0.0	23.4	11.0	0.5	0.0	0.0	24.3	21.7	0.0	0.0	0.0	13.59
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	11.6	0.0	23.4	9.4	0.5	0.0	0.0	20.6	21.7	0.0	0.0	0.0	12.23
(37) Level of Service, LoS = [See Note 4]	B	A	C	B	A	A	A	C	C	A	A	A	B

See Notes on last page.

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. PALMDALE ROAD (EW) and EL EVADO ROAD (NS)
Traffic Condition: Cumulative 1999
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	60	30	30	60	60	30	880	30	60	790	60	220	
(2) Number of Lanes, N	1	1	1	1	1	1	2	1	1	2	1	1	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	1	0	0	1	0	0	1	0	0	1	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	1	0	0	1	0	0	2	0	0	2	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.05	1.00	1.00	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	67	33	33	67	67	33	1027	33	67	922	67	244	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	1531	1599	1782	1531	1599	3564	1531	1599	3564	1531	1599	
(29) Flow Ratio, v/s = [(27)/(28)]	0.04	0.02	0.02	0.04	0.04	0.02	0.29	0.02	0.04	0.26	0.04	0.15	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.09	0.09	0.09	0.09	0.09	0.09	0.29	0.09	0.09	0.26	0.09	0.15	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.09	0.00	0.00	0.00	0.00	0.09	0.29	0.00	0.00	0.00	0.00	0.15	.627
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.15	0.39	0.15	0.15	0.30	0.15	0.46	0.61	0.15	0.41	0.56	0.24	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	265	601	238	265	455	238	1636	930	238	1469	858	389	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.25	0.06	0.14	0.25	0.15	0.14	0.63	0.04	0.28	0.63	0.08	0.63	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	21.6	10.8	21.1	21.6	14.7	21.1	12.3	4.5	21.7	13.9	5.8	21.5	14.44
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	18.3	9.1	21.1	18.3	12.5	21.1	10.4	3.8	21.7	11.8	4.9	21.5	12.75
(37) Level of Service, LoS = [See Note 4]	C	B	C	C	B	C	B	A	C	B	A	C	B

See Notes on last page.

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. BEAR VALLEY ROAD (EW) and AMETHYST ROAD (NS)
Traffic Condition: Cumulative 1999
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	20	100	0	20	180	380	770	20	240	820	440	60	
(2) Number of Lanes, N	1	0	1	1	1	1	2	1	1	2	1	1	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	0	0	1	0	0	1	0	0	1	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	2	0	0	2	0	0	2	0	0	2	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.10	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.05	1.00	1.00	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	144	0	0	22	200	422	898	22	267	957	489	67	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	0	1599	1782	1531	1599	3564	1531	1599	3564	1531	1599	
(29) Flow Ratio, v/s = [(27)/(28)]	0.08	0.00	0.00	0.01	0.13	0.26	0.25	0.01	0.17	0.27	0.32	0.04	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.09	0.00	0.09	0.09	0.13	0.26	0.25	0.09	0.17	0.27	0.32	0.09	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.09	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.17	0.27	0.00	0.00	.792
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.12	0.00	0.12	0.12	0.33	0.33	0.32	0.44	0.21	0.34	0.67	0.12	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	210	0	188	210	502	533	1133	667	336	1207	1028	188	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.69	0.00	0.00	0.11	0.40	0.79	0.79	0.03	0.79	0.79	0.48	0.35	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	30.3	0.0	22.2	22.5	15.1	22.8	20.5	9.2	29.7	19.6	4.8	23.6	19.07
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	25.8	0.0	22.2	19.1	12.8	22.8	17.4	7.8	29.7	16.7	4.1	23.6	17.05
(37) Level of Service, LoS = [See Note 4]	D	A	C	C	B	C	C	B	D	C	A	C	C

See Notes on last page.

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. ARMARGOSA ROAD (NS) and LA MESA ROAD (NS)
Traffic Condition: Cumulative 1999
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	710	0	80	820	190	0	0	100	370	0	0	0	
(2) Number of Lanes, N	1	0	1	1	1	0	0	1	1	0	0	0	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	0	0	1	0	0	1	0	0	0	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	2	0	0	0	0	0	2	0	0	0	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.00	1.10	1.00	1.00	1.00	1.10	1.10	1.00	1.00	1.10	1.10	1.10	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	789	0	89	911	211	0	0	111	411	0	0	0	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	1782	0	1599	1782	1531	0	0	1531	1599	0	0	0	
(29) Flow Ratio, v/s = [(27)/(28)]	0.44	0.00	0.06	0.51	0.14	0.00	0.00	0.07	0.26	0.00	0.00	0.00	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.44	0.00	0.09	0.51	0.14	0.00	0.00	0.09	0.26	0.00	0.00	0.00	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.00	0.00	0.09	0.51	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	.861
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.51	0.00	0.11	0.59	0.89	0.00	0.00	0.11	0.30	0.00	0.00	0.00	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	915	0	173	1057	1365	0	0	166	477	0	0	0	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.86	0.00	0.51	0.86	0.15	0.00	0.00	0.67	0.86	0.00	0.00	0.00	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	18.1	0.0	26.1	14.9	0.4	0.0	0.0	31.2	29.3	0.0	0.0	0.0	18.14
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	15.4	0.0	26.1	12.7	0.3	0.0	0.0	26.5	29.3	0.0	0.0	0.0	16.28
(37) Level of Service, LoS = [See Note 4]	C	A	D	B	A	A	A	D	D	A	A	A	C

See Notes on last page.

WORKSHEET FOR T-INTERSECTIONS

Intersection: Conditions: Cumulative - 1999
MAJOR STREET: PALMDALE ROAD (EW)
MINOR STREET: AMETHYST ROAD (NS)

SHARED-LANE CAPACITY

$$Csh = \frac{Vi+Vj}{(Vi/Cmi)+(Vj/Cmj)}$$ where 2 movements share a lane

Movement	V(pcph)	Cm(pcph)	Csh(pcph)	Cr=Csh-V	LOS
PM 7	66	0	0	-66	F
PM 9	154	610	610	456	A
PM 4	319	350	350	31	E

TURNING MOVEMENT VOLUMES:

```
                    0      0      0
                    |      |      |
          A    <-   V      ->   A
      0 --                       --    0
    740 -->                     <--  650
     80 --                       --  290
          V    <-   A      ->   V
                    |      |      |
^                  60      0    140
/|\
 |
 |
 |
N
```

FOXFIRE RANCH (5/93)

INTERSECTION DELAY CALCULATION USING 1985 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 1. PALMDALE ROAD (EW) and AMETHYST ROAD (NS)
Traffic Condition: Cumulative 1999
Time Period of Analysis: PM Peak Hour
Cycle Length: 75 Seconds

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
Input Data													
(1) Volume per Hour, V	0	140	60	0	0	0	740	80	0	650	0	290	
(2) Number of Lanes, N	0	1	1	0	0	0	2	1	0	2	0	1	
(3) Yellow Interval in Seconds, Y [Typically 4.0 for Throughs/Rights and 3.0 for Lefts]	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	4.00	3.00	3.00	
(4) Peak Hour Factor, PHF [1.00 for Peak Hour; 0.90 for Peak 15 Minutes]	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
(5) Lane Width [8; 9; 10; 11; 12; 13; 14; 15; or 16 for 15+]	12	14	12	12	14	12	12	14	12	12	14	12	
(6) Percent Heavy Vehicles [0; 2; 4; 6; 8; 10; 15; 20; 25; or 30]	2	2	2	2	2	2	2	2	2	2	2	2	
(7) Grade [-6; -4; -2; 0; +2; +4; or +6]	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Parking Maneuvers per Hour [-1=No Parking; 0; 10; 20; 30; or 40]	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(9) Buses Stopping per Hour [0; 10; 20; 30; or 40]	0	0	0	0	0	0	0	0	0	0	0	0	
(10) CBD/Other [0=CBD; 1=Other]	1	1	1	1	1	1	1	1	1	1	1	1	
(11) Right Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	1	0	0	0	0	0	1	0	0	0	0	
(12) Pedestrians per Hour Conflicting with Right Turns [0; 50; 100; 200; 300; 400; or 500]	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Left Turn Lane Type [0 = None/Factor = 1.00; 1 = Unprotected; 2 = Protected with Separate Arrow]	0	0	2	0	0	0	0	0	0	0	0	2	
(14) Saturated Flow Rate per Hour of Green Time [HCM Recommends 1800; 2050 is actual observed]	1800	1700	1700	1800	1700	1700	1800	1700	1700	1800	1700	1700	
(15) Signal Progression Type [1=Poor; 2=Fair; 3=Random Arrivals; 4=Good; 5=Excellent]	3	3	3	3	3	3	3	3	3	3	3	3	
(16) Type of Signal [1=Pretimed; 2=Actuated]	2	2	2	2	2	2	2	2	2	2	2	2	
Factors from Tables													
(17) Lane Utilization [Table 9-4]	1.10	1.00	1.00	1.10	1.10	1.10	1.05	1.00	1.10	1.05	1.10	1.00	
(18) Lane Width [Table 9-5]	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	1.00	1.07	1.00	
(19) Heavy Vehicles [Table 9-6]	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
(20) Grade [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Parking Maneuvers [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	
(22) Busses Stopping [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	
(23) CBD/Other [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) Right Turn Lane Type [Table 9-11]	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00	
(25) Left Turn Lane Type [Table 9-12]	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	
(26) Progression Factor [Table 9-13]	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	
Calculated Values													
(27) Adjusted Flow Rate in Vehicles per Hour, v = [(1)*(17)/(4)]	0	156	67	0	0	0	863	89	0	758	0	322	
(28) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	0	1531	1599	0	0	0	3564	1531	0	3564	0	1599	
(29) Flow Ratio, v/s = [(27)/(28)]	0.00	0.10	0.04	0.00	0.00	0.00	0.24	0.06	0.00	0.21	0.00	0.20	
(30) Minimum Green Time Required as Proportion of Cycle = [Larger of: (29) or (7 Secs + Ped Time)/Cycle Length]	0.00	0.10	0.09	0.00	0.00	0.00	0.24	0.09	0.00	0.21	0.00	0.20	
(31) Critical Lane Group = [(30)'s That Are Critical]	0.00	0.00	0.09	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.20	.537
(32) Green Time Allocated as Proportion of Cycle, g/C = [See Note 2]	0.00	0.38	0.17	0.00	0.00	0.00	0.45	0.62	0.00	0.45	0.00	0.38	
(33) Capacity in Vehicles per Hour, c = [(32) * (28)]	0	574	278	0	0	0	1607	956	0	1607	0	600	
(34) Volume to Capacity Ratio, v/c = X = [(27)/(33)]	0.00	0.27	0.24	0.00	0.00	0.00	0.54	0.09	0.00	0.47	0.00	0.54	
(35) Average Delay per Vehicle in Seconds Before Progression Adjustment = [See Note 3]	0.0	12.4	20.4	0.0	0.0	0.0	11.6	4.3	0.0	11.1	0.0	14.7	11.92
(36) Average Delay per Vehicle in Seconds After Progression Adjustment, d = [(35) * (26)]	0.0	10.6	20.4	0.0	0.0	0.0	9.9	3.6	0.0	9.4	0.0	14.7	10.56
(37) Level of Service, LoS = [See Note 4]	A	B	C	A	A	A	B	A	A	B	A	B	B

See Notes on last page.

NOTES

Note 1: Adjusted Saturation Flow Rate, s = [(14)*(2)*(18)*(19)*(20)*(21)*(22)*(23)*(24)*(25)]

Note 2: Green Time Allocation, g/C = [(30)/Sum of Criticals from (31)]

Note 3: Delay per Vehicle, d = 0.38 * C * [(1-(32))*(1-(32))]/(1-(32)*(34))
+ 173 * (34)*(34) * (((34)-1) + [((((34)-1)*((34)-1)) + (16*(34)/(33)))^.5]}

OR Delay per Vehicle, d = 0.38 * C * [(1-g/C)*(1-g/C)]/(1-g/C*X) + 173 * X*X * ((X-1) + [(((X-1)*(X-1)) + (16*X/c))^.5]}

Where C = Cycle Length
Where g = green time in seconds
Where X = v/c = volume to capacity ratio
Where v = volume per hour
Where c = capacity in vehicles per hour

Note 4 = Level of Service Definition

0 to 5	Seconds of Delay per Vehicle = Level of Service A
5.1 to 15	Seconds of Delay per Vehicle = Level of Service B
15.1 to 25	Seconds of Delay per Vehicle = Level of Service C
25.1 to 40	Seconds of Delay per Vehicle = Level of Service D
40.1 to 60	Seconds of Delay per Vehicle = Level of Service E
60 and up	Seconds of Delay per Vehicle = Level of Service F

ABBREVIATIONS:

NT = Northbound Through; NR = Northbound Right; and NL = Northbound Left
ST = Southbound Through; SR = Southbound Right; and SL = Southbound Left
ET = Eastbound Through; ER = Eastbound Right; and EL = Eastbound Left
WT = Westbound Through; WR = Westbound Right; and WL = Westbound Left

( ) = Variable Number. This number corresponds to the variable number as identified in individual intersection table.