PRELIMINARY WASTEWATER FACILITIES PLAN

for ALBERHILL VILLAGES SPECIFIC PLAN

in the City of Lake Elsinore,
County of Riverside, California

PREPARED FOR :

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Section

1
INTRODUCTION

1.1 PURPOSE OF STUDY

The Alberhill Villages project, TM 35000 is located within the Elsinore Valley Municipal Water District (EVMWD) for sewer service. The purpose of this report is to discuss the phasing needs of the project as it relates to the District's planned Wastewater Master Plan facilities, more specifically the Lake Street/Temescal Canyon Road trunk sewer system, the estimated project sewer contributions, and other tributary sewershed contributions. This report will provide information concerning projected Phase 1 condition and build-out sewage flows, existing sewer facilities, and recommended sewer facilities to support the project. It will also identify the approximate alignments and pipe sizes of these sewer infrastructures. The Alberhill Villages project sewer contributions are based on the land use within the planning areas identified in the Alberhill Villages Specific Plan (AVSP).

Castle & Cooke is also proposing a mixed use development on ±400 acres east of Lake Street called the Alberhill Ridge Project (VTTM 35001). The adjacent proposed Alberhill Ridge and existing Alberhill Ranch projects sewer contributions are based on the land use and layout as shown on the vesting tentative tract maps (VTTM 35001 and 28214) currently on file with the City of Lake Elsinore and in accordance with the land use plan depicted in the Brighton Alberhill Specific Plan Amendment No. 1. The remaining tributary sewer contributions are based on the District's Wastewater Master Plan report. This report will compare the Alberhill Villages and other tributary sewer contributions with the latest EVMWD Wastewater Master Plan.

1.2 PROJECT DESCRIPTION

As proposed by the Alberhill Villages Specific Plan, the current mining site will be reclaimed for development as the existing onsite clay, sand, and aggregate mining operations are gradually phased out. The Alberhill Villages project site is comprised of approximately 1,374 acres of undeveloped land that is currently being mined for its mineral resources. The site will also include an additional 9.1 acres and 16.8 acres for development which was originally part of the Alberhill Ranch Specific Plan. The site is bounded by undeveloped vacant land to the south, the I-15 Freeway to the north, the existing Horsethief Canyon development to the west, and Lake Street to the east. **Figure 1-1** shows a vicinity map of the area. The Alberhill Villages site is planned for a large mixed-use community consisting of a university campus, recreational lake and park areas, mixed-use commercial/office/retail, neighborhood commercial, public institutions/schools, and a large residential component ranging from very low density estate lots to very high density multifamily lots. Lake Street and Temescal Canyon Road/Lincoln Street are the main north-south thoroughfares into the community connecting the Downtown Lake Elsinore area and Interstate 15 Freeway. The development of Alberhill Villages project and other

neighboring communities will enhance the north area of the City of Lake Elsinore producing a profound entry statement into the City off of Interstate 15 at Lake Street.

1.3 RELATED STUDIES

The Elsinore Valley Municipal Water District Wastewater Master Plan, prepared by Carollo Engineers in November 2008, provides a regional study identifying existing and proposed major sewer facilities within the District's ultimate service area. The master plan study also presents design criteria to be utilized in sizing gravity sewer lines, sewer lift stations, and force mains; as well as provide information on the District's sewer generation rates that can be applied to determine projected average and peak wastewater flows. Section 4 of this report provides a comparison between the findings of this report and its relative consistency with the 2008 Wastewater Master Plan.

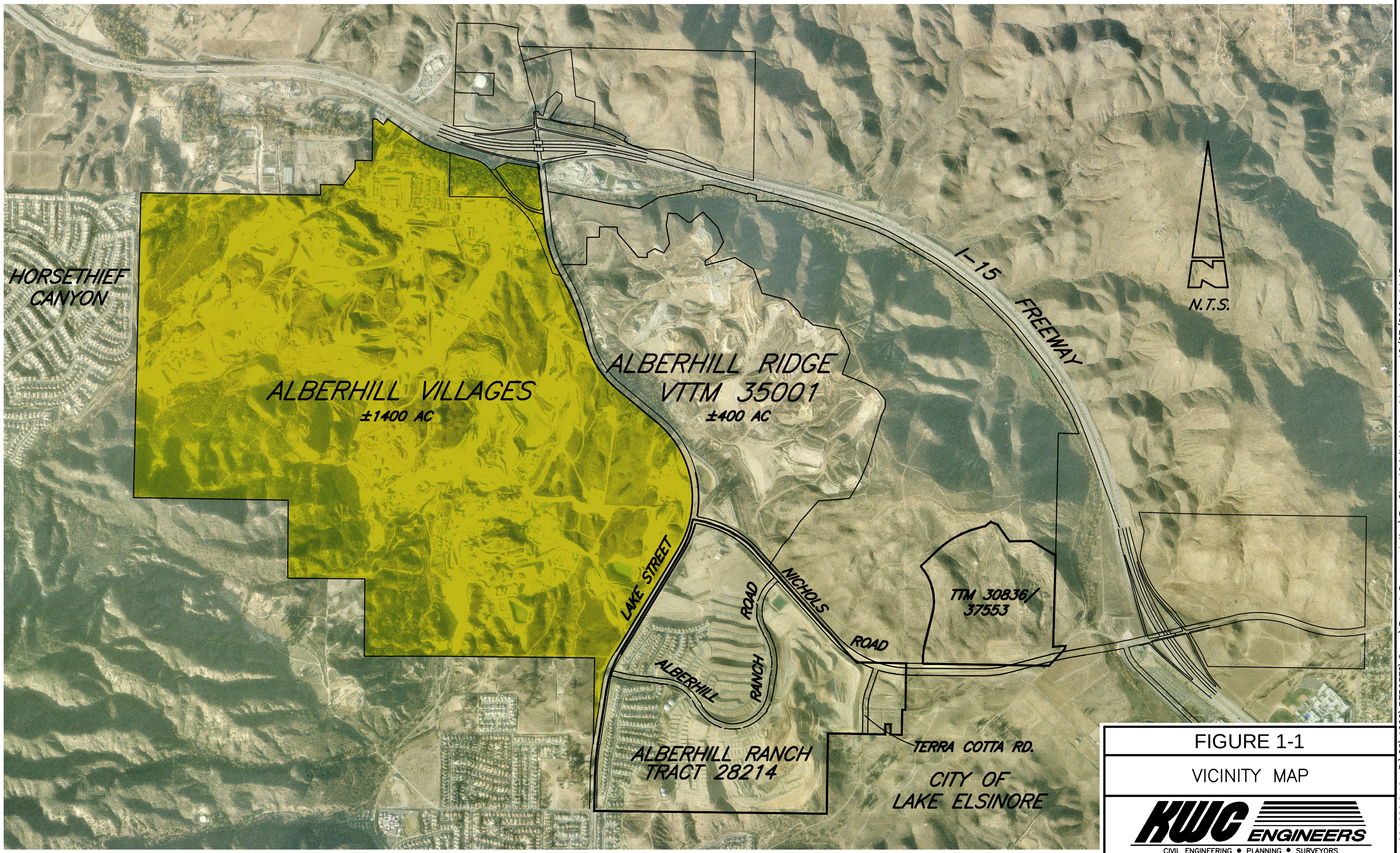

FIGURE 1-1

VICINITY MAP

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Section

2

DESIGN CRITERIA

This section presents the design criteria used to estimate the sewage flows and evaluate recommended sewer system improvements required for the Alberhill Villages project, and surrounding tributary sewershed within the Alberhill drainage area. The criteria utilized in this study are in accordance with the March 2005 Technical Memorandum for the Alberhill area, EVMWD's 2008 Wastewater Master Plan, and February 2015 EVMWD Standards Specifications.

2.1 SEWAGE FLOWS

The sewage generation factors used to estimate the average daily flows for the project and surrounding tributary area are listed in **Table 2-1**. **Table 2-2** lists other recommended generation factors for other land uses per unit basis.

TABLE 2-1

RECOMMENDED UNIT SEWAGE GENERATION FACTORS		
Land Use category	**Recommended Return-to-sewer ratio (%)**	**Recommended Wastewater flow factor (gpd/acre)**
Residential		
Mountainous (0-.1du/ac)	40	100
Very Low Density (.1-.5du/ac)	40	200
Low Density (.5-2du/ac)	45	400
Low Medium Density (2-4du/ac)	45	900
Medium Density (4-6du/ac)	45	1050
Medium High Density (6-12du/ac)	50	1500
High Density (12-24du/ac)	55	2750
Mixed Use (24du/ac max)	70	1650
Non-Residential		
Business Park	60	750
Commercial office	60	1800
Freeway Business	60	800
General Commercial	60	1500
Limited Industrial	60	550
Neighborhood Commercial	60	600
Open Space/Recreation	10	200
Public Institution/Schools	60	1400
Streets	0	0
Tourist Commercial	60	1500
Water/Floodway	0	0

TABLE 2-2

OTHER RECOMMENDED UNIT SEWAGE GENERATION FACTORS	
Land Use category	**Recommended Wastewater flow factor (gpd/unit)**
Public Institution/Schools (students)	30
High Density High Rise (> 24 du/ac)	150
Single Family Residential (2-6 du/ac)	250

To convert average dry weather daily flows to peak wet weather flows, the following formula was used:

$$\textbf{Peak Flow} = 1.78 * (\textbf{Average Flow in MGD})^{0.92}$$

2.2 GRAVITY SEWERS

All gravity sewers have been designed to convey peak wet weather flow. For pipes with a diameter of 12-inches or less, the sewers have been designed to convey this flow when flowing half full. For pipes with a diameter over 12-inches, the sewers have been designed to convey peak wet weather flow when flowing two-thirds full by depth. Manning's Equation with an "n" value of 0.013 was used to size all gravity sewers. All new sewers were designed to maintain a minimum velocity of two feet per second at design capacity to prevent the deposition of solids. To minimize excessive wear and tear of the pipe, pipes shall be designed to not exceed a maximum 10 feet per second velocity. **Table 2-3** lists the minimum slope requirements for various pipe sizes. When minimum velocities are not able to be met, minimum pipe slopes shall be maintained.

TABLE 2-3

MINIMUM SLOPE REQUIREMENTS	
Sewer Pipe Size (in)	**Minimum Percent Grade (%)**
4	2.0
6	1.0
8	0.4
10	0.32
12	0.24
15	0.15
18	0.12
21	0.09
24	0.08
27 and greater	0.06

2.3 FORCE MAINS

All force main sewers will be designed to convey peak wet weather flow. Hazel Williams Coefficient "C" value of 130 was used to size all force main sewers. All force mains were designed to maintain a minimum velocity of three feet per second at design capacity to prevent the deposition of solids. To minimize excessive wear and tear of the pipe, pipes shall be designed to not exceed a maximum 5 feet per second velocity. The maximum desirable headloss in the pipe is 5 feet per 100 feet of pipe and should never exceed 10 feet per 1000 feet of pipe.

2.4 LIFT STATIONS

All Lift Stations should be sized to accommodate the influent peak wet weather flows and based upon a 60 percent pump efficiency and 90 percent motor efficiency unless manufacturer specifications recommends otherwise. The lift station should also be capable of handling the flows with the largest capacity pump serving as standby.

Section

3
MASTER PLAN FACILITIES

Wastewater treatment is planned to occur at the proposed Alberhill Wastewater Treatment Plant located west of the Project and north of I-15 along Temescal Canyon Road per the current EVMWD Wastewater Master Plan. However, EMVWD, Consultant MWH, and KWC is currently updating the Waste Water Master Plan for the Alberhill Area to study the facilities required to convey wastewater flows to EVMWD's existing Regional Wastewater Treatment Plant (RWWTP) located on Chaney Street, located behind the district's central office. The district plans to expand RWWTP to include capacity for the Alberhill Area. Wastewater will flow northerly via gravity sewer mainline pipes through the Alberhill Village project in Lincoln Street and along the project in Lake Street. Estimated pipe sizes have been determined to be approximately 12"-18" in diameter. Pipe sizes will be further studied in the Master Plan update. A proposed Lift Station at the low-point of the Alberhill Villages project at the intersection of the future Temescal Canyon Road and Temescal Creek will pump flows via a force main in Lake Street up to the high-point in Nichols Road, east of Lake Street. Wastewater will then gravity flow easterly to the existing Nichols Road lift station, then gravity flow again southerly to the existing Collier Lift Station prior to gravity flowing to the RWWTP. Refer to Exhibit 1 entitled "Offsite Sewer Alternative to Regional WWTP" in Appendix B.

3.1 EXISTING FACILITIES

There are currently no existing wastewater treatment plant facility and sewer system available to service the Alberhill Villages drainage area. The Horsethief Canyon Development is currently served by a 0.50 MG Horsethief Canyon Wastewater Reclamation Facility (WRF) located within the Horsethief Canyon development. EVMWD is currently working with a group of developers to expand this facility for properties downstream of the facility but does not include AVSP.

Section

4

PROJECTED SEWAGE FLOWS

This section provides the projected sewage flows from the Alberhill Villages project. It also determines the tributary flows along the Lake Street/Temescal Canyon Road Reach trunk sewer system to the proposed Lift Station and its relative pipe sizes.

4.1 ALBERHILL VILLAGES TRIBUTARY AREA

The Alberhill Villages project is within the Alberhill sewershed. The project site is tributary to the proposed Master Planned trunk sewer line system along Lincoln Street, Lake Street and Temescal Canyon Road and the proposed Alberhill Lift Station. **Table 4.1** provides a statistical breakdown of the units and square footage for each of the Planning Areas proposed by the Alberhill Villages project. A copy of the Alberhill Villages Conceptual Land Use Plan as identified in the Alberhill Villages Specific Plan is provided in **Appendix D** and identifies the corresponding locations and proposed land uses for each of the Planning Areas. The projected sewer flows tributary to and for the design of the ultimate Lincoln Street, Lake Street/Temescal Canyon Road Reach were based on the current sewer and land use information for the proposed Alberhill Villages project development and the existing and future tributary developed areas.

TABLE 4-1

PROPOSED PROJECT LAND USE				
PLANNING AREA	**LAND USE**	**UNITS**	**S.F.**	**STUDENTS**
Alberhill Villages – Village 1				
University/University Town Center				
PA 1a	Inst/Res.	451	1,500,000	6,000
PA 1b	Mixed-Use	346	1,029,500	-0-
PA 1c	Mixed-Use	1,594	503,000	-0-
Alberhill Villages - Village 2				
Parkview				
PA 2a	Residential	1,131	-0-	-0-
PA 2b	Residential	1,026	-0-	-0-
PA 2c	Residential	288	-0-	WS, ES 1,450
Alberhill Villages - Village 3				
Highland				
PA 3a	Custom Res.	8	-0-	-0-
Alberhill Villages - Village 4				
Lakeside				
PA 4a	Residential	1,684	-0-	-0-
PA 4b	Residential	701	-0-	-0-
PA 4c	Mixed-Use	250	382,000	-0-
Alberhill Villages - Village 5				
Ridgeview				
PA 5a	Residential	287	-0-	-0-
PA 5b	Residential	329	-0-	-0-
Alberhill Villages - Village 6				
Town Center				
PA 6a	Mixed-Use	100	392,500	-0-
PA 6b	Mixed-Use	50	200,000	600
TOTALS		**8,244**	**4,007,000**	**8,050**

The Alberhill Villages project is a portion of the overall master planned sewer flow projections tributary the trunk sewer system along Lincoln Street, Temescal Canyon Road and Lake Street to the Alberhill Lift Station.

The sewage generation factors used to determine the average daily flow for the project were established in Section 2. **Table 4-2** summarizes the projected sewer flows for the proposed Alberhill Villages project.

TABLE 4-2

PROJECTED SEWER GENERATIONS				
PLANNING AREA	**LAND USE**	**Tributary Area (AC/DU)**	**AVERAGE DAILY FLOW (mgd)**	**PEAK FLOW (mgd)**
Alberhill Villages				
Village 1 – University/University Town Center				
PA 1a (per acreage basis)	Institutional	63.1	0.09	0.19
PA 1a (per unit basis)	Res - MF	451	0.07	0.15
PA 1b (per acreage basis)	Com/Office	12.2	0.02	0.05
PA 1b (per acreage basis)	Gen-Com	45.0	0.07	0.15
PA 1b (per unit basis)	Res - MF	346	0.05	0.12
PA 1c (per acreage basis)	Com/Office	40.8	0.07	0.16
PA 1c (per unit basis)	Res - MF	1594	0.24	0.48
Village 2 – Parkview				
PA 2a (per unit basis)	Res - MF	350	0.05	0.12
PA 2a (per acreage basis)	Res - SF	139.8	0.15	0.30
PA 2a (per acreage basis)	Res - SF	21.7	0.03	0.08
PA 2b (per unit basis)	Res - MF	1026	0.15	0.32
PA 2c (per acreage basis)	Institutional	12.0	0.02	0.04
PA 2c (per acreage basis)	Res - SF	20.2	0.02	0.05
PA 2c (per acreage basis)	Res - SF	23.8	0.04	0.08
PA 2a (per acreage basis)	Worship	5.2	0.01	0.02
PA 2c (per acreage basis)	OS/Park	14.3	0.00	0.01
Village 3 – Highland				
PA 3a (per acreage basis)	Res - Low	164.5	0.03	0.08
Village 4 – Lakeside				
PA 4a (per unit basis)	Res - MF	889	0.13	0.28
PA 4a (per acreage basis)	Res - SF	23.1	0.03	0.08
PA 4a (per acreage basis)	Res - SF	91.6	0.10	0.21
PA 4a (per acreage basis)	Res - SF	15.2	0.02	0.05
PA 4a (per acreage basis)	OS/Park	21.3	0.00	0.01
PA 4b (per acreage basis)	Res - SF	16.0	0.02	0.06
PA 4b (per acreage basis)	Res - SF	10.5	0.02	0.04
PA 4b (per acreage basis)	Res - MF	29.1	0.08	0.17
PA 4c (per unit basis)	Res - MF	60	0.01	0.02
PA 4c (per acreage basis)	Res - SF	18.7	0.03	0.07
PA 4c (per acreage basis)	Com/Office	3.2	0.01	0.02
PA 4c (per acreage basis)	Gen-Com	9.5	0.01	0.04
PA 4c (per acreage basis)	OS/Park	16.2	0.00	0.01
Village 5 – Ridgeview				
PA 5a (per acreage basis)	Res - SF	12.4	0.02	0.05
PA 5a (per acreage basis)	Res - SF	40.0	0.04	0.10
PA 5b (per acreage basis)	Res - SF	13.1	0.02	0.05
PA 5b (per acreage basis)	Res - MF	14.8	0.04	0.09
PA 5b (per acreage basis)	OS/Park	45.9	0.01	0.02
Village 6 – Alberhill Town Center				
PA 6a (per unit basis)	Res - MF	100	0.02	0.04
PA 6a (per acreage basis)	Com/Office	6.4	0.01	0.03
PA 6a (per acreage basis)	Gen-Com	19.3	0.03	0.07
PA 6b (per unit basis)	Res - MF	50	0.01	0.02
PA 6b (per unit basis)	Com/Office	4.3	0.01	0.02
PA 6b (per acreage basis)	Gen-Com	8.8	0.01	0.04
PA 6b (per acreage basis)	Worship	10.0	0.01	0.04
TOTALS			**1.81**	**3.47**

Section

5
CONCLUSIONS

The Alberhill Villages project will require the following Sewer Infrastructure to be constructed for the build-out and Phase 1 condition:

Alberhill Villages Ultimate Build-out and Phase 1 Improvements

- Construction of the Alberhill WWTP by EVMWD or construction of the Alberhill Lift Station for wastewater treatment by EVMWD at Regional WWTP;
- Construction of the master planned trunk sewer line in Lincoln Street, Temescal Canyon Road and Lake Street; and
- Construction of onsite gravity sewer collection lines within the Alberhill Villages project.

These proposed sewer infrastructure facilities with respect to their proximate locations, alignments, and sizes are still to be determined in the EVMWD Wastewater Master Plan update. The proposed Alberhill Villages onsite sewer facilities presented in this report are preliminary estimates of the anticipated sewer facilities necessary to service the project needs. Further studies may be required by EVMWD during the development phase of the project.

Appendix

A

REFERENCES

Alberhill Ranch Specific Plan Amendment #4, Sierra Consultants, July, 2008.

Brighton Alberhill Specific Plan Amendment No. 1, J.L. Webb Planning, Inc., March 19, 1991.

Alberhill Villages Specific Plan, Project Design Consultants, January 2010.

City of Lake Elsinore General Plan – Land Use Map, City of Lake Elsinore, December 13, 2011.

Draft Technical Memorandum – Alberhill Water & Wastewater Facilities Phasing Plan, Jeff Kirshberg, March 19, 2005.

Elsinore Valley MWD – Alberhill Water Reclamation Facility Preliminary Design Report, MWH, July 2006.

Memorandum – Alberhill CFD Participant Study Meeting Agenda for 3/9/06, Kennedy/Jenks Consultants, March 09, 2006.

Draft Technical Memorandum – Alberhill Mini Wastewater Master Plan, Kennedy/Jenks Consultants, March 23, 2006.

Castle & Cooke Alberhill Ranch Nichols Lift Station Pre-Design Report, Kimley-Horn & Assoc., May 26, 2006.

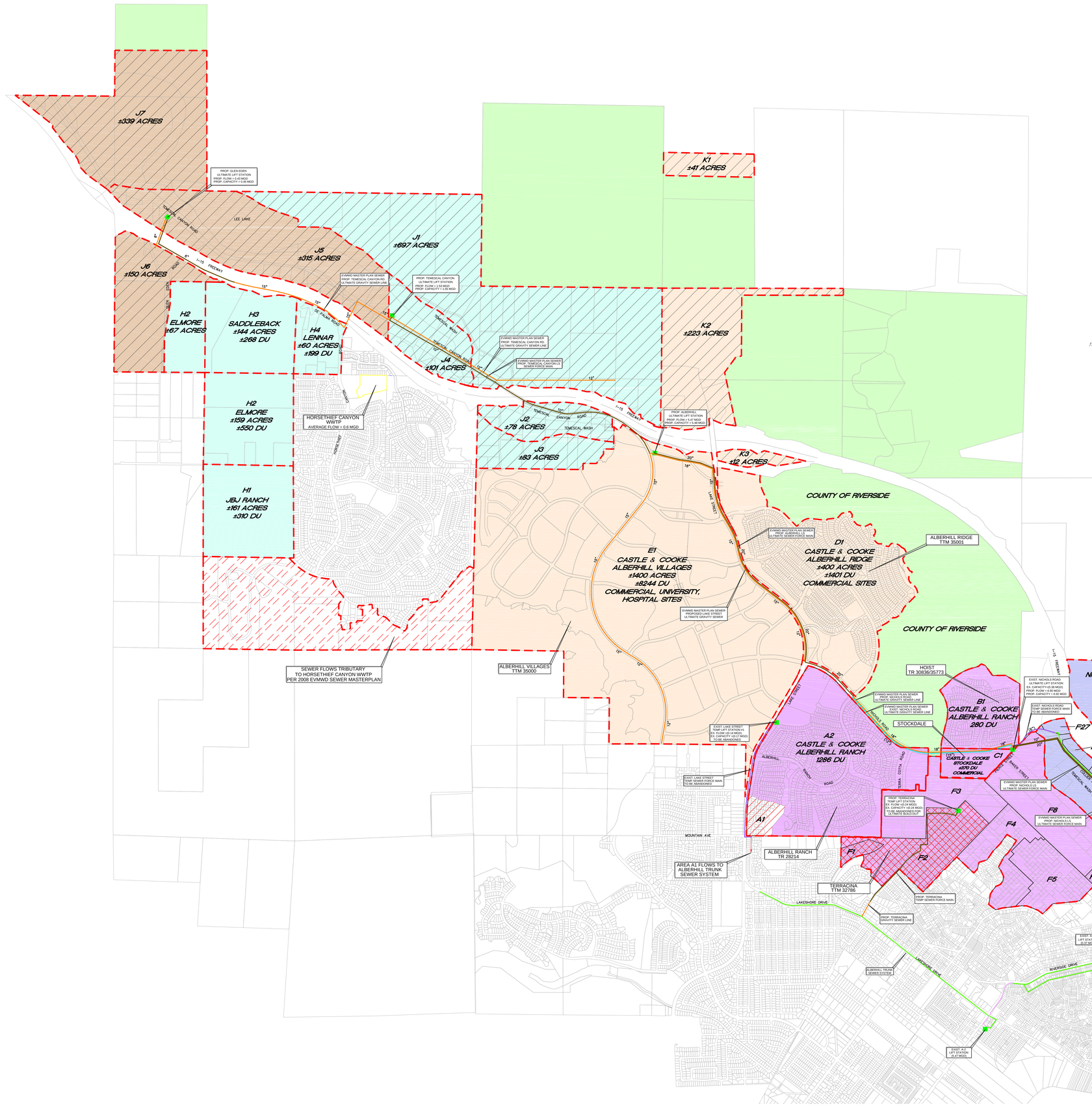
Elsinore Valley Municipal Water District, Wastewater Master Plan, Carollo Engineers, November 2008.

Elsinore Valley Municipal Water District, Wastewater Master Plan, Kennedy/Jenks Consultants, July 2002.

Appendix

B

ALBERHILL DRAINAGE AREA SEWERSHED BOUNDARY MAP



LEGEND:

- PROJECT BOUNDARY/PHASE LINES
- OFFSITE AREA TRIBUTARY TO NICHOLS ROAD LIFT STATION– DEVELOPMENT SCHEDULE UNKNOWN
- TRIBUTARY TO ALBERHILL LIFT STATION– DEVELOPMENT SCHEDULE UNKNOWN
- TRIBUTARY TO TEMESCAL CANYON LIFT STATION– DEVELOPMENT SCHEDULE UNKNOWN
- FUTURE TRIBUTARY TO TEMESCAL CANYON LIFT STATION– DEVELOPMENT SCHEDULE UNKNOWN
- FUTURE TRIBUTARY TO GLEN EDEN LIFT STATION– DEVELOPMENT SCHEDULE UNKNOWN
- RCA CONSERVED LAND OR PUBLIC/QUASI–PUBLIC CONSERVED LAND PER RIVERSIDE COUNTY PQP/WRCRCA CONSERVED LANDS MAP
- TRIBUTARY TO COLLIER LIFT STATION– TRIB. TO EXIST. COLLIER SYSTEM DEVELOPMENT SCHEDULE UNKNOWN
- SEWER FLOWS TRIBUTARY TO THE HORSETHIEF CANYON WWTP
- INTERIM FLOWS TRIBUTARY TO ALBERHILL TRUNK SEWER SYSTEM & A2 LIFT STATION
- LIFT STATION LOCATIONS
- (12") EX. GRAVITY SEWER LINE (EVMWD TRUNK SEWER)
- (12") EX. GRAVITY SEWER LINE (C&C TRUNK SEWER)
- (6") EX. SEWER FORCE MAIN LINE
- (12") EX. SEWER FORCE MAIN LINE (EVMWD TRUNK SEWER)
- 18" PROP SEWER FORCE MAIN LINE
- 15" PROP GRAVITY SEWER LINE

NOTES:

1) PEAK FLOWS SHOWN HEREON ARE PEAK DRY WEATHER FLOWS AS DETERMINED FROM PEAK FLOW EQUATION =1.84(ADWF)^0.92.
2) NO INFILTRATION AND INFLOW (I/I) FACTORS WERE INCLUDED IN ANALYSIS OF FLOWS AND PIPING AND FACILITIES SIZING.
3) UPSTREAM SEWER LIFT STATION DESIGN TO INCLUDE PUMPED FLOWS FROM DOWNSTREAM SEWER LIFT STATION.

ASSUMPTIONS:

1) EXISITNG LAKE STREET LIFT STATION #1 (0.17 MGD) WILL BE ABANDONED AND FLOWS WILL BE ROUTED TO THE NICHOLS ROAD LIFT STATION
2) REGIONAL WWTP WILL BE UPSIZED TO ACCOMMODATE ALL PROPOSED SEWER FLOWS FROM THE ALBERHILL SEWERSHED AREA
3) HORSETHIEF CANYON WWTP IS TO REMAIN IN PLACE AND OPERATION. THE ADJACENT RENAISANCE DEVELOPMENT WILL BE TRIBUTARY TO HORSETHIEF CANYON WWTP PER PRIOR DEVELOPMENT AGREEMENT WITH EVMWD.
4) SEWER FLOWS FROM SUBAREAS G1 AND G2 ARE TRIBUTARY TO A FUTURE NORTH PEAK GRAVITY SEWER LINE IN EL TORO ROAD (RP–32A AND RP–32B) PER 2008 MASTER PLAN WHICH ULTIMATELY DRAINS TO THE 3RD ST. TRUNK SEWER AT MINTHORN STREET.
5) SEWER FLOWS FROM SUBAREA G3 IS TRIBUTARY TO EXISTING GRAVITY SEWER IN EL TORO ROAD WHICH DRAINS TO THE COLLIER TRUNK SEWER AT RIVERSIDE DRIVE.

REVISION DATE: 03-19-14

FIGURE 5-1
CASTLE & COOKE
ALBERHILL AREA SEWER MASTER PLAN
LAKE ELSINORE, CA
OFFSITE SEWER ALTERNATIVE TO REGIONAL WWTP – ULTIMATE BUILDOUT

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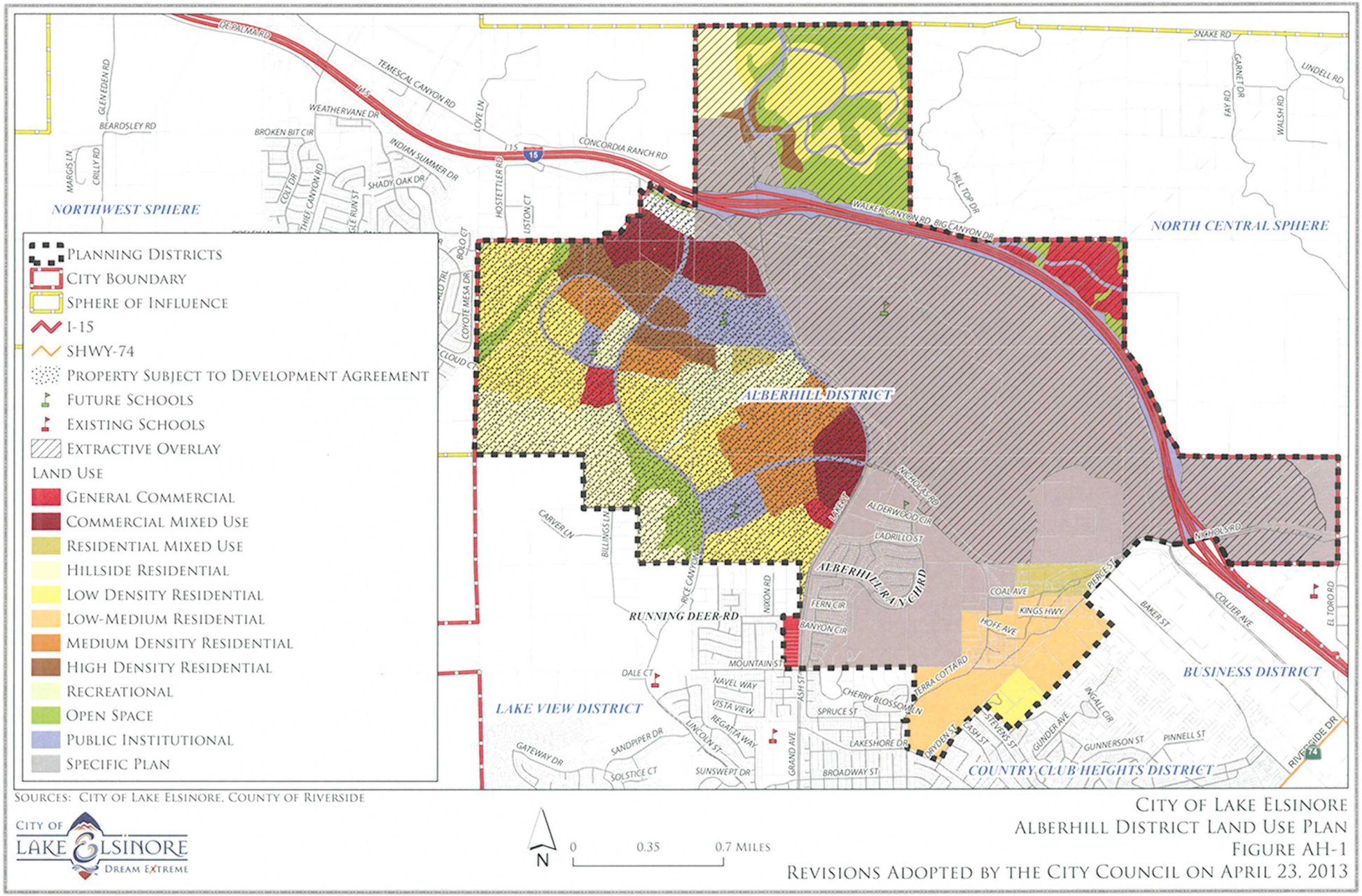
Appendix

C

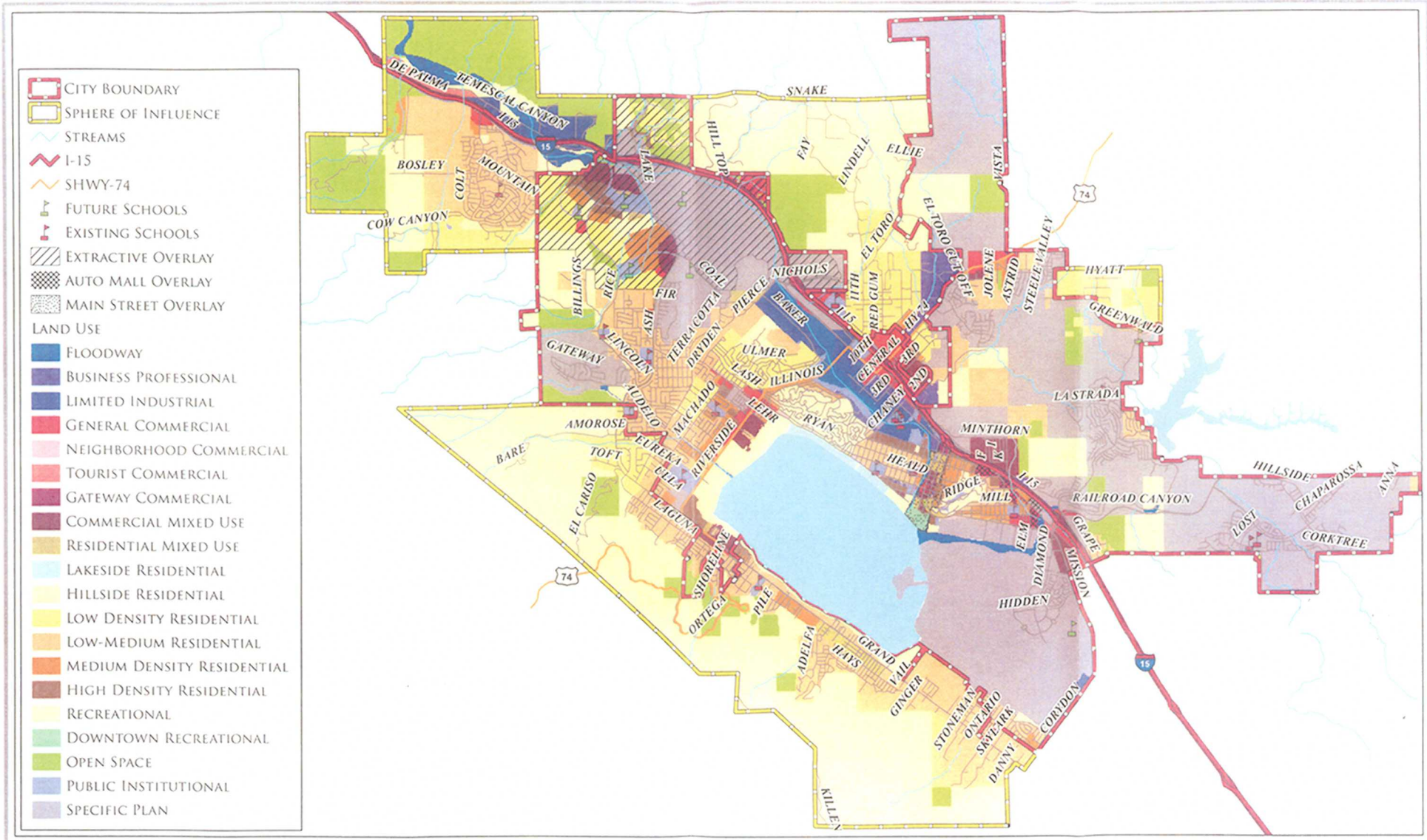
CITY OF LAKE ELSINORE GENERAL PLAN LAND USE MAP



SOURCES: CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE

CITY OF LAKE ELSINORE
DREAM EXTREME

CITY OF LAKE ELSINORE
ALBERHILL DISTRICT LAND USE PLAN
FIGURE AH-1
REVISIONS ADOPTED BY THE CITY COUNCIL ON APRIL 23, 2013



SOURCES: CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE

CITY OF LAKE ELSINORE
LAND USE PLAN
FIGURE 2.1A

Appendix

D

RELATED PROJECTS LAND USE PLAN

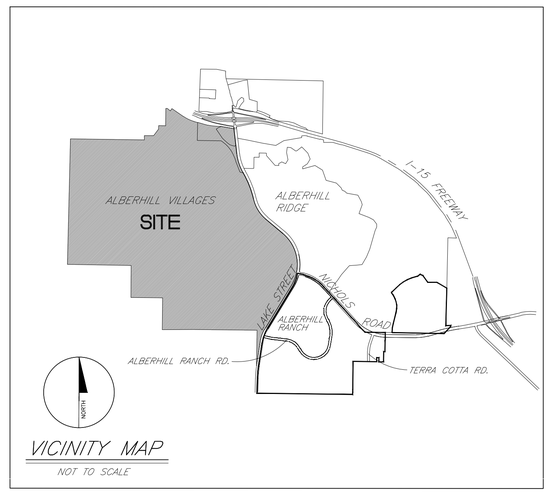
Alberhill Villages Conceptual Land Use Plan

Alberhill Ridge Land Use Plan & Vesting Tentative Tract Map

Alberhill Ranch Site Phasing Map

ALBERHILL VILLAGES SPECIFIC PLAN
PRELIMINARY LAND USE EXHIBIT

VICINITY MAP



LEGEND:

- HILLSIDE RESIDENTIAL
- SINGLE FAMILY RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- MIXED USE
- SCHOOL
- WORSHIP
- LAKE
- PUBLIC WATER FACILITY
- PARKS
- OPEN SPACE-NATURAL
- OPEN SPACE-RESTORED (DETENTION/DEBRIS BASIN/ SLOPE/ LOW FLOW CHANNEL)

VTTM 35001
ALBERHILL RIDGE

TRACT 28214
ALBERHILL RANCH

LAND USE SUMMARY TABLE

PHASE	PLANNING AREA	LAND USE	ACRES	DWELLING UNITS (MAX)	F.A.R.	NON-RESIDENTIAL BLDG. (SQ. FT.)	SCHOOL CAPACITY (STUDENTS)
	1A	UNIVERSITY	63.1		0.55	1,500,000	6,000
	1A	MF-35	12.9	451			
	1B	MU/REG COM	1.7	15	0.35	26,000	
	1B	PARK (TG)	0.7				
	1B	MU/REG COM	1.7	15	0.35	26,000	
	1B	MU/REG COM	36.5	206	0.45	717,500	
	1B	MU/REG COM	17.3	110	0.35	260,000	
	1B	OS (TEM CREEK)	9.5				
	1B	OS (LAKE ST)	0.7				
	4C	COMMERCIAL/MU	12.7	60	0.69	382,000	
	4C	LAKE	26.0				
	4C	PARK (TG)	0.7				
	4C	PARK	15.5				
	4C	SF-10	18.7	190			
	4B	MF-16	11.9	192			
	6A	COMMERCIAL/MU	25.7	100	0.35	392,500	
	6B	COMMERCIAL/MU	13.1	50	0.35	200,000	
	6B	WORSHIP	10.0				600
1		**SUBTOTAL**	**278.4**	**1,389**		**3,504,000**	**6,600**
	4B	SF-10	16.0	160			
	4B	SF-7	10.5	74			
	4B	MF-16	17.2	275			
	5B	SF-7	13.1	92			
	5B	MF-16	14.8	237			
	5B	PARK	45.9				
	5B	OS	6.0				
2		**SUBTOTAL**	**123.5**	**838**		**0**	**0**
	4A	MF-35	25.4	889			
	4A	SF-10	23.1	231			
	4A	OS	3.2				
	4A	SF-5	51.0	255			
	4A	SF-5	10.2	51			
	4A	SF-5	30.4	152			
	4A	SF-7	15.2	106			
	4A	PARK	21.3				
	4A	LAKE	13.6				
	5A	SF-5	22.6	113			
	5A	SF-7	12.4	87			
	5A	SF-5	17.4	87			
	5A	OS	8.6				
	3B	OS	67.7				
	3B	OS-N	19.7				
3		**SUBTOTAL**	**341.8**	**1,971**		**0**	**0**
	2A	SF-4.5	54.6	246			
	2A	SF-4.5	9.1	41			
	2A	SF-4.5	15.0	68			
	2A	SF-4.5	17.1	77			
	2A	SF-4.5	20.8	94			
	2A	SF-4.5	23.2	104			
	2A	SF-7	21.7	152			
	2A	MF-35	10.0	350			
	2A	OS-N	0.5				
	2A	OS	35.2				
	2C	SF-6	20.2	121			
	2C	SF-7	13.2	92			
	2C	SF-7	10.6	74			
	2C	ELM SCHOOL	12.0				850
	2C	PARK	14.3				
	2C	WORSHIP	5.2				600
4		**SUBTOTAL**	**282.7**	**1,419**		**0**	**1,450**
	3A	HILLSIDE	164.5	8			
	3A	PW	1.2				
	3A	OS	0.8				
	3A	OS	1.5				
5		**SUBTOTAL**	**168.0**	**8**		**0**	**0**
	1C	MU/OFFICE/MED	40.8	1,594	0.28	503,000	
	1C	OS (TEM CREEK)	7.7				
	1C	OS	2.3				
	2B	MF-35	29.3	1026			
6		**SUBTOTAL**	**80.1**	**2,620**		**503,000**	**0**
		STREETS	**123.9**				
		TOTAL	**1,398.4**	**8,244**		**4,007,000**	**8,050**

LAND USE TYPE SUMMARY

Land Use	Total Acres	Units
SF-4.5	139.8	629
SF-5	131.6	658
SF-6	20.2	121
SF-7	96.7	678
SF-10	57.8	581
MF-16	43.9	704
MF-35	77.6	2716
UNIVERSITY	63.1	
WORSHIP	15.2	
COMMERCIAL/MU	51.5	210
MU/REG COM	57.2	346
OS/PARK/LAKE	301.4	
ELM SCHOOL	12.0	
MU/OFFICE/MED	40.8	1594
HILLSIDE	164.5	8
STREETS	123.9	
PW	1.2	
TOTAL	**1398.4**	**8,244**

RESIDENTIAL TYPE SUMMARY

Land Use	Total Acres	Units
SFD	388.3	2086
SFA	57.8	581
MF	121.5	3420
MXU	149.5	2150
HILLSIDE	164.5	8
TOTAL	**881.6**	**8,244**

300' 0 300' 600' 900'
SCALE IN FEET

STUDY DATE IDENTIFIER
DATE OF LATEST CHANGE TO THIS MAP
BY: PVK
DATE OF THIS PLOT
03/23/15

PREPARED FOR:

PACIFIC CLAY PRODUCTS INC.
6455 ALBERHILL RANCH ROAD
LAKE ELSINORE, CA 92530
(951) 245-0476

PREPARED BY:

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

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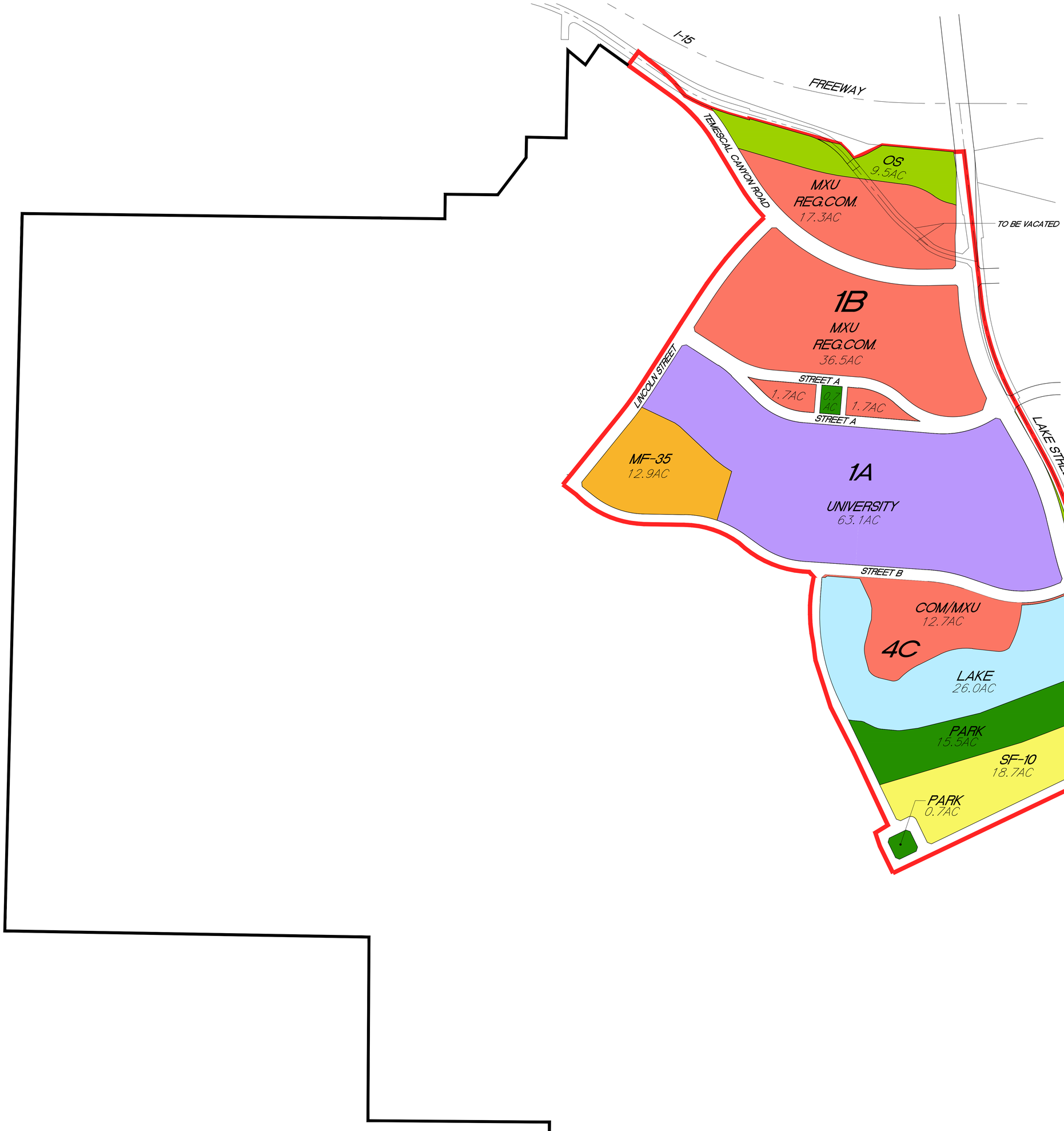
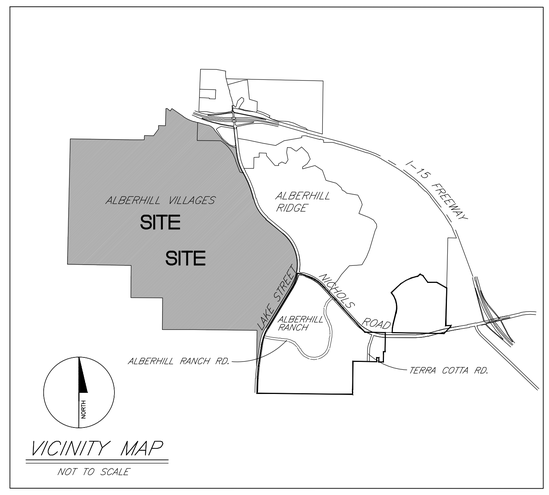
ALBERHILL VILLAGES SPECIFIC PLAN
PRELIMINARY LAND USE EXHIBIT - PHASE I



VICINITY MAP



VICINITY MAP
NOT TO SCALE

LEGEND:

- HILLSIDE RESIDENTIAL
- SINGLE FAMILY RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- MIXED USE
- SCHOOL
- WORSHIP
- LAKE
- PUBLIC WATER FACILITY
- PARKS
- OPEN SPACE-NATURAL
- OPEN SPACE-RESTORED (DETENTION/DEBRIS BASIN/ SLOPE/ LOW FLOW CHANNEL)

LAND USE SUMMARY TABLE

PHASE	PLANNING AREA	LAND USE	ACRES	DWELLING UNITS (MAX)	F.A.R.	NON-RESIDENTIAL BLDG. (SQ. FT.)	SCHOOL CAPACITY (STUDENTS)
	1A	UNIVERSITY	63.1		0.55	1,500,000	6,000
	1A	MF-35	12.9	451			
	1B	MU/REG COM	1.7	15	0.35	26,000	
	1B	PARK (TG)	0.7				
	1B	MU/REG COM	1.7	15	0.35	26,000	
	1B	MU/REG COM	36.5	206	0.45	717,500	
	1B	MU/REG COM	17.3	110	0.35	260,000	
	1B	OS (TEM CREEK)	9.5				
	1B	OS (LAKE ST)	0.7				
	4C	COMMERCIAL/MU	12.7	60	0.69	382,000	
	4C	LAKE	26.0				
	4C	PARK (TG)	0.7				
	4C	PARK	15.5				
	4C	SF-10	18.7	190			
	4B	MF-16	11.9	192			
	6A	COMMERCIAL/MU	25.7	100	0.35	392,500	
	6B	COMMERCIAL/MU	13.1	50	0.35	200,000	
	6B	WORSHIP	10.0				600
1		**SUBTOTAL**	**278.4**	**1,389**		**3,504,000**	**6,600**

300' 0 300' 600' 900'
SCALE IN FEET

PREPARED FOR:

PACIFIC CLAY PRODUCTS INC.
6455 ALBERHILL RANCH ROAD
LAKE ELSINORE, CA 92530
(951) 245-0476

STUDY DATE IDENTIFIER
DATE OF LATEST CHANGE TO THIS MAP
BY: PVK
DATE OF THIS PLOT
04/03/15

PREPARED BY:

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

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Appendix

E

PROJECTED WASTEWATER GENERATION

Alberhill Villages Project (from Specific Plan)

Projected Wastewater Generation (per Conceptual Land Use Plan)

Sewershed ID	Contributary Area (AC) or Units	Land Use Designation	Ultimate Flows: Average Daily Flow (mgd)	Ultimate Flows: Peak Flow (mgd)
Village 1 - University/Unversity Town Center				
PA 1a				
College Campus (6000 Students)	63.1	Public Inst/Schools	0.09	0.19
Multi-Family-35DU/AC (per Unit Basis)	451	Multi Family High Rise	0.07	0.15
PA 1b- Commercial/Mixed Use				
Residential-52DU/AC (per Unit Basis)	346	Multi Family High Rise	0.05	0.12
Office	12.2	Commercial Office	0.02	0.05
Retail	45.0	General Commercial	0.07	0.15
Park	0.7	Parks/Landscaping	0.0001	0.001
PA 1c- Office Medical				
Office	40.8	Commercial Office	0.07	0.16
Multi Family High Rise (per Unit Basis)	1594	Multi Family High Rise	0.24	0.48
		Subtotal	**0.61**	**1.13**
Village 2 - Parkview				
PA 2a				
Multi-Family-35DU/AC (per Unit Basis)	350	Multi Family High Rise	0.05	0.12
Single Family-4.5DU/AC	139.8	Medium Density	0.15	0.30
Single Family-7DU/AC	21.7	Medium High Density	0.03	0.08
PA 2b				
Multi-Family-35DU/AC (per Unit Basis)	1026	Multi Family High Rise	0.15	0.32
PA 2c				
Park	14.3	Open Space/Recreation	0.00	0.01
Elementary School (850 Students)	12.0	Public Inst/Schools	0.02	0.04
Single Family-6DU/AC	20.2	Medium Density	0.02	0.05
Single Family-7DU/AC	23.8	Medium High Density	0.04	0.08
Worship	5.2	Public Institutional	0.01	0.02
		Subtotal	**0.47**	**0.89**
Village 3 - Highland				
PA 3a				
Hillside Residential	164.5	Very Low Density	0.03	0.08
		Subtotal	**0.03**	**0.08**

Alberhill Villages Project (from Specific Plan)

Projected Wastewater Generation (per Conceptual Land Use Plan)

Sewershed ID	Contributary Area (AC) or Units	Land Use Designation	Ultimate Flows: Average Daily Flow (mgd)	Ultimate Flows: Peak Flow (mgd)
Village 4 - Lakeside				
PA 4a				
Multi-Family-35DU/AC (per Unit Basis)	889	Multi Family High Rise	0.13	0.28
Single Family-10DU/AC	23.1	Medium High Density	0.03	0.08
Single Family-5DU/AC	91.6	Medium Density	0.10	0.21
Park	21.3	Open Space/Recreation	0.004	0.01
Single Family-7DU/AC	15.2	Medium High Density	0.02	0.05
PA 4b				
Single Family-10DU/AC	16.0	Medium High Density	0.02	0.06
Single Family-7DU/AC	10.5	Medium High Density	0.02	0.04
Multi-Family-16DU/AC	29.1	High Density	0.08	0.17
PA 4c				
Residential-30DU/AC (per Unit Basis)	60	Multi Family High Rise	0.01	0.02
Single Family-10DU/AC	18.7	Medium High Density	0.03	0.07
Office	3.2	Commercial Office	0.01	0.02
Retail	9.5	General Commercial	0.01	0.04
Park	16.2	Open Space/Recreation	0.003	0.01
		Subtotal	**0.47**	**0.89**
Village 5 - Ridgeview				
PA 5a				
Single Family-7DU/AC	12.4	Medium High Density	0.02	0.05
Single Family-5DU/AC	40.0	Medium Density	0.04	0.10
PA 5b				
Single Family-7DU/AC	13.1	Medium High Density	0.02	0.05
Multi-Family-16DU/AC	14.8	High Density	0.04	0.09
Park	45.9	Open Space/Recreation	0.01	0.02
		Subtotal	**0.13**	**0.27**
Village 6 - Alberhill Town Center				
PA 6a				
Residential-42DU/AC (per Unit Basis)	100	Multi Family High Rise	0.02	0.04
Office	6.4	Commercial Office	0.01	0.03
Retail	19.3	General Commercial	0.03	0.07
PA 6b				
Residential-42DU/AC (per Unit Basis)	50	Multi Family High Rise	0.01	0.02
Office	4.3	Commercial Office	0.01	0.02
Retail	8.8	General Commercial	0.01	0.03
Worship	10.0	Public Institutional	0.01	0.04
		Subtotal	**0.10**	**0.21**
Total for Alberhill Villages			**1.81**	**3.47**

Appendix

F

ULTIMATE CONDITION SEWER DESIGN FOR BUILD-OUT

PROP. ALBERHILL LIFT STATION (5.80 MGD)
TEMESCAL WASH
TEMESCAL CANYON RD
LAKE STREET
LINCOLN STREET
NICHOLS ROAD
ALBERHILL RANCH
15”
18”
12”
21”
(12”)
COUNTY OF RIVERSIDE
ALBERHILL RIDGE TTM 35001
EVMWD MASTER PLAN SEWER PROPOSED LAKE STREET GRAVITY SEWER FORCE MAIN
CASTLE & COOKE ALBERHILL VILLAGES
CASTLE & COOKE ALBERHILL RIDGE ±400 ACRES ±1401 DU COMMERCIAL SITES
ALBERHILL VILLAGES TTM 35000
EVMWD MASTER PLAN SEWER PROP. NICHOLS ROAD GRAVITY SEWER LINE
EVMWD MASTER PLAN SEWER EXIST. NICHOLS ROAD GRAVITY SEWER LINE
EXIST. LAKE STREET LIFT STATION #1 (0.17 MGD) TO BE ABANDONED
CASTLE & COOKE ALBERHILL RANCH 1286 DU
EXIST. LAKE STREET SEWER FORCE MAIN TO BE ABANDONED
LEGEND:
ALBERHILL VILLAGES
LIFT STATION LOCATIONS
EX. GRAVITY SEWER LINE (EVMWD TRUNK SEWER)
EX. GRAVITY SEWER LINE (C&C TRUNK SEWER)
EX. SEWER FORCE MAIN LINE
EX. SEWER FORCE MAIN LINE (EVMWD TRUNK SEWER)
PROP SEWER FORCE MAIN LINE
PROP GRAVITY SEWER LINE
NOTES:
1) PEAK FLOWS SHOWN HEREON ARE PEAK DRY WEATHER FLOWS AS DETERMINED FROM PEAK FLOW EQUATION =1.78(ADWF)^0.92.
2) UPSTREAM SEWER LIFT STATION DESIGN TO INCLUDE PUMPED FLOWS FROM DOWNSTREAM SEWER LIFT STATION.
300' 0 300' 600' 900'
SCALE IN FEET
REVISION DATE: 4/7/2015
EXHIBIT 1
ALBERHILL VILLAGES PRPOSED SEWER FACILITIES
KWC ENGINEERS

Appendix

G

SEWER DESIGN FOR PHASE 1

TEMESCAL WASH

PROP. ALBERHILL
LIFT STATION
(5.80 MGD)

TEMESCAL CANYON RD

LAKE STREET

LINCOLN STREET

15"

18"

CASTLE & COOKE
ALBERHILL VILLAGES
PHASE 1

COUNTY OF RIVERSIDE

CASTLE & COOKE
ALBERHILL RIDGE

12"

EVMWD MASTER PLAN SEWER
PROPOSED LAKE STREET
GRAVITY SEWER FORCE MAIN

EVMWD MASTER PLAN SEWER
PROP. NICHOLS ROAD
GRAVITY SEWER LINE

EVMWD MASTER PLAN SEWER
EXIST. NICHOLS ROAD
GRAVITY SEWER LINE

NICHOLS ROAD

21"

(12")

EXIST. LAKE STREET
LIFT STATION #1
(0.17 MGD)
TO BE ABANDONED

EXIST. LAKE STREET
SEWER FORCE MAIN
TO BE ABANDONED

ALBERHILL RANCH

CASTLE & COOKE
ALBERHILL RANCH
1286 DU

LEGEND:

- ALBERHILL VILLAGES PHASE 1
- LIFT STATION LOCATIONS
- EX. GRAVITY SEWER LINE (EVMWD TRUNK SEWER)
- EX. GRAVITY SEWER LINE (C&C TRUNK SEWER)
- EX. SEWER FORCE MAIN LINE
- EX. SEWER FORCE MAIN LINE (EVMWD TRUNK SEWER)
- PROP SEWER FORCE MAIN LINE
- PROP GRAVITY SEWER LINE

NOTES:

1) PEAK FLOWS SHOWN HEREON ARE PEAK DRY WEATHER FLOWS AS DETERMINED FROM PEAK FLOW EQUATION =1.84(ADWF)^0.92.
2) UPSTREAM SEWER LIFT STATION DESIGN TO INCLUDE PUMPED FLOWS FROM DOWNSTREAM SEWER LIFT STATION.

300' 0 300' 600' 900'
SCALE IN FEET

REVISION DATE: 3/31/2015

EXHIBIT 2
ALBERHILL VILLAGES PHASE 1
PROPOSED SEWER FACILITIES

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

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Appendix

H

PIPE CAPACITY CALCULATIONS

Rating Table for 33-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	1.84	ft
Diameter	33.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	19.04	6.98	4.22	5.27	2.59
0.01000	26.93	9.86	4.22	5.27	2.59
0.01500	32.98	12.08	4.22	5.27	2.59
0.02000	38.08	13.95	4.22	5.27	2.59
0.02500	42.58	15.60	4.22	5.27	2.59
0.03000	46.64	17.09	4.22	5.27	2.59
0.03500	50.38	18.45	4.22	5.27	2.59
0.04000	53.86	19.73	4.22	5.27	2.59
0.04500	57.12	20.93	4.22	5.27	2.59
0.05000	60.21	22.06	4.22	5.27	2.59
0.05500	63.15	23.13	4.22	5.27	2.59
0.06000	65.96	24.16	4.22	5.27	2.59
0.06500	68.65	25.15	4.22	5.27	2.59
0.07000	71.24	26.10	4.22	5.27	2.59
0.07500	73.75	27.01	4.22	5.27	2.59
0.08000	76.16	27.90	4.22	5.27	2.59
0.08500	78.51	28.76	4.22	5.27	2.59
0.09000	80.78	29.59	4.22	5.27	2.59
0.09500	83.00	30.40	4.22	5.27	2.59
0.10000	85.15	31.19	4.22	5.27	2.59

Rating Table for 30-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	1.67	ft
Diameter	30.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	14.73	6.54	3.48	4.78	2.35
0.01000	20.84	9.25	3.48	4.78	2.35
0.01500	25.52	11.33	3.48	4.78	2.35
0.02000	29.47	13.09	3.48	4.78	2.35
0.02500	32.95	14.63	3.48	4.78	2.35
0.03000	36.09	16.03	3.48	4.78	2.35
0.03500	38.98	17.31	3.48	4.78	2.35
0.04000	41.67	18.51	3.48	4.78	2.35
0.04500	44.20	19.63	3.48	4.78	2.35
0.05000	46.59	20.69	3.48	4.78	2.35
0.05500	48.87	21.70	3.48	4.78	2.35
0.06000	51.04	22.67	3.48	4.78	2.35
0.06500	53.12	23.59	3.48	4.78	2.35
0.07000	55.13	24.48	3.48	4.78	2.35
0.07500	57.07	25.34	3.48	4.78	2.35
0.08000	58.94	26.17	3.48	4.78	2.35
0.08500	60.75	26.98	3.48	4.78	2.35
0.09000	62.51	27.76	3.48	4.78	2.35
0.09500	64.22	28.52	3.48	4.78	2.35
0.10000	65.89	29.26	3.48	4.78	2.35

Rating Table for 27-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	1.50	ft
Diameter	27.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	11.09	6.10	2.82	4.30	2.12
0.01000	15.69	8.62	2.82	4.30	2.12
0.01500	19.22	10.56	2.82	4.30	2.12
0.02000	22.19	12.19	2.82	4.30	2.12
0.02500	24.81	13.63	2.82	4.30	2.12
0.03000	27.18	14.93	2.82	4.30	2.12
0.03500	29.35	16.13	2.82	4.30	2.12
0.04000	31.38	17.24	2.82	4.30	2.12
0.04500	33.28	18.29	2.82	4.30	2.12
0.05000	35.08	19.28	2.82	4.30	2.12
0.05500	36.80	20.22	2.82	4.30	2.12
0.06000	38.43	21.12	2.82	4.30	2.12
0.06500	40.00	21.98	2.82	4.30	2.12
0.07000	41.51	22.81	2.82	4.30	2.12
0.07500	42.97	23.61	2.82	4.30	2.12
0.08000	44.38	24.38	2.82	4.30	2.12
0.08500	45.74	25.13	2.82	4.30	2.12
0.09000	47.07	25.86	2.82	4.30	2.12
0.09500	48.36	26.57	2.82	4.30	2.12
0.10000	49.62	27.26	2.82	4.30	2.12

Rating Table for 24-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	1.34	ft
Diameter	24.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	8.16	5.64	2.24	3.84	1.88
0.01000	11.54	7.98	2.24	3.84	1.88
0.01500	14.13	9.77	2.24	3.84	1.88
0.02000	16.32	11.29	2.24	3.84	1.88
0.02500	18.25	12.62	2.24	3.84	1.88
0.03000	19.99	13.82	2.24	3.84	1.88
0.03500	21.59	14.93	2.24	3.84	1.88
0.04000	23.08	15.96	2.24	3.84	1.88
0.04500	24.48	16.93	2.24	3.84	1.88
0.05000	25.80	17.84	2.24	3.84	1.88
0.05500	27.06	18.72	2.24	3.84	1.88
0.06000	28.27	19.55	2.24	3.84	1.88
0.06500	29.42	20.35	2.24	3.84	1.88
0.07000	30.53	21.11	2.24	3.84	1.88
0.07500	31.60	21.85	2.24	3.84	1.88
0.08000	32.64	22.57	2.24	3.84	1.88
0.08500	33.65	23.27	2.24	3.84	1.88
0.09000	34.62	23.94	2.24	3.84	1.88
0.09500	35.57	24.60	2.24	3.84	1.88
0.10000	36.49	25.24	2.24	3.84	1.88

Rating Table for 21-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	1.17	ft
Diameter	21.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	5.70	5.16	1.71	3.35	1.65
0.01000	8.06	7.30	1.71	3.35	1.65
0.01500	9.87	8.94	1.71	3.35	1.65
0.02000	11.40	10.32	1.71	3.35	1.65
0.02500	12.74	11.54	1.71	3.35	1.65
0.03000	13.96	12.64	1.71	3.35	1.65
0.03500	15.08	13.65	1.71	3.35	1.65
0.04000	16.12	14.59	1.71	3.35	1.65
0.04500	17.10	15.48	1.71	3.35	1.65
0.05000	18.02	16.32	1.71	3.35	1.65
0.05500	18.90	17.11	1.71	3.35	1.65
0.06000	19.74	17.87	1.71	3.35	1.65
0.06500	20.55	18.60	1.71	3.35	1.65
0.07000	21.32	19.30	1.71	3.35	1.65
0.07500	22.07	19.98	1.71	3.35	1.65
0.08000	22.79	20.64	1.71	3.35	1.65
0.08500	23.50	21.27	1.71	3.35	1.65
0.09000	24.18	21.89	1.71	3.35	1.65
0.09500	24.84	22.49	1.71	3.35	1.65
0.10000	25.49	23.07	1.71	3.35	1.65

Rating Table for 18-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	1.00	ft
Diameter	18.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	3.76	4.65	1.25	2.87	1.41
0.01000	5.32	6.58	1.25	2.87	1.41
0.01500	6.52	8.06	1.25	2.87	1.41
0.02000	7.53	9.30	1.25	2.87	1.41
0.02500	8.41	10.40	1.25	2.87	1.41
0.03000	9.22	11.40	1.25	2.87	1.41
0.03500	9.96	12.31	1.25	2.87	1.41
0.04000	10.64	13.16	1.25	2.87	1.41
0.04500	11.29	13.96	1.25	2.87	1.41
0.05000	11.90	14.71	1.25	2.87	1.41
0.05500	12.48	15.43	1.25	2.87	1.41
0.06000	13.04	16.12	1.25	2.87	1.41
0.06500	13.57	16.77	1.25	2.87	1.41
0.07000	14.08	17.41	1.25	2.87	1.41
0.07500	14.57	18.02	1.25	2.87	1.41
0.08000	15.05	18.61	1.25	2.87	1.41
0.08500	15.51	19.18	1.25	2.87	1.41
0.09000	15.96	19.74	1.25	2.87	1.41
0.09500	16.40	20.28	1.25	2.87	1.41
0.10000	16.83	20.80	1.25	2.87	1.41

Rating Table for 15-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	0.83	ft
Diameter	15.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	2.30	4.12	0.87	2.38	1.18
0.01000	3.25	5.82	0.87	2.38	1.18
0.01500	3.99	7.13	0.87	2.38	1.18
0.02000	4.60	8.23	0.87	2.38	1.18
0.02500	5.15	9.20	0.87	2.38	1.18
0.03000	5.64	10.08	0.87	2.38	1.18
0.03500	6.09	10.89	0.87	2.38	1.18
0.04000	6.51	11.64	0.87	2.38	1.18
0.04500	6.90	12.35	0.87	2.38	1.18
0.05000	7.28	13.01	0.87	2.38	1.18
0.05500	7.63	13.65	0.87	2.38	1.18
0.06000	7.97	14.26	0.87	2.38	1.18
0.06500	8.30	14.84	0.87	2.38	1.18
0.07000	8.61	15.40	0.87	2.38	1.18
0.07500	8.91	15.94	0.87	2.38	1.18
0.08000	9.20	16.46	0.87	2.38	1.18
0.08500	9.49	16.97	0.87	2.38	1.18
0.09000	9.76	17.46	0.87	2.38	1.18
0.09500	10.03	17.94	0.87	2.38	1.18
0.10000	10.29	18.40	0.87	2.38	1.18

Rating Table for 12-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	0.50	ft
Diameter	12.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	0.81	3.21	0.39	1.57	1.00
0.01000	1.15	4.54	0.39	1.57	1.00
0.01500	1.41	5.56	0.39	1.57	1.00
0.02000	1.63	6.41	0.39	1.57	1.00
0.02500	1.82	7.17	0.39	1.57	1.00
0.03000	1.99	7.86	0.39	1.57	1.00
0.03500	2.15	8.49	0.39	1.57	1.00
0.04000	2.30	9.07	0.39	1.57	1.00
0.04500	2.44	9.62	0.39	1.57	1.00
0.05000	2.57	10.14	0.39	1.57	1.00
0.05500	2.70	10.64	0.39	1.57	1.00
0.06000	2.82	11.11	0.39	1.57	1.00
0.06500	2.94	11.56	0.39	1.57	1.00
0.07000	3.05	12.00	0.39	1.57	1.00
0.07500	3.15	12.42	0.39	1.57	1.00
0.08000	3.26	12.83	0.39	1.57	1.00
0.08500	3.36	13.22	0.39	1.57	1.00
0.09000	3.45	13.61	0.39	1.57	1.00
0.09500	3.55	13.98	0.39	1.57	1.00
0.10000	3.64	14.34	0.39	1.57	1.00

Rating Table for 10-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	0.42	ft
Diameter	10.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	0.51	2.85	0.28	1.32	0.83
0.01000	0.72	4.03	0.28	1.32	0.83
0.01500	0.88	4.94	0.28	1.32	0.83
0.02000	1.01	5.70	0.28	1.32	0.83
0.02500	1.13	6.37	0.28	1.32	0.83
0.03000	1.24	6.98	0.28	1.32	0.83
0.03500	1.34	7.54	0.28	1.32	0.83
0.04000	1.44	8.06	0.28	1.32	0.83
0.04500	1.52	8.55	0.28	1.32	0.83
0.05000	1.60	9.01	0.28	1.32	0.83
0.05500	1.68	9.45	0.28	1.32	0.83
0.06000	1.76	9.87	0.28	1.32	0.83
0.06500	1.83	10.28	0.28	1.32	0.83
0.07000	1.90	10.66	0.28	1.32	0.83
0.07500	1.97	11.04	0.28	1.32	0.83
0.08000	2.03	11.40	0.28	1.32	0.83
0.08500	2.09	11.75	0.28	1.32	0.83
0.09000	2.15	12.09	0.28	1.32	0.83
0.09500	2.21	12.42	0.28	1.32	0.83
0.10000	2.27	12.75	0.28	1.32	0.83

Rating Table for 8-inch Pipe

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	0.33	ft
Diameter	8.00	in

Channel Slope (ft/ft)	Discharge (mgd)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00500	0.27	2.44	0.17	1.04	0.67
0.01000	0.38	3.45	0.17	1.04	0.67
0.01500	0.47	4.22	0.17	1.04	0.67
0.02000	0.54	4.87	0.17	1.04	0.67
0.02500	0.61	5.45	0.17	1.04	0.67
0.03000	0.66	5.97	0.17	1.04	0.67
0.03500	0.72	6.45	0.17	1.04	0.67
0.04000	0.77	6.89	0.17	1.04	0.67
0.04500	0.81	7.31	0.17	1.04	0.67
0.05000	0.86	7.71	0.17	1.04	0.67
0.05500	0.90	8.08	0.17	1.04	0.67
0.06000	0.94	8.44	0.17	1.04	0.67
0.06500	0.98	8.79	0.17	1.04	0.67
0.07000	1.02	9.12	0.17	1.04	0.67
0.07500	1.05	9.44	0.17	1.04	0.67
0.08000	1.09	9.75	0.17	1.04	0.67
0.08500	1.12	10.05	0.17	1.04	0.67
0.09000	1.15	10.34	0.17	1.04	0.67
0.09500	1.18	10.62	0.17	1.04	0.67
0.10000	1.21	10.90	0.17	1.04	0.67