

Alpine Pointe Development Walnut

800 Meadow Pass Road Walnut, CA 91789

Inquiry Number: 3806765.6

December 09, 2013

The EDR-City Directory Abstract



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DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1920 through 2013. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

<u>Year</u>	<u>Source</u>	<u>TP</u>	<u>Adjoining</u>	Text Abstract	Source Image
2013	Cole Information Services	_	X	X	-
2008	Cole Information Services	-	X	Χ	-
2006	Haines Company	-	-	-	-
2004	Haines Company	-	-	-	-
2003	Haines & Company	Χ	X	X	-
2001	Haines & Company, Inc.	-	-	-	-
2000	Haines & Company	-	-	-	-
1999	Haines Company	-	-	-	-
1996	GTE	-	X	Χ	-
1995	Pacific Bell	-	-	-	-
1992	PACIFIC BELL WHITE PAGES	-	-	-	-
1991	Pacific Bell	-	-	-	-
1990	GTE	-	X	X	-
1986	Pacific Bell	-	-	-	-
1985	GTE	-	X	X	-
1981	Pacific Telephone	-	-	-	-
1980	GTE	-	X	Χ	-
1976	Pacific Telephone	-	-	-	-
1975	Pacific Telephone	-	-	-	-
1972	R. L. Polk & Co.	-	-	-	-
1971	Pacific Telephone	-	-	-	-
1970	Pacific Telephone	-	-	-	-
1969	Pacific Telephone	-	-	-	-
1967	Pacific Telephone	-	-	-	-
1966	Pacific Telephone	-	-	-	-
1965	Pacific Telephone	-	-	-	-

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<u>Year</u>	Source	<u>TP</u>	<u>Adjoining</u>	Text Abstract	Source Image
1964	Pacific Telephone	-	-	-	-
1963	Pacific Telephone	-	-	-	-
1962	Pacific Telephone	-	-	-	-
1961	R. L. Polk & Co.	-	-	-	-
1960	R. L. Polk & Co.	-	-	-	-
1958	Pacific Telephone	-	-	-	-
1957	Pacific Telephone	-	-	-	-
1956	R. L. Polk & Co.	-	-	-	-
1955	R. L. Polk & Co.	-	-	-	-
1954	R. L. Polk & Co.	-	-	-	-
1952	Los Angeles Directory Co.	-	-	-	-
1951	R. L. Polk & Co.	-	-	-	-
1950	Pacific Telephone	-	-	-	-
1949	Los Angeles Directory Co.	-	-	-	-
1948	Associated Telephone Company, Ltd.	-	-	-	-
1947	Los Angeles Directory Co.	-	-	-	-
1946	Los Angeles Directory Co.	-	-	-	-
1945	R. L. Polk & Co.	-	-	-	-
1944	R. L. Polk & Co.	-	-	-	-
1942	Los Angeles Directory Co.	-	-	-	-
1940	Los Angeles Directory Co.	-	-	-	-
1939	Los Angeles Directory Co.	-	-	-	-
1938	Los Angeles Directory Co.	-	-	-	-
1937	Los Angeles Directory Co.	-	-	-	-
1936	Los Angeles Directory Co.	-	-	-	-
1935	Los Angeles Directory Co.	-	-	-	-
1934	Los Angeles Directory Co.	-	-	-	-
1933	Los Angeles Directory Co.	-	-	-	-
1932	Los Angeles Directory Co.	-	-	-	-
1931	TRIBUNE-NEWS PUBLISHING CO.	-	-	-	-
1930	Los Angeles Directory Co.	-	-	-	-
1929	Los Angeles Directory Co.	-	-	-	-
1928	Los Angeles Directory Co.	-	-	-	-
1927	Los Angeles Directory Co.	-	-	-	-
1926	Los Angeles Directory Co.	-	-	-	-
1925	Los Angeles Directory Co.	-	-	-	-
1924	Los Angeles Directory Co.	-	-	-	-
1923	Los Angeles Directory Co.	-	-	-	-
1921	Los Angeles Directory Co.	-	-	-	-
1920	Los Angeles Directory Co.	-	-	-	-

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MAP INFORMATION

The Overview Map provides information on nearby property parcel boundaries. Properties on this map that were selected for research are listed below the map.



SELECTED ADDRESSES

The following addresses were selected by the client. Detailed findings are contained in the findings section. An "X" indicates where information was identified.

<u>Address</u>	<u>Type</u>	<u>Findings</u>
800 Meadow Pass Road	Map ID: 1	Х
747 MEADOW PASS RD	Map ID: 11	Х
20201 RIM RIDGE RD	Map ID: 4	Х
816 MEADOW PASS RD	Map ID: 7	Х
20011 La Puente Rd	Client Entered	
368 Lemon Ave	Client Entered	
372 Lemon Ave	Client Entered	

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AddressTypeFindings390 Lemon AveClient Entered350 LemonClient Entered330 LemonClient Entered

TARGET PROPERTY INFORMATION

ADDRESS

800 Meadow Pass Road Walnut, CA 91789

FINDINGS DETAIL

Target Property research detail.

MEADOW PASS RD

800 MEADOW PASS RD

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 WALTON Keith Haines & Company

Meadow Pass Road

800 Meadow Pass Road

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 WALTON Keith Haines & Company

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

BIG HORN LN

702 BIG HORN LN

YearUsesSource1996Marquez HectorGTE

705 BIG HORN LN

<u>Year</u> <u>Uses</u> <u>Source</u>

2008 CRUCHY POTATO CAKE Cole Information Services

725 BIG HORN LN

YearUsesSource1996Walshe lii Jas CGTE

BIG HORN LN N

702 BIG HORN LN N

YearUsesSource2003MAROUEZ HecdorHaines & Company1990MARQUEZ HECTORGTE

705 BIG HORN LN N

YearUsesSource2003ISE LauraHaines & CompanyISE KotaroHaines & Company1990LEUNG DANIELGTE

711 BIG HORN LN N

YearUsesSource2003SHIAUJasonHaines & Company1990ROGERS GEO MGTE

712 BIG HORN LN N

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 OSUEMORI Yoichlro Haines & Company

719 BIG HORN LN N

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 LEE Pei Haines & Company
AUWai T Haines & Company

720 BIG HORN LN N

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 ONWOKEDI Sylvestler Haines & Company

725 BIG HORN LN N

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 WALSHE James C 3D Haines & Company

1990 WALSHE III JAS C GTE

726 BIG HORN LN N

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 MONACO Dorsirk Haines & Company

COLT LN

845 COLT LN

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 YUNG Gordon Haines & Company

1996 Yang Chung Lin GTE

860 COLT LN

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 RIZVI Syed Haines & Company

MEADOW PASS RD

747 MEADOW PASS RD

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	ST LORENZO RELIGIOUS EDUCATION CENTE	Cole Information Services
	ST LORENZO CONFIRMATION OFFICE	Cole Information Services
	ST LORENZO RUIZ CATHOLIC CHURCH	Cole Information Services
	ST LORENZO RELIGIOUS EDUCATION CENTE	Cole Information Services
	ST LORENZO CONFIRMATION OFFICE	Cole Information Services
	ST LORENZO RUIZ CATHOLIC CHURCH	Cole Information Services
2008	SAINT LORENZO CONFIRMATION OFFICE	Cole Information Services

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2008	ROMAN CATHOLIC ARCHBISHOP	Cole Information Services
	SAINT LORENZO CONFIRMATION OFFICE	Cole Information Services
	ROMAN CATHOLIC ARCHBISHOP	Cole Information Services
2003	CONFIRMATION OFFICE ST LORENZO	Haines & Company
	RELIGIOUS EDCTN CT	Haines & Company
	STLORENZORUIZ 909 59 954 S	Haines & Company
	CATHOLIC CH	Haines & Company
	ST LORENZO	Haines & Company
1996	v ST LORENZO RELIGIOUS	GTE
	v ST LORENZO RUIZ CATHOLIC	GTE
	VST LORENZO RECTORY	GTE

800 MEADOW PASS RD

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	BROOKSIDE EQUESTRIAN CENTER	Cole Information Services
	BROOKSIDE EQUESTRIAN CENTER	Cole Information Services

816 MEADOW PASS RD

Map ID: 7 <u>Year</u> <u>Uses</u> <u>Source</u> 2003 Haines & Company Li U VIct

GTE

824 MEADOW PASS RD

Wall Merrill

1996

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	CHAVEZ Daniel	Haines & Company

840 MEADOW PASS RD

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2008	SAVING CONSULTING GROUP INC	Cole Information Services
2003	CHADHA Sahndegh	Haines & Company

850 MEADOW PASS RD

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	XXXX	Haines & Company

N LEMON AVE

330 N LEMON AVE

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	DIEP MICHAEL DDS	Cole Information Services

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350 N LEMON AVE

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	VONS	Cole Information Services
2008	VONS	Cole Information Services
	VONS FOOD & DRUG	Cole Information Services

368 N LEMON AVE

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	UNCLE LIN SAUSAGE	Cole Information Services
	WELLS FARGO	Cole Information Services
	TACO FACTORY	Cole Information Services
2008	PHILLYS BEST	Cole Information Services
	WELLS FARGO BANK NA	Cole Information Services

372 N LEMON AVE

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	BANGKOK BBQ	Cole Information Services
2008	BANGKOK BBQ	Cole Information Services

390 N LEMON AVE

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	HASSAN & SONS INC	Cole Information Services
2008	CHEVRON WALNUT 2	Cole Information Services

PALOMINO CIR

19910 PALOMINO CIR

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	CHENB o	Haines & Company

19920 PALOMINO CIR

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	GOH Kean	Haines & Company
1996	Hui Seline	GTE
	Seline Hul	GTE

19930 PALOMINO CIR

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	SHANAHAN William	Haines & Company

19940 PALOMINO CIR

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 CHOWJohn Haines & Company

RIM RIDGE RD

20201 RIM RIDGE RD Map ID: 4

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 HSUEH Mai Haines & Company

HSIEH Helen Haines & Company

20247 RIM RIDGE RD

<u>Year</u> <u>Uses</u> <u>Source</u>

2008 ACP GRAPHIC INC Cole Information Services

20279 RIM RIDGE RD

<u>Year</u> <u>Uses</u> <u>Source</u>

1996 Cabaneros Armando J GTE

20307 RIM RIDGE RD

<u>Year</u> <u>Uses</u> <u>Source</u>

1996 Jones John D GTE

20311 RIM RIDGE RD

<u>Year</u> <u>Uses</u> <u>Source</u>

1996 Wagner Daie GTE

20325 RIM RIDGE RD

<u>Year</u> <u>Uses</u> <u>Source</u>

1996 Parker Karen GTE

<u>RIM RIDGE RD E</u>

20235 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 SUZUKI Fred T Haines & Company

20241 RIM RIDGE RD E

<u>Year Uses</u> <u>Source</u>

2003 XXXX Haines & Company

1980 WERSHIL GEO GTE

BENDER ALEX GTE

20247 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 CHEN Kuo Haines & Company

20255 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 YANG Chien Haines & Company

1980 YANG C GTE

20261 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 ODUPLECHAIN James Haines & Company

20265 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 KAO Alleen Haines & Company

CHOU Ben Haines & Company

20275 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 CHUNG Paletr Haines & Company

20279 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 CABANEROS Armando J Haines & Company

1990CABANEROS ARMANDO JGTE1985CABANEROS ARMANDO JGTE

1980 CABANEROS ARMANDO J GTE

20301 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 MAUNA Louis Haines & Company

20307 RIM RIDGE RD E

<u>Year</u> <u>Uses</u> <u>Source</u>

2003 LIAOTechang Haines & Company

CHEN Yi Chen Haines & Company
CHANG ShIh Y Haines & Company

1990 JONES JOHN GTE

1985 JONES JOHN GTE

20311 RIM RIDGE RD E

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	WAGNER Dale	Haines & Company
1990	WAGNER DALE	GTE
1985	WAGNER DALE	GTE
1980	WAGNER DALE	GTE

20321 RIM RIDGE RD E

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	CRENSHAW Robert	Haines & Company
1985	BOGDAN DANLT	GTE
1980	BOGDAN DANL T	GTE

20324 RIM RIDGE RD E

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	GGRIEGO Cassis	Haines & Company

20325 RIM RIDGE RD E

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	PARKER Robt	Haines & Company
	DOI Karen	Haines & Company
	PARKER Karen	Haines & Company
1990	DOI MICHAEL	GTE
1985	DOI MICHAEL	GTE
1980	DOI MICHAEL	GTE

S LEMON AVE

368 S LEMON AVE

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	USA ROOFING INC	Cole Information Services

372 S LEMON AVE

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	LMX INC	Cole Information Services
	SHANGHAI ITPC IMP EXP CO USA	Cole Information Services
2008	AMERICAN SUNREX CORP	Cole Information Services
	SHANGHAI ITPC IMP EXP CO USA	Cole Information Services

390 S LEMON AVE

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2013	SEALINGTEK INC	Cole Information Services
2008	APPLEBOX	Cole Information Services
	KM TRADING INC	Cole Information Services

STREAMVIEW ST

803 STREAMVIEW ST

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	GEHRINGERAnton	Haines & Company
1990	RIGUAL ANTHONY	GTE

811 STREAMVIEW ST

<u>Year</u>	<u>Uses</u>	<u>Source</u>
2003	FEI I Kuang	Haines & Company
	FEI Shu C	Haines & Company

TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

Address Researched	Address Not Identified in Research Source
800 Meadow Pass Road	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986,
	1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964,
	1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949,
	1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934,
	1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920

ADJOINING PROPERTY: ADDRESSES NOT IDENTIFIED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not identified in research source.

Address Researched	Address Not Identified in Research Source
19910 PALOMINO CIR	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
19920 PALOMINO CIR	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
19930 PALOMINO CIR	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
19940 PALOMINO CIR	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20011 La Puente Rd	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20201 RIM RIDGE RD	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20235 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20241 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920

Address Researched	Address Not Identified in Research Source
20247 RIM RIDGE RD	2013, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20247 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20255 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20261 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20265 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20275 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20279 RIM RIDGE RD	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20279 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1981, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20301 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20307 RIM RIDGE RD	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20307 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20311 RIM RIDGE RD	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920

Address Researched	Address Not Identified in Research Source
20311 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1981, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20321 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1981, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20324 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20325 RIM RIDGE RD	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
20325 RIM RIDGE RD E	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1981, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
330 Lemon	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
330 N LEMON AVE	2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
350 Lemon	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
350 N LEMON AVE	2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
368 Lemon Ave	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
368 N LEMON AVE	2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920

Address Researched	Address Not Identified in Research Source
368 S LEMON AVE	2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
372 Lemon Ave	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
372 N LEMON AVE	2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
372 N LEMON AVE	2013, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
372 S LEMON AVE	2013, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
372 S LEMON AVE	2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
390 Lemon Ave	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
390 N LEMON AVE	2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
390 N LEMON AVE	2013, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
390 S LEMON AVE	2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
702 BIG HORN LN	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
702 BIG HORN LN N	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920

Address Researched	Address Not Identified in Research Source
705 BIG HORN LN	2013, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
705 BIG HORN LN N	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
711 BIG HORN LN N	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
712 BIG HORN LN N	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
719 BIG HORN LN N	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
720 BIG HORN LN N	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
725 BIG HORN LN	2013, 2008, 2006, 2004, 2003, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
725 BIG HORN LN N	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
726 BIG HORN LN N	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
747 MEADOW PASS RD	2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
747 MEADOW PASS RD	2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
747 MEADOW PASS RD	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920

Address Researched	Address Not Identified in Research Source
800 MEADOW PASS RD	2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
800 MEADOW PASS RD	2008, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
803 STREAMVIEW ST	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
811 STREAMVIEW ST	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
816 MEADOW PASS RD	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
824 MEADOW PASS RD	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
840 MEADOW PASS RD	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
840 MEADOW PASS RD	2013, 2006, 2004, 2003, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
845 COLT LN	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
850 MEADOW PASS RD	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920
860 COLT LN	2013, 2008, 2006, 2004, 2001, 2000, 1999, 1996, 1995, 1992, 1991, 1990, 1986, 1985, 1981, 1980, 1976, 1975, 1972, 1971, 1970, 1969, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1958, 1957, 1956, 1955, 1954, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1942, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1921, 1920

Alpine Pointe Development Walnut

800 Meadow Pass Road Walnut, CA 91789

Inquiry Number: 3806765.3

December 09, 2013

Certified Sanborn® Map Report



Certified Sanborn® Map Report

12/09/13

Site Name:

Client Name:

Alpine Pointe Development 800 Meadow Pass Road Walnut. CA 91789 RBF Consulting 14725 Alton Parkway Irvine, CA 92618

EDR Inquiry # 3806765.3 Contact: Wesley Salter



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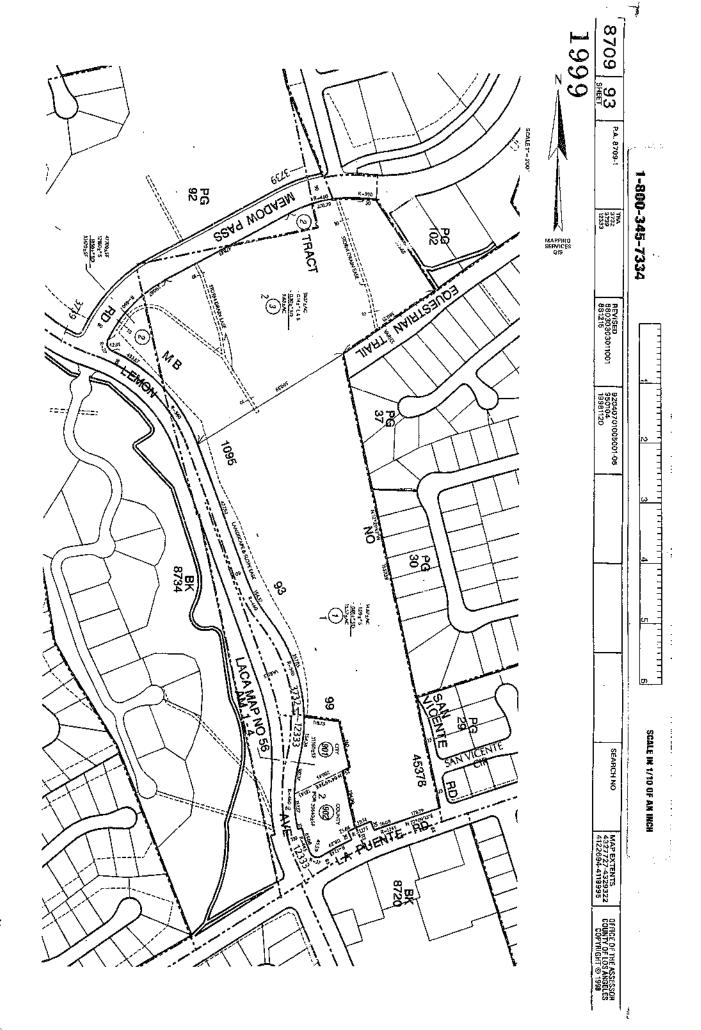
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Price Per SqFt:

Property Detail Report

For Property Located At:

,, CA



Owner Information

Owner Name: CHEN LIAN Y/TAI CHUNG C

18217 GALE AVE #A, CITY OF INDUSTRY CA 91748-1265 C079 Mailing Address:

Vesting Codes: HW //JT

Location Information

Legal Description: TR=45378 LOT 1

APN: 8709-093-001 County: LOS ANGELES, CA

4034.07 / 1 Alternate APN: Census Tract / Block:

Township-Range-Sect: Subdivision: 45378

109-- 93 Map Reference: Legal Book/Page:

Legal Lot: 1 Tract #: 45378 School District: Legal Block: WALNUT VLY

Market Area: 688 School District Name:

Neighbor Code: Munic/Township:

Owner Transfer Information

Recording/Sale Date: Deed Type:

Sale Price: 1st Mtg Document #:

Document#:

Last Market Sale Information

Recording/Sale Date: 07/22/2013 / 06/12/2013 1st Mtg Amount/Type: Sale Price: \$5,300,000 1st Mtg Int. Rate/Type: 1st Mtg Document #: Sale Type: **FULL** Document#: 1071274 2nd Mtg Amount/Type: Deed Type: **GRANT DEED** 2nd Mtg Int. Rate/Type:

Transfer Document #:

Multi/Split Sale: New Construction:

Title Company: FIRST AMERICAN TITLE INSURANCE

Lender:

WALTON KEITH L Seller Name:

Prior Sale Information

Prior Rec/Sale Date: Prior Lender:

Prior Sale Price: Prior 1st Mtg Amt/Type: Prior Doc Number: Prior 1st Mtg Rate/Type:

Prior Deed Type:

Property Characteristics

Year Built / Eff: Total Rooms/Offices Garage Area: Total Restrooms: Gross Area: Garage Capacity: Roof Type: Parking Spaces: **Building Area:** Roof Material: Tot Adj Area: Heat Type: Above Grade: Construction: Air Cond: # of Stories: Foundation: Pool: Other Improvements: Exterior wall: Quality: Basement Area: Condition:

Site Information

VACANT RESIDENTIAL Zoning: WARP Acres: 14.30 County Use: (010V)

Lot Area: 622,707 Lot Width/Depth: State Use: Х

RESIDENTIAL Land Use: Commercial Units: Water Type: **ACREAGE**

Site Influence: Sewer Type: **Building Class:**

Tax Information

Total Value: \$971,915 Assessed Year: 2013 Property Tax: \$11,584.08

Land Value: \$971,915 Improved %: Tax Area: 3732

Improvement Value: Tax Exemption: Tax Year: 2012 Total Taxable Value: \$971.915

Property Detail Report

For Property Located At:

,, CA



45378

Owner Information

Owner Name: TRANSGLOBE INVESTMENT USA CORP

Mailing Address: 18217 GALE AVE #A, CITY OF INDUSTRY CA 91748-1265 C079

Vesting Codes: //CO

Location Information

Legal Description: TR=45378 THAT POR INTRA 3739 OF LOT 2

8709-093-002 County: LOS ANGELES, CA APN:

Census Tract / Block: 4034.07 / 1 Alternate APN:

Township-Range-Sect: Subdivision:

109-- 93 Map Reference: 93-B5 / Legal Book/Page: Legal Lot: 2 Tract #: 45378 School District: WALNUT VLY Legal Block:

Market Area: 688 School District Name:

Neighbor Code: Munic/Township:

Owner Transfer Information

Recording/Sale Date: Deed Type:

1st Mtg Document #: Sale Price:

Document#:

Last Market Sale Information

Recording/Sale Date: 10/23/2013 / 10/14/2013 1st Mtg Amount/Type: Sale Price: \$9.000.000 1st Mtg Int. Rate/Type: 1st Mtg Document #: Sale Type: **FULL** Document#: 1516461 2nd Mtg Amount/Type: Deed Type: **GRANT DEED** 2nd Mtg Int. Rate/Type:

Price Per SqFt: Transfer Document #:

Multi/Split Sale: New Construction: **MULTI**

Title Company: FIRST AMERICAN TITLE INSURANCE

Lender:

WALTON KEITH L Seller Name:

Prior Sale Information

Prior Rec/Sale Date: Prior Lender:

Prior 1st Mtg Amt/Type: Prior Sale Price: Prior Doc Number: Prior 1st Mtg Rate/Type:

Prior Deed Type:

Property Characteristics

Year Built / Eff: Total Rooms/Offices Garage Area: Total Restrooms: Garage Capacity: Gross Area: Roof Type: Parking Spaces: **Building Area:** Roof Material: Heat Type: Tot Adj Area: Above Grade: Construction: Air Cond: # of Stories: Foundation: Pool: Other Improvements: Exterior wall: Quality: Basement Area: Condition:

Site Information

VACANT RESIDENTIAL Zoning: WARPD3700010U Acres: 0.94 County Use:

(010V) 41.183

Lot Area: Lot Width/Depth: State Use: Х Land Use: RESIDENTIAL LOT Commercial Units: Water Type: **Building Class:** Site Influence: Sewer Type:

Tax Information

Total Value: Assessed Year: 2013 Property Tax: \$341.57 \$14,729 Land Value: \$14.729 Improved %: Tax Area: 3739

Improvement Value: Tax Year: 2012 Tax Exemption:

Total Taxable Value: \$14,729

Property Detail Report

For Property Located At:

800 MEADOW PASS RD, WALNUT, CA 91789-1955



Owner Information

Owner Name: TRANSGLOBE INVESTMENT USA CORP

Mailing Address: 18217 GALE AVE #A, CITY OF INDUSTRY CA 91748-1265 C079

Vesting Codes: //CO

Location Information

Legal Description: TR=45378 THAT POR INTRA 3732 OF LOT 2

County: LOS ANGELES, CA 8709-093-003

Census Tract / Block: 4034.04/2 Alternate APN:

Township-Range-Sect: Subdivision: 45378 Legal Book/Page: 109-- 93 Map Reference: /639-E6 2 Tract #: 45378

Legal Lot: Legal Block: School District: WALNUT VLY

Market Area: 688 School District Name: Neighbor Code: Munic/Township:

Owner Transfer Information

Recording/Sale Date: Deed Type:

Sale Price: 1st Mtg Document #:

Document #:

Last Market Sale Information

Recording/Sale Date: 10/23/2013 / 10/14/2013 1st Mtg Amount/Type: Sale Price: \$9.000.000 1st Mtg Int. Rate/Type: Sale Type: **FULL** 1st Mtg Document #: 2nd Mtg Amount/Type: Document#: 1516461

2nd Mtg Int. Rate/Type: Deed Type: **GRANT DEED**

Transfer Document #: Price Per SqFt: \$4.964.15 New Construction: Multi/Split Sale: **MULTIPLE**

FIRST AMERICAN TITLE INSURANCE Title Company:

I ender:

WALTON KEITH L Seller Name:

Prior Sale Information

Prior Rec/Sale Date: Prior Lender:

Prior Sale Price: Prior 1st Mtg Amt/Type: Prior 1st Mtg Rate/Type: Prior Doc Number:

Prior Deed Type:

Property Characteristics

Gross Area: Parking Type: Construction:

Living Area: 1,813 Garage Area: Heat Type: **CENTRAL**

Tot Adj Area: Garage Capacity: Exterior wall: Above Grade: Parking Spaces: Porch Type: Total Rooms: Basement Area Patio Type: 3 Bedrooms: Finish Bsmnt Area: Pool: Bath(F/H): 2 / Basement Type: Air Cond: 1996 / 1996 Year Built / Eff: Roof Type: Style: Foundation: Quality: Fireplace: Condition:

of Stories: Roof Material:

Other Improvements:

Site Information

Zoning: WARP 10.16 County Use: SINGLE FAMILY RESID (0100) Acres:

Lot Width/Depth: Lot Area: 442.573 State Use: Х Land Use: **SFR** Res/Comm Units: Water Type:

Site Influence: Sewer Type:

Tax Information

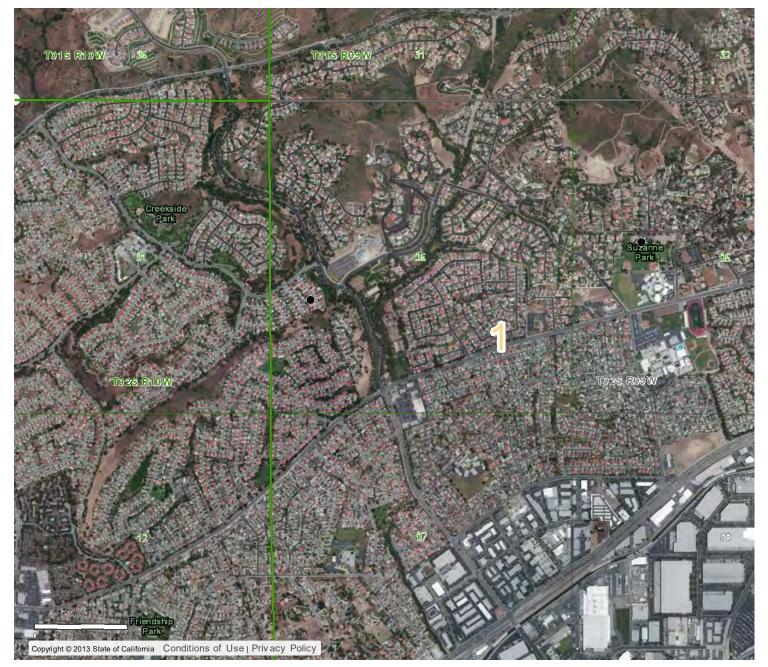
Assessed Year: 2013 \$9.826.13 Total Value: \$801,296 Property Tax: Land Value: \$683,933 Improved %: 15% Tax Area: 3732

Improvement Value: \$117,363 Tax Year: 2012 Tax Exemption: Total Taxable Value: \$794,296





DOGGR Online Mapping System



Disclaimer: The well information and data represented on this site varies in accuracy, scale, origin and completeness and may be changed at any time without notice. While the Califi Gas and Geothermal Resources (DOC) makes every effort to provide accurate information, DOC makes no warranties as to the suitability of this product for any particular purpose. At



PHASE I ENVIRONMENTAL SITE ASSESSMENT INTERVIEW QUESTIONNAIRE

Date: 14/14 Time: 2:2	Dry Pro	perty Name:	Alpine Pointe Development
Property Address and APN(s):		3-001, -002, a	nd -003 (address 800 CA)
If questions are answered for only a	specific area o	of the property	(i.e., APN), specify the area:
Person Answering Questionnaire:	Name: Phone/Fax: Email:	Jo	ick Su 6-8176989 ucksu89@gmail.com
Party Administering Questionnaire:	Name: Phone/Fax: Email:	<u> </u>	er, RBF Consulting rn Fax to (949) 837-4122; or .com
1. How long have you worked at or	been associate	ed with the pro	perty?
 What is your position? teal estate agent What are your job responsibilities 		•	1491
agent and device To the best of your knowledge is	lyer	operty curren	tly or historically been used for
an industrial use? If yes, please explain:		Yes [] No ☑∕ Unk 📋

5.	To the best of your knowledge is any adjoinin for an industrial use?	g property currently or historically been used Yes
	If yes, please explain:	
	North:	
_	East:	
_	South:	
_	West:	
6.	To the best of your knowledge is the subjec used as a:	t property currently used or was historically
	 a) gasoline station b) motor repair facility c) commercial printing facility d) dry cleaners e) photo developing laboratory f) plating shops g) junkyard or landfill h) solid waste treatment, storage, disposal, processing, or recycling facility 	Yes
_	If yes, please explain:	
		Y
7	To the best of your knowledge is any adjoinin used as a:	g property currently used or was historically
. !	a) gasoline station b) motor repair facility c) commercial printing facility d) dry cleaners e) photo developing laboratory f) plating shops g) junkyard or landfill h) solid waste treatment, storage, disposal, processing, or recycling facility	Yes ☐ No ☑ Unk ☐
J	f yes, please explain:	
_		

8. To the best of your knowledge are there currently stored or used, or have there been previously stored or used, any of the following on the **subject property**:

	 a) damaged or discarded automotive industrial batteries 	reor Yes □ No ☑ Unk □
	b) pesticides, paints	Yes ☐ No [✔] Unk ☐
	c) petroleum products	Yes ☐ No 🗹 Unk 🗍
	d) degreasers	Yes ☐ No ☑ Unk ☐
	e) solvents	Yes ☐ No ☑ Unk ☐
	f) paints	Yes ☐ No ☑ Unk ☐
	g) cleaners	Yes ☐ No ☑ Unk ☐
	h) pesticidesi) other hazardous materials?	Yes □ No ☑ /Unk □ Yes □ No ☑ Unk □
-	If yes, please explain:	
- 9.	To the best of your knowledge are there wastes or used oil generated on the prop	currently, or where there historically, any hazardous perty? Yes □ No ☑ Unk □
	If yes, where is it stored?	
	from a contaminated site or that is of an i	dirt been brought onto the property that originated unknown origin? Yes ☐ No ☐ Unk ☐
_	T- 6h- h	
_ _ 1.	To the best of your knowledge are there pond, or lagoons located on the propedisposal?	currently, or have there been previously, any pits, erty in connection with waste treatment or waste Yes \(\Bar{\cup} \) No \(\bar{\cup} \) Unk \(\Bar{\cup} \)
 - 1.	pond, or lagoons located on the prope	erty in connection with waste treatment or waste
 - 1.	pond, or lagoons located on the prope disposal?	erty in connection with waste treatment or waste Yes ☐ No Unk ☐
- 1.	pond, or lagoons located on the propedisposal? If yes, please explain: Existing Circle and Are there currently, or to the best of your	erty in connection with waste treatment or waste Yes ☐ No Unk ☐
 111. 	pond, or lagoons located on the propedisposal? If yes, please explain: Existing Circle and Are there currently, or to the best of your	If town drain. knowledge has there been previously, any stained

13	Are there currently, or to the best of your knowledge are there currently or has there been previously, any registered or unregistered storage tanks (above or underground) located on the subject property? Yes \square No \checkmark Unk \square					
	If yes, where?					
14	If existing or removed tanks are known, do you have any knowledge of any leaks, spills or releases from these tanks? Yes □ No ☑ Unk □ If yes, please explain:					
. 15	Are there currently, or to the best of your knowledge have there been previously, any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property? Yes \(\sum \) No \(\surset \) Unk \(\supset \)					
16.	If applicable, what are the current procedures for obtaining storing, and handling hazardous materials and/or petroleum products at the subject property? Not Applicable □					
- - 17.	If applicable, what are the current procedures for disposing of hazardous waste and/or waste petroleum products at the subject property? Not Applicable □					
18.	Do you know of any hazardous material/hazardous waste or petroleum products spills that have occurred on the subject property? Yes □ No ☑ Unk □ If yes, when and where did they occur?					
_						

Are there currently, or to the best of your knowledge have there been previously, any drains, dry wells, underground sumps, septic tanks, leach fields at the subject property? Yes-☑ No ☐ Unk ☐				
<i>h</i>				
site connected to a sewer line? Yes ☑ No ☐ Unk ☐				
ou specify where the tank and leach field (if applicable) are				
ny past or current existence environmental violations with Yes ☐ No ☑ Unk ☐				
nental cleanup liens against the property that are filed or tate, or local law? Yes ☐ No ☐ Unk ☐				
d land use limitations (AULS), such as engineering controls, nal controls that are in place at the site and/or have been der Federal, tribal, State, or local law? Yes No Unk				

24	24. Do you have any specialized knowledge or experience related to the property or nearb properties? For example, are you involved in the same line of business as the current of former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business? Yes □ No □ Unk □					
lf y	es, plea	ase explain:				
-						
25	proper	ou aware of commonly known or reasonably ascertainable information about the ty that would help the environmental professional to identify conditions indicative of es or threatened releases? For example,				
	a)	Do you know the past uses of the property? Yes ☐ No ☑ Unk ☐				
-	If yes,	please explain:				
-	b)	Do you know of any environmental cleanups that have taken place at the property? Yes □ No ☑ Unk □				
-	If yes, p	please explain:				
-		Do you know of any other commonly known or reasonably ascertainable information about the property? Yes ☐ No ☑ Unk ☐				
_	If yes, p	please explain:				
- 26.	Based indicato	on your knowledge and experience related to the property are there any <i>obvious</i> ors that point to the presence or likely presence of contamination? Yes No Unk				
_	If yes, p	please explain:				
_ 27. ⁻	To the	best of your knowledge, have any historic addresses Yes No Unk NA ilized for the subject property?				

Pha	se I ESA Questionnaire		<u>-</u>	.
_	If yes, please explain:	_,		
- 28.	To the best of your knowledge, have any hazardous substances or petroleum products or unidentified waste materials been buried at the subject property?	Yes	No 🖸	Unk
_	If yes, please explain:			
- 29.	To the best of your knowledge, has any solid wastes, including construction materials, concrete, trash been dumped or buried on the property?	Yes	No E	Unk
_	If yes, please explain:			
30	Is there a transformer, capacitor, or any hydraulic equipment for which there are any records indicating the presence of Polychlorinated Biphenyls (PCBs)?	Yes	No D	Unk
	If yes, please explain:			
31	Are there any areas you would recommend for further environmental investigation based on your knowledge of current and historical uses of the subject property?	Yes	No E	Unk
	If yes, please explain:			
	. Is there anyone else you would recommend we interview for the Phase I ESA?	 Yes ☑	No □	
32	Interview for the Phase I ESA!	_		

Interviewed Person Jack Su	
Name/Title	Company/Govt. Agency
18217 Gale Ave #A, City of Industry Address	628-8176984 Phone Number
Signature	1/18/14 Date

APPENDIX D: QUALIFICATIONS OF THE ENVIRONMENTAL PROFESSIONAL

QUALIFICATIONS OF THE ENVIRONMENTAL PROFESSIONAL

QUALIFICATIONS AND EXPERIENCE

Phase I Environmental Site Assessments (ESAs) prepared by RBF Consulting reflect the most current interpretations of industry standards, which are in accordance with the American Society for Testing and Materials (ASTM) E 1527-13 Standard Practice for Environmental Site Assessments.

KEY PERSONNEL

Projects are overseen by Mr. Richard Beck, Certified Environmental Professional (CEP), who conducts quality assurance/quality control for of each Phase I ESA. Document preparation and quality assurance/quality control is also conducted by Mr. Wesley Salter, Environmental Professional. Document research, records gathering, and the site reconnaissance were conducted by Mr. Tim Tidwell.

Richard Beck, CEP #10050455 Environmental Professional

Mr. Beck graduated from the University of California, Santa Cruz, with a degree in Environmental Studies. Mr. Beck's professional environmental experience of 10 years includes the management, review, and preparation of hazardous material assessments, which include: Phase I Environmental Site Assessments, Initial Site Assessments for the California Department of Transportation (Caltrans), Preliminary Hazardous Material Assessments, Existing Hazardous Material Conditions Assessments, and Environmental Baseline Surveys for the Department of the Navy for sites located throughout California, Nevada, and Arizona. Mr. Beck has prepared hundreds of hazardous materials assessments, which include detailed literature/historical reviews, thorough site reconnaissance, interviews, and professional recommendations with respect to remedial activities and/or housekeeping practices.

Wesley Salter Environmental Professional

Mr. Salter graduated from California Polytechnic State University, San Luis Obispo, with a degree in Forestry and Natural Resources. Mr. Salter assists in the preparation of environmental and planning studies for public and private sector clients. As an Environmental

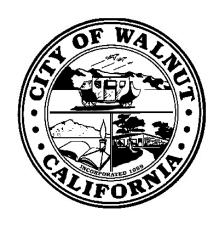
Analyst at RBF, Mr. Salter is involved with 404/401/1600 permit processing, wetland delineations, field studies, Phase I ESAs, and permitting in accordance with CEQA and NEPA. Mr. Salter's professional environmental experience of five years includes the management, review, and preparation of hazardous material assessments, which include: Phase I Environmental Site Assessments, Initial Site Assessments for the California Department of Transportation (Caltrans), Preliminary Hazardous Material Assessments, and Environmental Baseline Surveys for the Department of the Navy for sites located throughout California, Nevada, and Arizona.

Tim Tidwell Environmental Analyst

Mr. Tidwell assists in the preparation of environmental and planning studies for public and private sector clients. As an Environmental Analyst at RBF, Mr. Tidwell is involved with 404/401/1600 permit processing, wetland delineations, field studies, Phase I ESAs, and permitting in accordance with CEQA and NEPA. Mr. Tidwell professional environmental experience includes the management, review, and preparation of hazardous material assessments, which include: Phase I Environmental Site Assessments, Initial Site Assessments for the California Department of Transportation (Caltrans), and Preliminary Hazardous Material Assessments.







APPENDIX L Standard Urban Stormwater Mitigation Plan

STANDARD URBAN STORMWATER MITIGATION PLAN (SUSMP)

For:
TENTATIVE TRACT NO. 45378
CITY OF WALNUT,
LOS ANGELES COUNTY, CA

Prepared for:

SPRING MEADOWS HOMES LLC

416351 Gothard Street Suite A Huntington Beach, CA 92647

Prepared by:



14725 Alton Parkway Irvine, CA 92618 (959) 472-3505

Contact: Remi Candaele, P.E.

1st Submittal Prepared: April 14, 2014

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Background

On December 13, 2001, the Los Angeles Regional Water Quality Control Board (LARWQCB) adopted a National Pollutant Discharge Elimination System (NPDES) Permit (Order No. 01-182) to regulate municipal and urban runoff storm water discharges within the County of Los Angeles. This Order was superseded by Order No. R4-2012-0175, NPDES No. CAS004001, which was adopted by the LARWQCB on November 8, 2012 and became effective on December 28, 21012. Under this Order, the Los Angeles County Flood Control District and incorporated cities within the County, including the City of Walnut, are required to ensure that all new development and redevelopment projects minimize impacts from storm water runoff and urban runoff discharges. Section VI.D of the Order requires the implementation of a Planning and Land Development Program (Program) pursuant to Part VI.D.7.b for all New Development and Redevelopment projects that trigger the applicability criteria discussed within Part VI.D.7.b. The development of this Standard Urban Stormwater Mitigation Plan (SUSMP) is intended to satisfy the requirements set forth in Order No. R4-2012-0175, Part VI.D.7. The SUSMP also ensures that the proposed post-construction Best Management Practices (BMPs) incorporated into the project will be maintained in perpetuity to reduce the discharge of pollutants from storm water and urban runoff discharges to the maximum extent practicable (MEP).

Introduction

Spring Meadows Homes LLC is planning to install 46 single family residential community lots, a recreation center, two private streets and four open space lots. The design-build project consists of re-development of the existing equestrian facility between La Puente Road and Meadow Pass Road in the City of Walnut. RBF Consulting has been contracted by Spring Meadows Homes LLC to provide engineering services for the proposed residential development area in the City of Walnut, California.

Since the proposed redevelopment project includes the creation of 5,000 square feet or more of impervious surface area on an already developed site, a Planning and Land Development Program is required and being implemented through this SUSMP. This SUSMP has been prepared in accordance with the requirements stated within Order NO. R4-2012-0175 and the Los Angeles County SUSMP Manual dated September 2002. This SUSMP provides information about the proposed project and discusses how features incorporated into the project design meet the applicable Planning and Land Development Program requirements. Appendices have been included to provide supporting detail.

Project Information

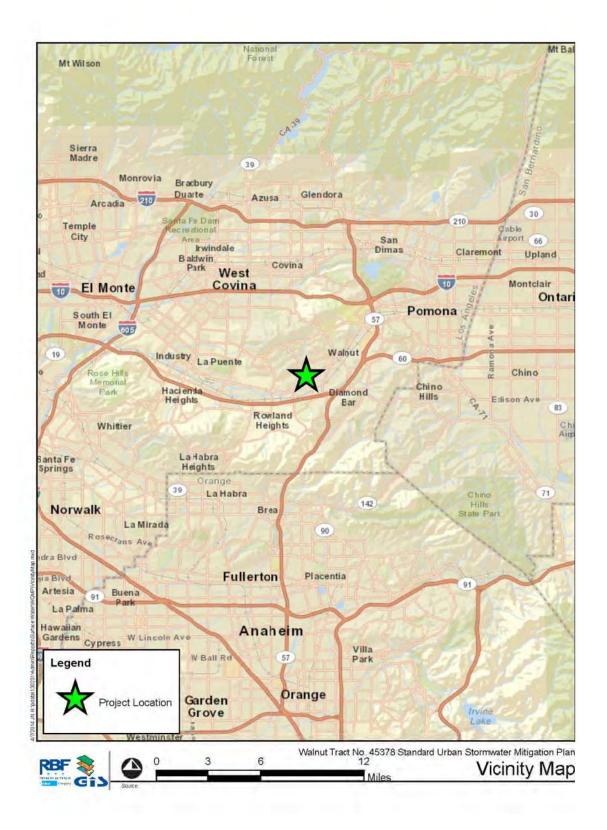
The project is located in the City of Walnut just south of Meadow Pass Road and north of La Puente Road (refer to the vicinity map in Figure 1). The project foot print occupies approximately 25.8 acres. Approximately 14.2 acres or residential lots will be placed throughout the site. The development area will include the construction of single family homes, private streets, wet and dry utilities, a recreation center, improvements to the existing trail adjacent to Lemon Creek, sidewalk improvements adjacent to and along the private streets, two biofiltration devices, and vegetated landscaped areas.

Part 7.b.ii of Order NO. R4-2012-0175 states: "Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post development storm water quality control requirements, the entire project must be mitigated. Where Redevelopment results in an alteration to less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post development storm water quality control

requirements, only the alteration must be mitigated, and not the entire development. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade."

The total project area is approximately 25.8 acres and is approximately 36% impervious. The residential lots total approximately 14.2 acres and are 42% impervious. Existing conditions include approximately 3% impervious area of an equestrian complex. Portions of the project considered as maintenance excluded areas are not required to be mitigated for. These areas include the majority of the improvements taking place on Lemon Creek trail and the hillside slopes tributary to Lemon Creek. All other areas on the site, either pervious or impervious, were included in the Storm Water Quality Design Volume (SWQDv) calculation for mitigation. Although all of the areas have been included in the SWQDv calculations, drainage areas C-1 through C-5 are not tributary to any BMP and are not being treated. Refer to the BMP Map in Appendix A for tributary area locations. Because the redeveloped area in the project is altering more than 50 percent of the impervious surfaces of the existing site, the BMP discussed in the subsequent sections of this report was sized to capture and treat the SWQDv generated from the entire project. Drainage area A will be tributary to the bioretention with underdrains located in the planned public recreation center. Drainage area B will be tributary to a second bioretention with underdrains BMP located adjacent to the cul-de-sac on the proposed private street near La Puente Road.

Figure 1: Vicinity Map



Project Site Watershed and Drainage Patterns

The project is located within the San Gabriel River Watershed, specifically discharging to San Jose Creek prior to discharging to Reach 3 of the San Gabriel River. The San Gabriel River receives drainage from a large area of eastern Los Angeles County; its headwaters originate in the San Gabriel Mountains. The watershed consists of extensive areas of undisturbed riparian and woodland habitats in its upper reaches. Much of the watershed of the West Fork and East Fork of the river is set aside as a wilderness area; other areas in the upper watershed are subject to heavy recreational use. The upper watershed also contains a series of flood control dams. Further downstream, towards the middle of the watershed, are large spreading grounds utilized for groundwater recharge. The watershed is hydraulically connected to the Los Angeles River through the Whittier Narrows Reservoir (normally only during high storm flows). The lower part of the river flows through a concrete-lined channel in a heavily urbanized portion of the county before becoming a soft bottom channel once again near the ocean in the City of Long Beach. Large electrical power poles line the river along the channelized portion; nurseries, small stable areas, and storage facilities are located in these areas.

Groundwater in certain areas of the San Gabriel Basin has been impacted by volatile organics attributable to widespread industrial land use and associated contaminant releases over the last several decades. In 1979, volatile organic compounds (VOC)s were discovered in a number of public water supply wells in the San Gabriel Basin. As a result, the USEPA and the Regional Board entered into a cooperative agreement in 1989 to identify and cleanup the contamination. Subsequent investigations revealed more widespread soil and groundwater contamination in the Basin. During the last 15 years, more than one quarter of the approximately 366 water supply wells in the San Gabriel Valley have been found to be contaminated. The Regional Board, under authority of the California Water Code, locates and abates the sources of pollutants affecting these wells and oversees the remediation of the pollution. Soil and groundwater in the San Gabriel Valley are contaminated by VOCs such as PCE, TCE, and 1,1,1-TCA. Since 1997, new chemicals called emerging chemicals have been found in drinking water and groundwater monitoring wells. These chemicals include perchlorate, NDMA, and 1 and 4-dioxane which are carcinogens or suspected carcinogens.

Pollutants from dense clusters of residential and commercial activities have impaired water quality in the middle and lower watershed. Tertiary effluent from several sewage treatment plants enters the river in its middle reaches (which is partially channelized) while two power generating stations discharge cooling water into the river's estuary. Several landfills are also located in the watershed. Land use in the watershed is diverse and ranges from predominantly open space in the upper watershed to urban land uses in the middle and lower parts of the watershed.

Under the pre development conditions, runoff on the South side of Meadow Pass Road sheet flows into Lemon Creek. All of the runoff is conveyed to Lemon creek adjacent to Lemon Avenue just west of the site. This creek drains into San Jose Creek Reach 2, which eventually drains into the San Gabriel River.

Under the post development conditions, runoff from the site is conveyed to two biofiltration BMPs (Bioretention with underdrains) located within the recreation center and located adjacent to the cul-de-sac near La Puente Road. Although all of the areas have been included in the SWQDv calculations, drainage areas C-1 through C-5 are not tributary to any BMP and are not being treated. Refer to the BMP Map in Appendix A for tributary area locations. The water quality first flush runoff infiltrates into the engineered soil while runoff generated during larger

storm events overflow into the proposed storm drain system which traverses south and ties into Lemon Creek. The proposed bioretention BMP's bottom footprint consists of 6,856 ft² and 3,568 ft² for drainage areas A and B, respectively. The planting mix for both BMPs is 5 feet and the freeboard for ponding depth is 1.5 feet. Additionally, 6 inches of crushed, angular stone with a porosity of 40% will be placed around all sides of the 6 inch diameter underdrain. For detailed specifications and maintenance of these BMPs, refer to Appendix C.

To provide the required SWQDv for the BMPs, a factor of 1.5 was used to the original SWQDv. Part 7.c.iii of Order NO. R4-2012-0175 states: When a Permittee determines a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site, or is proposing an alternative offsite project to replenish regional ground water supplies, the Permittee shall require one of the following mitigation options:

(1) On-site Biofiltration

(a) If using biofiltration due to demonstrated technical infeasibility, then the new project must biofiltrate 1.5 times the portion of the SWQDv that is not reliably retained on-site"

Refer to the project Drainage Report for the complete hydrologic and hydraulic analysis. Once the storage volume is filled with water, the remaining storm flows will be conveyed past the storage structure to the existing Lemon Creek. Overflow into the creek ties into the concrete lined channel known as the San Gabriel River. The San Jose creek confluences with Reach 3 of the San Gabriel River Channel between Santa Fe Dam and the Whittier Narrows Basin. This reach is located in the middle of the watershed and is soft-bottomed with riprap sides. The lower part of the river flows through a concrete-lined channel in a heavily urbanized portion of the County before becoming a soft bottom channel once again before draining into the San Gabriel River Estuary and finally the Pacific Ocean in the City of Long Beach.

SUSMP Requirements

The Planning and Land Development Program requires that each Permittee implement a Program pursuant to Part VI.D.7.b for all New Development and Redevelopment projects subject to this Order to:

- "(1) Lessen the water quality impacts of development by using smart growth practices such as compact development, directing development towards existing communities via infill or redevelopment, and safeguarding of environmentally sensitive areas.
- (2) Minimize the adverse impacts from storm water runoff on the biological integrity of Natural Drainage Systems and the beneficial uses of water bodies in accordance with requirements under CEQA (Cal. Pub. Resources Code § 21000 et seq.).
- (3) Minimize the percentage of impervious surfaces on land developments by minimizing soil compaction during construction, designing projects to minimize the impervious area footprint, and employing Low Impact Development (LID) design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use.
- (4) Maintain existing riparian buffers and enhance riparian buffers when possible.
- (5) Minimize pollutant loadings from impervious surfaces such as roof tops, parking lots, and roadways through the use of properly designed, technically appropriate BMPs (including Source Control BMPs such as good housekeeping practices), LID Strategies, and Treatment Control BMPs.
- (6) Properly select, design and maintain LID and Hydromodification Control BMPs to address pollutants that are likely to be generated, reduce changes to pre-development hydrology, assure long-term function, and avoid the breeding of vectors.

- (7) Prioritize the selection of BMPs to remove storm water pollutants, reduce storm water runoff volume, and beneficially use storm water to support an integrated approach to protecting water quality and managing water resources in the following order of preference:
- (a) On-site infiltration, biofiltration and/or rainfall harvest and use.
- (b) On-site biofiltration, off-site ground water replenishment, and/or off-site retrofit."

The following 17 categories are intended to address the requirements set forth by the Order. The following sections address each of the required categories and address how the proposed project meets the Program requirements to the MEP.

1. Smart Growth and Low Impact Development Practices

The wide spread single family residential housing brings vegetated areas between impervious surfaces. The existing Lemon Creek also provides existing vegetation and smart growth practices. This project also implements two biofiltration BMPs located in the recreation center and the southern portion of the developed area. Biofiltration is listed under the Order as a BMP for Low Impact Development.

2. Conserve and Enhance Riparian Buffers and Natural Areas

Existing landscaped areas will be retained where feasible. Approximately 25% (6.45acres) of the site will remain as the existing conditions.

3. Minimize Impervious Surfaces

The goal here is to minimize the percentage of impervious surfaces by minimizing soil compaction during construction, designing projects to minimize the impervious area footprint, and employing Low Impact Development (LID) design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use. Minimization of impervious surfaces on site is implemented where feasible. All runoff from the proposed developed area will be conveyed to the biofiltration systems. Runoff in excess of the system's capacity will discharge into Lemon Creek.

4. Protect Beneficial Uses and Biological Integrity of Natural Waters

According to Part VI.D.7.a of the Order, the Planning and Land Development Program must also address mitigation of potential adverse impacts on the biological integrity of Natural Drainage Systems and the beneficial uses of receiving water bodies in accordance with requirements under the California Environmental Quality Act (CEQA) (Cal. Pub. Resources Code § 21000 et seq.). The proposed project BMPs are designed to reduce potential pollutants of concern generated from the development as well as mitigate any potential increase of runoff from the project through flood control measures. Natural drainage courses are a concern that is specifically addressed by hydromodification measures and is discussed in detail in Section 7 of the SUSMP.

5. Minimize Storm Water Pollutants of Concern

Pollutants generating from developed areas are dependent upon the type of development and land use is associated with the specific project. The project contains parking areas, streets, pedestrian access, residential housing and vegetated areas. Pollutants anticipated to be generated on-site are trash and debris, oil and grease, pathogens or bacteria/virus, sediment, heavy metals, nutrients, pesticides, and toxic organic compounds.

The San Gabriel River Watershed is impaired for multiple pollutants. Table 1 provides a list of TMDLs applicable to the watershed to address the impairments. It is imperative to understand the conditions of the receiving waters downstream of the project. Receiving waters which are impaired for one or any of the pollutants of concern which are anticipated from the project need to be addressed through the proposed project BMPs. Table 1 provides a list of downstream receiving water body impairments including both 303(d) and TMDL impairments.

Table 1: Receiving Water Body Impairments

Receiving Water Body	2010 303(d) Impairment(s)	TMDL(s)
San Jose Creek Reach 2	Coliform Bacteria	None
San Jose Creek Reach 1	Ammonia, Coliform Bacteria, pH, Dissolved Solids, Toxicity	Coliform Bacteria
San Gabriel River Reach 3	Indicator Bacteria	None
San Gabriel River Reach 2	Coliform Bacteria, Cyanide, Lead	Metals
San Gabriel River Reach 1	Coliform Bacteria, pH	None
San Gabriel River Estuary	Copper, Dioxin, Nickel, Dissolved Oxygen	Metals
San Pedro Bay Near/Off Shore Zone	Chlordane, DDT, PCBs, Sediment Toxicity	Sediment

These pollutants will be controlled using the proposed BMP. The proposed BMP was selected considering LID requirements. The BMP required by the Order is implemented in this project to address pollutants that are likely to be generated and reduce changes to pre-development hydrology. The proposed BMP consists of a biofiltration system made up of a bioretention BMP with underdrains located on the recreation center and the southern portion of the development area. The BMP will treat anticipated pollutants of concern generated from residential housing, parking and private streets. Fact sheets, vendor information and other relevant information can be found in Appendix C.

Low Impact Development (LID) Strategies

The proposed biofiltration devices previously discussed will retain the water quality volume onsite protecting downstream receiving waters from pollutants of concern and will serve as an LID BMP to treat runoff generated from the parking facility and adjacent driveways. The use of this device will treat runoff and adhere to LID principles as addressed in the Order.

The proposed biofiltration BMP's bottom footprint consists of 6,856 ft² and 3,568 ft² for drainage areas A and B, respectively. The planting mix for both BMPs is 5 feet and the freeboard for ponding depth is 1.5 feet to provide the required storage capacity of the structure. Additionally, 6 inches of crushed, angular stone with a porosity of 40% will be placed around all sides of the 6 inch diameter underdrain. For detailed specifications and maintenance of these BMPs, refer to Appendix C. Based on Los Angeles County criteria a required storage volume of 57,936 and 30,151 cubic feet are required to be mitigated for the areas tributary to the recreation center and the southern portion of the project site, respectively. Access for maintenance will be provided for both BMPs. The biofiltration structures will be laid at a level longitudinal grade, having a flat invert to allow the entire storage volume to be used and evenly distribute the infiltrated flows across the greatest area for optimal efficiency. The manufacturer's Operation and Maintenance Manual for the BMPs are included in Appendix C.

Although all of the areas have been included in the SWQDv, drainage areas C-1 through C-5 are not tributary to the BMPs and are not being treated. Refer to the BMP Map in Appendix A for tributary area locations. These existing natural areas are tributary to Lemon Creek.

This project includes biofiltration BMPs as the primary BMPs which are sized to retain the SWQDv and meet hydromodification requirements on-site. All of the calculations, BMP selection, and BMP sizing were prepared by others at RBF Consulting. Details and methodology can be found in the stand alone Drainage Report, submitted by RBF Consulting.

Treatment Control BMPs

This site does not implement any treatment control BMPs.

Source Control BMPs

Additionally, the following non-structural BMPs will be implemented to reduce or eliminate the off-site discharge of pollutants:

- Routine landscape maintenance, including proper pickup and disposal of trash throughout the site (including parking areas), sediment and green waste
- Proper fertilizer and pesticide management (minimizing use, not applying before
 predicted rain, proper disposal of unused/excess product. Activity restrictions including
 but not limited to: dumping hazardous material into the storm drains, washing and
 cleaning of vehicles, or repair or maintenance of vehicles that would allow oil, grease,
 fuel, or other fluid into the storm drain. Trash areas are not anticipated on site. Litter
 control and maintenance throughout the property and parking structure).
- Private street areas are anticipated to be cleaned on an as needed basis. It is recommended that these streets exposed to storm water shall be kept clear of debris and excessive oil buildup and mechanically swept 2 times per month or more frequently if necessary.
- As needed litter control and maintenance throughout the property.
- Public education through the installation of storm drain stencils above catch basins and storm drain inlets.
- Fire line testing activities are considered routine maintenance and testing activities necessary for the protection of life and property. These activities include building fire suppression system maintenance and testing (e.g. sprinkler line flushing) and fire hydrant testing and maintenance. These activities are classified as Conditionally Exempt Essential Non-Storm Water Discharges. On-site testing is anticipated to take place twice annually. Recommendations and requirements include and are not limited to:
 - Testing shall take place during the dry season on non-rainy days only.
 - Prior to discharge sediment/debris/trash or any other visible pollutants must be removed from the gutters and/or flow paths to avoid discharging pollutants into the drains and biofiltration systems.
 - All discharge must be drained to a landscaped area or to the BMPs in a nonerosive manner.
 - Los Angeles County Metropolitan Transportation Authority maintenance personnel performing tests are required to comply with all of the requirements set forth in the CAL FIRE, Office of the State Fire Marshal's Water-Based Fire Protection Systems Discharge Best Management Practices Manual (September 2011) or equivalent BMP manual for fire training activities and post-emergency firefighting activities.
 - Whenever there is a discharge of 100,000 gallons or more into the MS4, Permittees shall require advance notification by the discharger to the potentially affected MS4 Permittees, including at a minimum the LACFCD, if applicable, and the Permittee with jurisdiction over the land area from which the discharge originates.

6. BMP Selection Criteria

The Order requires the selection of BMPs to be prioritized based on the most effective means to remove storm water pollutants, reduce storm water runoff volume, and beneficially use storm water to support an integrated approach to protecting water quality and managing water resources. The order of preference is on-site infiltration, bioretention, and/or rainfall harvest and use. The Order also states, when evaluating the potential for on-site retention, each project shall also consider the maximum potential for evapotranspiration from green roofs and rainfall harvest and use.

This project includes two bioretention with underdrains as the primary BMPs which are sized to retain the Storm Water Quality Design Volume (SWQDv). Infiltration and bioretention BMPs were deemed infeasible due to the clayey native soil and expected slow percolation rates. The project site consists of soil type #2.

7. Design Standards for Structural or Treatment Control BMPs

The design standards for structural or treatment control BMPs presented in this section are intended to meet the design requirements in the Order.

Storm Water Quality Design

Except as provided in Part VI.D.7.c.ii. (Technical Infeasibility or Opportunity for Regional Ground Water Replenishment), Part VI.D.7.d.i (Local Ordinance Equivalence), or Part VI.D.7.c.v (Hydromodification), the project is required to retain on-site the SWQDv defined as the runoff from the 0.75-inch, 24-hour rain event or the 85th percentile, 24-hour rain event, as determined from the Los Angeles County 85th percentile precipitation isohyetal map, whichever is greater. The development area in Walnut is located in an area where the 85th percentile, 24-hour precipitation depth is 1 inch and will therefore govern as the design precipitation depth. The isohyetal map including the project location is provided in Appendix A. This project includes biofiltration as the primary BMPs which are sized to retain the SWQDv.

Intensities, Cu, and C_d were calculated through the Tc calculator, soil types and calculations were based on the LA County Hydrology Manual and methodology approved by LA County, following the LA County Hydrology Manual. Values for Cu and C_d can be found in Appendix A.

Tc = $(10)^{-0.507*}(C_d*I)^{-0.519*}(L)^{0.483*}(S)^{-0.135}$ SWQDv = $C_d*A*43560*d/12$

Where:

 C_d = Developed Runoff Coefficient (unit less)

L = Flow Length (ft)

A = Tributary Drainage Area (square ft)

d = precipitation depth (in)

S = Longitudinal slope of flow path (ft/ft)

Although all of the areas have been included in the SWQDv, drainage areas C-1 through C-5 are not tributary to the BMP and are not being treated. Refer to the BMP Map in Appendix A and for tributary area locations.

Hydromodification Requirements

As stated in the Hydromodification (Flow/Volume/Duration) Control Criteria, Part VI.D.7.c.iv in the Order;

"Each Permittee shall require all New Development and Redevelopment projects located within natural drainage systems as described in Part VI.D.7.c.iv.(1)(a)(iii) to implement hydrologic control measures, to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. The purpose of the hydrologic controls is to minimize changes in post-development hydrologic storm water runoff discharge rates, velocities, and duration. This shall be achieved by maintaining the project's pre-project storm water runoff flow rates and durations."

Hydromodification Control Criteria:

Except as provided for in Part VI.D.7.c.iv.(1)(b), projects disturbing an area greater than 1 acre but less than 50 acres within natural drainage systems will be presumed to meet predevelopment hydrology if one of the following demonstrations is made:

- 1. The project is designed to retain on-site, through infiltration, evapotranspiration, and/or harvest and use, the storm water volume from the runoff of the 95th percentile, 24-hour storm, or
- 2. The runoff flow rate, volume, velocity, and duration for the post development condition do not exceed the pre-development condition for the 2-year, 24-hour rainfall event. This condition may be substantiated by simple screening models, including those described in *Hydromodification Effects on Flow Peaks and Durations in Southern California Urbanizing Watersheds (Hawley et al., 2011) or other models acceptable to the Executive Officer of the Regional Water Board, or*
- 3. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J. Alternatively, Permittees can opt to use other work equations to calculate Erosion Potential with Executive Officer approval.

Natural drainage systems that are subject to the hydromodification assessments and controls as described in the Order, include all drainages that have not been improved (e.g., channelized or armored with concrete, shotcrete, or rip-rap) or drainage systems that are tributary to a natural drainage system.

The project development will not exceed the pre-development condition for the 2-year, 24-hour rainfall event set forth in number 2 above. The 2-year, 24-hour rainfall depth is 3.02 inches for both pre and post development conditions. The LID BMPs will have sufficient storage to provide for the difference in runoff flow rate, volume, velocity, and duration. Calculations can be found in Appendix A. Table 2 provides a summary for the project hydrologic findings.

Flood Control or Other Local Drainage Requirements

A pre and post-development hydrology analysis has been prepared for the project and is provided in the project Drainage Report. This report is a stand-alone document and was used to mitigate for the hydromodification requirements.

Under predevelopment conditions, runoff from the site flows into Lemon Creek and then flows south into San Jose Creek before discharging into the San Gabriel River. Under the post development conditions, runoff from the development area is conveyed biofiltration BMPs located on-site prior to discharging into Lemon Creek. Excess runoff overflows from the system and flows southerly within Lemon Creek in the same manner as the existing condition. Hydrology maps and BMP calculations were developed and taken from the stand alone

Drainage Report. They have been attached and are located in Appendix A of this report for reference.

8. Protect Slopes and Channels

All slopes and channels are either concrete-lined or stabilized with vegetation.

9. Provide Storm Drain System Stenciling and Signage

All on-site storm drain inlets/catch basins will be labeled with "No Dumping – Drains to San Gabriel River" or an equivalent message as directed by the City. Markers may be purchased from the City for a nominal fee. An example of an approved stencil can be found in Appendix D.

10. Properly Design Outdoor Material Storage Areas

This requirement does not apply to the project, as the project does not include any outdoor material storage areas. There are no proposed outdoor storage facilities or activities involving vehicle fueling, vehicle washing, or food processing on the site.

11. Properly Design Trash Storage Areas

The development area will include trash storage areas in the single family residential housing units. All trash storage areas shall include at a minimum a cover to protect any runoff from collecting pollutants. Educational materials and fact sheets will be provided in Appendix B.

12. Provide Proof of Ongoing BMP Maintenance

A combination of treatment control and non-structural BMPs will be implemented and maintained where applicable by the Home Owner's Association (HOA) to minimize the pollutants of concern and to maximize the pollutant reduction to the MEP.

The following BMPs are the treatment control BMPs and their specific routine maintenance:

- The private streets will receive mechanical street sweeping services on a monthly basis.
- The biofiltration BMPs will need to be inspected and maintained before and after the rainy season. The device shall be inspected after each storm event to ensure that there is no ponded water beyond 72 hours after the storm has ended. If standing water exists beyond 72 hours it needs to be pumped and drained to avoid the potential for vector breeding. The invert of the device needs to be inspected to determine if the invert is clogged and if soil, sediment, or debris needs to be removed. If the invert is free from such matter then the subsurface soil may need to be remediated. A geological engineer should be contacted to resolve the drainage issue. Inspection and maintenance will need to take place for the life of the BMP to ensure the NPDES Permit requirements are being met and that the public safety is assured.
- Catch basins, BMPs, pretreatment devices, or any other storm water conveyance system shall be cleaned and empty any time they are 25% or more full.

In order to certify that the BMPs implemented as a part of this project are maintained properly, inspection forms have been developed with maintenance procedures for the HOA. Appendix C highlights what needs to be maintained, signs that maintenance is necessary, how maintenance should be conducted, who to contact for assistance, and inspection forms to assist in facilitating the inspection process and recordkeeping. Inspection records shall be kept in an easy to access location for review by the Regional Water Board, including inspection reports, warning letters, notices of violations, and other enforcement records, demonstrating a good faith effort to bring facilities into compliance. BMP inspection forms and detailed maintenance requirements are included in Appendix C.

Maintenance access is available through the entrance locations on each end of the site. The location(s) are shown on the BMP Location Map in Appendix A.

13. Individual Priority Project Categories

Table 2 shows individual priority project categories included in this project and those that were not included.

Table 2: Priority Project Categories

Category	Requirement	Check One		
		Included	Not Applicable	Explanation
Single-Family Hillside Home	Conserve natural areas	X		See below
	Protect slopes and channels	X		See below
1 acre or larger Industrial /Commercial Development	Properly design loading/unloading dock areas		X	No docking areas
	Properly design repair/maintenance bays		Х	No repair bays
	Properly design vehicle/equipment wash areas		Х	No wash areas
Restaurants	Properly design equipment/accessory wash areas		Х	Not a restaurant
Retail Gasoline Outlets	Properly design fueling area		Х	Not a gasoline outlet
Automotive Repair Shops	Properly design fueling area		Х	Not an auto repair shop
	Properly design repair/maintenance bays		X	Not an auto repair shop
	Properly design vehicle/equipment wash areas		X	Not an auto repair shop
	Properly design loading/unloading dock areas		Х	Not an auto repair shop
Parking Lots	Properly design parking area		Х	Not a parking lot
	Properly design to limit oil contamination and perform maintenance		Х	Not a parking lot

[&]quot;Single-Family Hillside Homes" shall conserve natural areas, protect slopes and channels, provide storm drain system stenciling and signage, divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability and direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

The project includes redevelopment of an equestrian complex. Planter areas around impervious areas will be implemented where feasible such as filter strips along sidewalks and/or private

streets. The development area has been designed to minimize the offsite transport of pollutants by treating the first flush runoff through the proposed biofiltration systems. The biofiltration systems will treat all of the runoff produced from the 85th percentile storm event if constructed properly and will have some incidental infiltration. There are no proposed outdoor storage facilities or activities involving vehicle fueling, vehicle washing, or food processing on the site.

Although these activities are not anticipated to take place on-site, a spill response plan shall be implemented for any spill that may discharge into the MS4. The spill response plan shall clearly identify agencies responsible for spill response and cleanup, telephone numbers and e-mail address for contacts, and shall contain at a minimum the following requirements:

- Coordination with spill response teams throughout all appropriate departments, programs and agencies so that maximum water quality protection is provided.
- Initiate investigation of all public and employee spill complaints within one business day of receiving the complaint to assess validity.
- Response to spills for containment within 4 hours of becoming aware of the spill, except where such spills occur on private property, in which case the response should be within 2 hours of gaining legal access to the property.
- Spills that may endanger health or the environment shall be reported to appropriate public health agencies and the Office of Emergency Services (OES).

14. Mitigation Funding

Because the project incorporates BMPs on site, there is no need to pursue off-site or regional treatment solutions, and therefore no need or request to provide mitigation funding.

15. Limitation on Use of On-Site Infiltration and Retention BMPs

According to Part 7.c.ii.2 of the Order, to demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use. The applicant must also demonstrate that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Technical infeasibility may result from conditions including:

- a) The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv on-site.
- b) Locations where seasonal high ground water is within 5 to 10 feet of the surface,
- c) Locations within 100 feet of a ground water well used for drinking water,
- d) Brownfield development sites where infiltration poses a risk of causing pollutant mobilization,
- e) Other locations where pollutant mobilization is a documented concern
- f) Locations with potential geotechnical hazards, or
- g) Smart growth and infill or redevelopment locations where the density and/or nature of the project would create significant difficulty for compliance with the on-site volume retention requirement.)

The project will not use infiltration BMPs due to the clayey type soil. The soils map from the Los Angeles County Hydrology Manual indicates that the study area consists of soil type 2. Poor soil characteristics restrict using the native soils for infiltration.

16. Certification for Stormwater Treatment Mitigation

The proposed improvements stated within this SUSMP are believed to meet the requirements set forth in Order No. R4-2012-0175. Remi Candaele, a registered Civil Engineer in the State of California, will provide certification for the information and water quality recommendations found in this report. Modifications to the project plans or variations in subsurface conditions due to any activities prior to installation of the BMPs may require re-evaluation of the recommendations contained in this report.

This project includes biofiltration as the primary BMPs which are sized to retain the SWQDv and meet hydromodification requirements on-site. All of the calculations, BMP selection, and BMP sizing were prepared by others. Details and methodology can be found in the stand alone Drainage Report.

The data, opinions, and recommendations contained herein are applicable to the specific design elements and locations which are the subject of this report. Data, opinions, and recommendations herein have no applicability to any other design elements or to any other locations, and any and all subsequent users accept any and all liability resulting from any use or reuse of the data, opinions, and recommendations without the prior written consent of RBF.

17. References

SUGGESTED RESOURCES	HOW TO GET A COPY
Development Planning for Storm Water Management - A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP)	http://ladpw.org/wmd/NPDES/table_contents.cfm
MS4 Discharges within the Coastal Watersheds of Los Angeles County – Order No. R4-2012-0175 NPDES No. CAS004001	http://www.waterboards.ca.gov/losangeles/water_issues/ programs/stormwater/municipal/index.shtml
Start at the Source (1999) by Bay Area Stormwater Management Agencies Association - Detailed discussion of permeable pavements and alternative driveway designs presented	Bay Area Stormwater Management Agencies Association (BASMA) 2101 Webster Street, Suite 500 Oakland, CA [Zip Code?] (510) 286-1255
California Storm Water Best Management Practices Handbooks (2003) for Construction Activity, Municipal, and Industrial/Commercial - Presents a description of a large variety of Structural BMPs, Treatment Control, BMPs and Source Control BMPs	Los Angeles County Department of Public Works Cashiers Office 900 S. Fremont Avenue Alhambra, CA 91803 (626) 458-6959
Second Nature: Adapting LA's Landscape for Sustainable Living (1999) by Tree People Detailed discussion of BMP designs presented to conserve water, improve water quality, and achieve flood protection	Tree People 12601 Mullholland Drive Beverly Hills, CA 90210 (818) 753-4600 (? info@treepeople.org
Caltrans Storm Water Quality Handbook: Planning and Design Staff Guide (Best Management Practices Handbooks (1998) - Presents guidance for design of storm water BMPs	California Department of Transportation P.O. Box 942874 Sacramento, CA 94274 (916) 653-2975

APPENDIX A: Hydrology Maps, Hydrology Results, and BMP Location Map

	Biofiltration Sizing													
			Sizing	Criteria for SU	JSMP Volume				Biofiltration A	Area				
BMP ID	DA ID	_	Impervious Fraction	C _u		Diointi ation	-	SUSMP Volume		•	Ponding Depth (ft)	Design Percolation rate (in/hr)		Bioretention Area Required -Bottom (ft²)
Recreation Center Tributary to DA (A)	A-1 A-2 A-3 A-4 A-5 A-6	2.74 3.44 0.81 3.65 1.02	0.42 0.70 0.42 0.50	0.76 0.79 0.76 0.80	0.82 0.87 0.82 0.85	1.5 1.5 1.5 1.5	8,375 10,225 2,549 10,849 3,147 3,480	12,562 15,337 3,824 16,273 4,721	57,936	5	1.5	2.50	31.2	6,856
Open Space Lot Tributary to DA (B)		2.63 1.90 2.03	0.53	0.77	0.84	1.5	8,099 5,786 6,216	12,148 8,679 9,325	30,151	5	1.5	2.5	31.2	3,568

ID	Area	Impervious Area	Impervious
A-1	2.74	1.1508	42%
A-2	3.44	1.4448	42%
A-3	0.81	0.567	70%
A-4	3.65	1.533	42%
A-5	1.02	0.102	10%
A-6	1.13	0.5989	53%
	12.79		42%

ID	Area	Impervious Area	Impervious
B-1	2.63	1.3939	53%
B-2	1.9	1.007	53%
B-3	2.03	1.0759	53%
	6.56		53%

ID	Area	Impervious Area	Impervious
C-1	1.46	0.0292	2%
C-2	1.4	0.028	2%
C-3	1.44	0.0288	2%
C-4	1.41	0.0282	2%
C-5	0.74	0.0148	2%
	6.45		2%

	Existing Hydrology													
Project	Subarea	Area (acres)	Impervious (%)	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc- calculated (min.)	Intensity (in./hr)	Cu	Cd	2 yr Volume	Flowrate (cfs)
Walnut	A&B	19.35	4.36%	2	2	2346	0.0345	3.02	29	0.79	0.66	0.67	144,252	10
Walnut	C-1	1.46	0.00%	2	2	838	0.12	3.02	11	1.24	0.76	0.76	12,164	1
Walnut	C-2	1.4	2.50%	2	2	259	0.0154	3.02	7	1.54	0.79	0.79	12,167	2
Walnut	C-3	1.44	4.10%	2	2	307	0.013	3.02	9	1.37	0.77	0.78	12,391	2
Walnut	C-4	1.41	4.10%	2	2	366	0.0027	3.02	13	1.15	0.75	0.76	11,836	1
Walnut	C-5	0.74	1.00%	2	2	384	0.013	3.02	10	1.3	0.76	0.76	6,177	1
		25.8	3.89%										198,987	

						P	roposed Hyd	lrology						
Project	Subarea	Area (acres)	Impervious (%)	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc- calculated (min.)	Intensity (in./hr)	Cu	Cd	2 yr Volume	Flowrate (cfs)
Walnut	A-1	2.74	42.00%	2	2	336	0.082	3.02	6	1.65	0.8	0.84	25,292	4
Walnut	A-2	3.44	42.00%	2	2	450	0.01	3.02	11	1.24	0.76	0.82	30,878	3
Walnut	A-3	0.81	70.00%	2	2	389	0.0715	3.02	7	1.54	0.79	0.87	7,699	1
Walnut	A-4	3.65	42.00%	2	2	449	0.02	3.02	10	1.3	0.76	0.82	32,763	4
Walnut	A-5	1.02	50.00%	2	2	240	0.021	3.02	6	1.65	0.8	0.85	9,505	1
Walnut	A-6	1.13	53.00%	2	2	408	0.059	3.02	7	1.54	0.79	0.85	10,509	1
Walnut	B-1	2.63	53.00%	2	2	440	0.08	3.02	7	1.54	0.79	0.85	24,458	3
Walnut	B-2	1.9	53.00%	2	2	420	0.03	3.02	9	1.37	0.77	0.84	17,473	2
Walnut	B-3	2.03	53.00%	2	2	310	0.018	3.02	8	1.44	0.78	0.84	18,774	2
Walnut	C-1	1.46	0.00%	2	2	838	0.12	3.02	11	1.24	0.76	0.76	12,164	1
Walnut	C-2	1.4	2.50%	2	2	259	0.0154	3.02	7	1.54	0.79	0.79	12,167	2
Walnut	C-3	1.44	4.10%	2	2	307	0.013	3.02	9	1.37	0.77	0.78	12,239	2
Walnut	C-4	1.41	4.10%	2	2	366	0.0027	3.02	13	1.15	0.75	0.76	11,688	1
Walnut	C-5	0.74	1.00%	2	2	384	0.013	3.02	10	1.3	0.76	0.76	6,177	1
	6.45	25.8	36.59%										231,784	

	Hydromodification Analysis													
2 \	2 Year Hydromodification Volume Mitigation Effective BMP Volume													
														Additional
Drainage Area		Existing	Proposed	Delta	Soil Media	Soil Media	Gravel	Gravel Depth	Ponding	Effective	Effective	Effective	Effective Vol >	Storage
ID	Area	Volume	Volume	Volume	Porosity	Depth (ft)	Porosity	(ft)	Depth (ft)	Depth	Surface Area	Volume	Delta Vol?	Required
Α	12.79	95,348	116,644	21,297	0.35	5	0.40	0.60	1.50	3.49	6,856	23,929	Yes	0
В	6.56	48,904	60,705	11,801	0.35	5	0.40	0.60	1.50	3.49	3,568	12,453	Yes	0
С	6.45	54,735	54,435	-								0		
	25.8			33,097										

Other hydromodification analysis will be included in the Final SUSMP (flow, velocity and time of concentration mitigation)
**Drainage Area C for existing hydrology and proposed hydrology did not change and will not require mitigation or hydromodification.

Appendix B: BMP Design Criteria & Fact Sheet

5. BIORETENTION

Definition

Bioretention areas are vegetated (i.e., landscaped) shallow depressions that provide storage, infiltration, and evapotranspiration. Bioretention areas also remove pollutants by filtering stormwater through plants adapted to the local climate and soil moisture conditions and an engineered soil mix. In bioretention areas, pore spaces, microbes, and organic material in the engineered soils help to retain water in the form of soil moisture and to promote the adsorption of pollutants (e.g., dissolved metals and petroleum hydrocarbons) into the soil matrix. Plants utilize soil moisture and promote the drying of the soil through transpiration. If no underdrain is provided, exfiltration of the stored water in the bioretention area engineered soil into the underlying soils occurs over a period of days. For areas with low permeability native soils or steep slopes, bioretention areas can be designed with an underdrain system that routes the treated runoff to the storm drain system rather than depending on infiltration. In this situation, treatment is achieved mainly through filtration and adsorption in the vegetation and engineered soils in the biofiltration area.

General Constraints and Siting Considerations

- Native soil infiltration rate underdrain is required in low permeability soils
- Vertical relief and proximity to storm drain site must have adequate relief between land surface and storm drain to permit vertical percolation through the soil media and collection and conveyance in underdrain to storm drain system
- Depth to groundwater shallow groundwater table may not permit complete drawdown between storms

Multi-Use Opportunities

Bioretention areas can be applied in various settings, including:

- Individual lots for rooftop, driveway, and other on-lot impervious surface infiltration.
- Shared facilities located in common areas for individual lots.
- Areas within loop roads or cul-de-sacs.
- Landscaped parking lot islands.
- Within right-of-ways along roads.
- Common landscaped areas in apartment complexes or other multifamily housing designs.
- In parks and along open space edges.

Bioretention Design Specifications

Geotechnical and Landscape Considerations

1. Bioretention areas located within 50 feet of a sensitive steep slope shall incorporate an underdrain. A geotechnical report must be provided to address the potential effects of

infiltration on the steep slope if a bioretention area without an underdrain is sited within 200 feet of the slope or hazardous landslide area.

2. An underdrain should be provided for the bioretention area when native soils permeability is less than 0.5 inches/hour, as determined by an in-situ percolation test.

Pretreatment

- 1. Bioretention areas shall use a filter strip to pretreat and spread incoming flows from roadways. Bioretention areas that treat runoff from residential roofs, sidewalks, driveways, or other "cleaner" surfaces do not require pretreatment.
- 2. If sheet flow is conveyed to the treatment area over stabilized grassed areas, the site must be graded in such a way that minimizes erosive conditions. Sheet flow velocities shall not exceed 1 foot per second.

Sizing Criteria

Bioretention areas can be sized using one of two methods: a simple sizing method or a routing method. The simple sizing procedure is summarized below. Continuous simulation modeling, routing spreadsheets, and/or other forms of routing modeling that incorporate rainfall-runoff relationships and infiltrative (flow) capacities of bioretention may be used to size facilities. Alternative sizing methodologies should be prepared with good engineering practices. For the routing modeling method, refer to Section 10 - Sand Filters. A bioretention sizing worksheet and example are provided in Appendix B.

With either method, the runoff entering the facility must completely drain the ponding area and the planting soil within 48 hours. Bioretention provides storage above ground, in the voids of the planting soil, and (if used) in the voids of gravel drainage layer. Bioretention is to be sized, with or without underdrains, such that the SUSMP volume will fill the available ponding depth, the void spaces in the planting soil, and (if provided) the gravel drainage layer.

Step 1: Calculate the design volume

Bioretention areas should be sized to capture and treat the SUSMP volume (see *A Manual for the Standard Urban Storm Water Mitigation Plan*, LACDPW, September 2002 (or as amended)).

Step 2: Determine the design percolation rate

The design percolation rate, P_{design} , will differ depending on whether the native soil percolation rate falls above or below a rate of 0.5 in/hr. Sites where the native soil percolation rate is equal to or exceeds 0.5 in/hr, measured per the Policy for New Percolation Basin Testing, Design, and Maintenance (see Appendix G), do not require the use of an underdrain, while sites where native soil percolation rates are less than 0.5 in/hr require the use of an underdrain.

Option 1: Determining the design percolation rate, P_{design}, with an underdrain

If the bioretention includes an underdrain, then the design percolation rate will be that of the planting soil. The planting soil design specifications listed below are assumed to have a design percolation rate of 2.5 in/hr.

Option 2: Determining the design percolation rate, P_{design} , of the native subsoil (no underdrain) If the bioretention area does not include an underdrain, then the design percolation rate will be the limiting percolation rate (slowest) of the native subsoil, using in-situ tests described in Appendix G, and the planting soil. In most cases, the limiting percolation rate will be that of the native subsoil. It is important that adequate conservatism is incorporated in the selection of design percolation rates. The design percolation rate discussed here is the percolation rate of the underlying subsoil and not the percolation rate of the planting soil.

The design percolation rate may be calculated by applying correction factors to the field-measured percolation rate. A percolation testing correction factor applied to bioretention sizing of 0.25 (providing a safety factor of 4) should be applied to results of the percolation testing conducted per Appendix G.

$$P_{design} = P_{measured} x F_{testing}$$
 (Equation 5-1)

Where:

Pdesign = design percolation rate (in/hr)

Pmeasured = field measured percolation rate (in/hr)

 $F_{testing}$ = correction factor for testing method; use 0.25

Step 3: Calculate the bioretention surface area

Determine the bottom surface area of the bioretention (surface area at the base of sideslopes, not at the top of sideslopes) using the following equation:

$$A = \frac{(V_{design})(l)}{(t)(P_{design}/12)(d+l)}$$
 (Equation 5-2)

Where:

 V_{design} = SUSMP volume (ft³)

 P_{design} = design percolation rate (in/hr) d = ponding depth (ft) [max 1.5 ft]

/ = depth of planting media (ft) [min 2 ft] t = required drawdown time (hr) [max 48 hrs] Gravel Drainage Layer. A gravel drainage layer should be provided where underlying native soil permeability is greater than 0.5 in/hr and percolation is allowed. The base of the drainage layer should have zero slope (level). The drawdown time for the gravel drainage layer should not exceed 72 hours. The planting soil and gravel layers should be separated with a thin, 2- to 4-inch layer of sand and a thin layer (nominally two inches) of #8 stone.

Determine the maximum depth of runoff that can be infiltrated within the required drain time (72 hr) as follows:

$$d_{\text{max}} = \frac{P_{\text{design}}}{12} * t$$
 (Equation 5-3)

Where:

 d_{max} = the maximum depth of water that can be infiltrated within the required drain time (ft)

 P_{design} = native subsoil design percolation rate (in/hr) [measured percolation rate x 0.25]

t = required drain time (hrs) [72 hours]

Choose the gravel drainage layer depth (1) such that:

$$d_{\max} \ge n * l$$
 (Equation 5-4)

Where:

 d_{max} = the maximum depth of water that can be infiltrated within the required drain time (ft)

n = gravel drainage layer porosity (unitless)l = depth of gravel drainage layer (ft)

Calculate the infiltrating surface area (filter bottom area) required:

$$A = \frac{V_{design}}{\frac{TP_{design}}{12} + nl}$$
 (Equation 5-5)

Where:

 V_{design} = SUSMP volume (ft³)

n = gravel drainage layer porosity (unitless)

 P_{design} = native subsoil design percolation rate (in/hr) [measured percolation rate x 0.25]

/ = depth of gravel drainage layer (ft)

T = fill time (time to fill bioretention area with water) (hrs) [use 2 hours for most

designs]

A = surface area of gravel drainage layer (ft^2)

Geometry

- 1. Bioretention areas shall be sized to capture and treat the SUSMP volume (see *A Manual for the Standard Urban Storm Water Mitigation Plan*, LACDPW, September 2002 (or as amended)) with an 18-inch maximum ponding depth.
- 2. Planting soil depth shall be a minimum of 2 feet, although 3 feet is preferred. *Intent: The planting soil depth should provide a beneficial root zone for the chosen plant palette and adequate water storage for the water quality design volume. A deeper planting soil depth will provide a smaller surface area footprint.*
- 3. Bioretention areas shall be designed to drain in less than 48 hours. Intent: Soils must be allowed to dry out periodically in order to restore hydraulic capacity to receive flows from subsequent storms, maintain percolation rates, maintain adequate soil oxygen levels for healthy soil biota and vegetation, and to provide proper soil conditions for biodegradation and retention of pollutants.

Flow Entrance and Energy Dissipation

The following types of flow entrance can be used for bioretention cells:

- 1. Dispersed, low velocity flow across a landscape area. Dispersed flow may not be possible given space limitations or if the facility is controlling roadway or parking lot flows where curbs are mandatory.
- 2. Dispersed flow across pavement or gravel and past wheel stops for parking areas.
- 3. Flow spreading trench around perimeter of bioretention area. May be filled with pea gravel or vegetated with 3:1 side slopes similar to a swale. A vertical-walled open trench may also be used at the discretion of the County.
- 4. Curb cuts for roadside or parking lot areas: curb cuts should include rock or other erosion protection material in the channel entrance to dissipate energy. Flow entrance should drop 2 to 3 inches from curb line and provide an area for settling and periodic removal of sediment and coarse material before flow dissipates to the remainder of the cell.
- 5. Pipe flow entrance: Piped entrances, such as roof downspouts, should include rock, splash blocks, or other erosion protection material at the entrance to dissipate energy and disperse flows.
- 6. Woody plants (trees, shrubs, etc.) can restrict or concentrate flows and can be damaged by erosion around the root ball and shall not be placed directly in the entrance flow path.

Underdrains

If underdrains are required, then they must meet the following criteria:

1. 6-inch minimum diameter.

- 2. Underdrains must be made of <u>slotted</u>, polyvinyl chloride (PVC) pipe (PVC SDR 35 or approved equivalent). *Intent: As compared to round-hole perforated pipe, slotted underdrains provide greater intake capacity, clog resistant drainage, and reduced entrance velocity into the pipe, thereby reducing the chances of solids migration.*
- 3. Slotted pipe shall have 2 to 4 rows of slots cut perpendicular to the axis of the pipe or at right angles to the pitch of corrugations. Slots shall be 0.04 to 0.1-inch and shall have a length of 1-inch to 1.25-inch. Slots shall be longitudinally spaced such that the pipe has a minimum of one square inch per lineal foot.
- 4. Underdrains shall be sloped at a minimum of 0.5%.
- 5. Rigid non-perforated observation pipes with a diameter equal to the underdrain diameter shall be connected to the underdrain every 250 to 300 feet to provide a clean-out port as well as an observation well to monitor dewatering rates. The wells/cleanouts shall be connected to the perforated underdrain with the appropriate manufactured connections. The wells/cleanouts shall extend 6 inches above the top elevation of the bioretention facility mulch, and shall be capped with a lockable screw cap. The ends of underdrain pipes not terminating in an observation well/cleanout shall also be capped.
- 6. The following aggregate shall be used to provide a gravel blanket and bedding for the underdrain pipe. Place the underdrain on a bed of washed aggregate at a minimum thickness of 6 inches and cover with the same aggregate to provide a 1-foot minimum depth around the top and sides of the slotted pipe.

Sieve size	Percent Passing
¾ inch	100
¼ inch	30-60
US No. 8	20-50
US No. 50	3-12
US No. 200	0-1

7. At the option of the designer/geotechnical engineer, a geotextile fabric may be placed between the planting media and the drain rock. If a geotextile fabric is used it must meet the following minimum materials requirements.

Geotextile Property	Value	Test Method
Trapezoidal Tear (lbs)	40 (min)	ASTM D4533
Permeability (cm/sec)	0.2 (min)	ASTM D4491
AOS (sieve size)	#60 - #70 (min)	ASTM D4751
Ultraviolet resistance	70% or greater	ASTM D4355

Preferably, aggregate should be used in place of filter fabric to reduce the potential for clogging. This aggregate layer should consist of 2 - 4 inches of washed sand underlain with 2 inches of Choking Stone (Typically #8 or #89 washed).

8. The underdrain shall be elevated from the bottom of the bioretention facility by 6 inches within the gravel blanket to create a fluctuating anaerobic/aerobic zone below the drain

- pipe. Intent: denitrification within the anaerobic/anoxic zone is facilitated by microbes using forms of nitrogen (NO2 and NO3) instead of oxygen for respiration.
- 9. The underdrain must drain freely to an acceptable discharge point. The underdrain can be connected to a downstream open conveyance (vegetated swale), to another bioretention cell as part of a connected treatment system, daylight to a vegetated dispersion area using an effective flow dispersion device, stored for reuse, or to a storm drain.

Overflow

An overflow device is required at the 18-inch ponding depth. The following, or equivalent, should be provided:

- 1. A vertical PVC pipe (SDR 35) shall be connected to the underdrain.
- 2. The overflow riser(s) should be 6 inches or greater in diameter, so it can be cleaned without damage to the pipe. The vertical pipe will provide access to cleaning the underdrains.
- 3. The inlet to the riser should be 6 inches above the planting media, and be capped with a spider cap to exclude floating mulch and debris.

Hydraulic Restriction Layers

Infiltration pathways may need to be restricted due to the close proximity of roads, foundations, or other infrastructure. A geomembrane liner may be placed along the vertical walls to reduce lateral flows. This liner shall have a minimum thickness of 30 mils.

Planting/Storage Media

- 1. The planting media placed in the cell shall be highly permeable and high in organic matter (e.g., loamy sand mixed thoroughly with compost amendment) and a surface mulch layer.
- 2. Planting media shall consist of 60 to 70% sand, 15 to 25% compost, and 10 to 20% clean topsoil. The organic content of the soil mixture should be 8% to 12%; the pH range should be 5.5 to 7.5.
- 3. Sand should be free of stones, stumps, roots or other similar objects larger than 5 millimeters, and have the following gradation:

Particle Size	
(ASTM D422)	% Passing
#4	100
#6	88-100
#8	79-97
#50	11-35
#200	5-15

- 4. Compost should be free of stones, stumps, roots or other similar objects larger than ¾ inches; have a particle size of 98% passing through ¾" screen or smaller; and meet the following characteristics:
 - Soluble Salt Concentration: < 10 mmhos/cm (dS/m)
 - pH: 5.0-8.5
 - Moisture: 30-60% wet weight basis
 - Organic Matter: 30-65% dry weight basis
 - Stability (Carbon Dioxide evolution rate): >80% relative to positive control
 - Maturity (Seed emergence and seedling vigor): >80% relative to positive control
 - Physical contaminants: < 1% dry weight basis
- 5. Topsoil shall be free of stones, stumps, roots or other similar objects larger than 2 inches, and have the following characteristics:

Soluble salts: < 4.0 mmhos/cm (dS/m)

pH range: 5.5 to 7.0Organic matter: > 5%

• Carbon to Nitrogen Ratio: < 20:1

• Moisture content: 25-55%

Particle Size	
(ASTM D422, D1140)	% Passing
3/4"	98
Sand (0.05 - 2.0 mm)	50-75
Silt (0.002 - 0.05 mm)	15-40
Clay	< 5

- 6. The bioretention area shall be covered with 2 4 inches (average 3 inches) of mulch at the start and an annual placement of 1-2 inches of mulch beneath plants. *Intent: this will help sustain nutrient levels, suppress weeds, and maintain infiltrative capacity.* Mulch shall be:
 - Well-aged, shredded or chipped woody debris or plant material. Well-aged mulch is defined as mulch that has been stockpiled or stored for at least twelve (12) months. Compost meeting the requirements above may also be used (compost is less likely to float and is a better source for organic materials).
 - Free of weed seeds, soil, roots and other material that is not bole or branch wood and bark.
 - A maximum of 2 to 3 inches thick (*intent: thicker applications can inhibit proper oxygen and carbon dioxide cycling between the soil and atmosphere*).
 - Grass clippings or pure bark shall not be used as mulch.
- 7. Planting media design height shall be marked appropriately, such as a collar on the vertical riser (if installed), or with a stake inserted 2 feet into the planting media and notched to show bioretention surface level and ponding level.
- 8. The bioretention soil mix shall be tested and meet the following criteria:

Item	Criteria	Test Method
Corrected pH	5.5 – 7.5	ASTM D4972
Magnesium	Minimum 32 ppm	*
Phosphorus (Phosphate - P ₂ O ₅)	Not to exceed 69 ppm	*
Potassium (K ₂ O)	Minimum 78 ppm	*
Soluble Salts	Not to exceed 500 ppm	*

^{*} Use authorized soil test procedures.

Should the pH fall outside of the acceptable range, it may be modified with lime (to raise) or iron sulfate plus sulfur (to lower). The lime or iron sulfate must be mixed uniformly into the soil mix prior to use in bioretention facilities.

Should the soil mix not meet the minimum requirement for magnesium, it may be modified with magnesium sulfate. Likewise, should the soil mix not meet the minimum requirement for potassium, it may be modified with potash. Magnesium sulfate and potash must be mixed uniformly into the soil mix prior to use in bioretention facilities.

<u>Limestone</u>. Limestone shall contain not less than 85 percent calcium and magnesium carbonates. Dolomitic (magnesium) limestone shall contain at least 10 percent magnesium as magnesium oxide and 85 percent calcium and magnesium carbonates.

Limestone shall conform to the following gradation:

Sieve Size	Minimum Percent Passing By Weight
No. 10	100
No. 20	98
No. 100	50

<u>Iron Sulfate</u>. Iron sulfate shall be a constituent of an approved horticultural product produced as a fertilizer for supplying iron and as a soil acidifier.

<u>Magnesium Sulfate</u>. Magnesium sulfate shall be a constituent of an approved horticultural product produced as a fertilizer.

<u>Potash</u>. Potash (potassium oxide) shall be a constituent of an approved horticultural product produced as a fertilizer.

Plants

Prior to installation, a licensed landscape architect shall certify that all plants, unless
otherwise specifically permitted, conform to the standards of the current edition of American
Standard for Nursery Stock as approved by the American Standards Institute, Inc. All plant
grades shall be those established in the current edition of American Standards for Nursery
Stock.

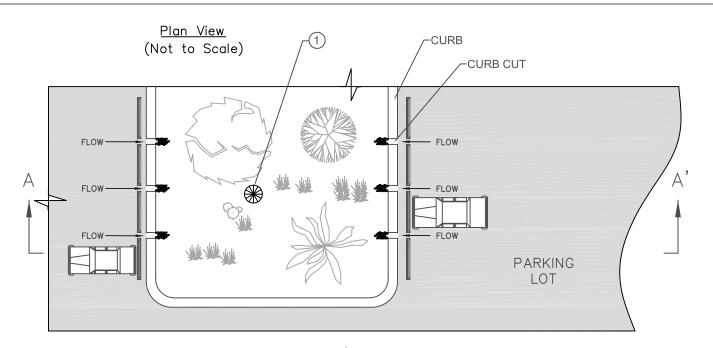
2. Shade trees shall have a single main trunk. Trunks shall be free of branches below the following heights:

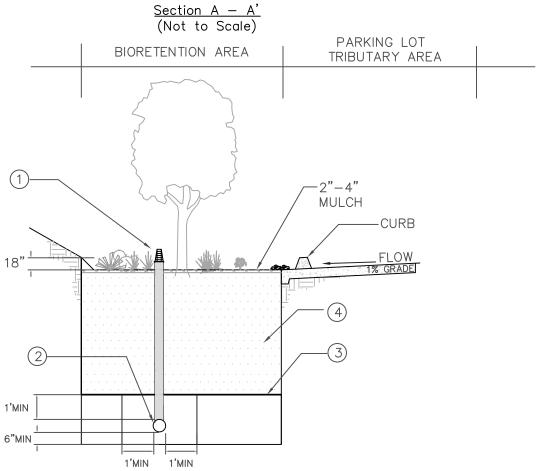
CALIPER (in)	HEIGHT (ft)
1-1/2 to 2-1/2	5
3	6

- Plant materials shall be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 48 hours.
- It is recommended that a minimum of three tree, three shrubs, and three herbaceous groundcover species be incorporated to protect against facility failure due to disease and insect infestations of a single species. Plant rooting depths shall not damage underdrain if present. Slotted or perforated underdrain pipe should be more than 5 feet from tree locations (if space allows).
- Native plant species and/or hardy cultivars that are not invasive and do not require chemical inputs shall be used to the maximum extent practicable.

Restricted Construction Materials

The use of treated wood or galvanized metal anywhere inside the facility is prohibited.





NOTES

- ① OVERFLOW DEVICE: VERTICAL RISER OR EQUIVALENT.
- (2) PERFORATED 6" MIN PVC PIPE UNDERDRAIN SYSTEM (AS NEEDED). WHERE SOIL CONDITIONS ALLOW, OMIT THE UNDERDRAIN AND INSTALL AN APPROPRIATELY SIZED GRAVEL DRAINAGE LAYER (TYPICALLY A WASHED 57 STONE) BENEATH THE PLANTING MEDIA FOR ENHANCED INFILTRATION.
- 3 OPTIONAL CHOKING GRAVEL LAYER.
- 4 2' MIN PLANTING MIX; 3' PREFERRED.

Figure 5-1 BIORETENTION

APPENDIX C: Operation and Maintenance of BMPs

Bioretention Operations and Maintenance

General Requirements

Bioretention areas require annual plant, soil, and mulch layer maintenance to ensure optimum infiltration, storage, and pollutant removal capabilities. In general, bioretention maintenance requirements are typical landscape care procedures and include:

- 1. Watering: Plants should be selected to be drought tolerant and not require watering after establishment (2 to 3 years). Watering may be required during prolonged dry periods after plants are established.
- 2. Erosion control: Inspect flow entrances, ponding area, and surface overflow areas periodically, and replace soil, plant material, and/or mulch layer in areas if erosion has occurred (see Appendix E for guidance on facility inspection and Appendix F for a bioretention inspection and maintenance checklist). Properly designed facilities with appropriate flow velocities should not have erosion problems except perhaps in extreme events. If erosion problems occur the following should be reassessed: (1) flow velocities and gradients within the cell, and (2) flow dissipation and erosion protection strategies in the pretreatment area and flow entrance. If sediment is deposited in the bioretention area, immediately determine the source within the contributing area, stabilize, and remove excess surface deposits.
- 3. Plant material: Depending on aesthetic requirements, occasional pruning and removing of dead plant material may be necessary. Replace all dead plants and if specific plants have a high mortality rate, assess the cause and, if necessary, replace with more appropriate species. Periodic weeding is necessary until plants are established. The weeding schedule should become less frequent if the appropriate plant species and planting density have been used and, as a result, undesirable plants excluded.
- 4. Nutrient and pesticides: The soil mix and plants are selected for optimum fertility, plant establishment, and growth. Nutrient and pesticide inputs should not be required and may degrade the pollutant processing capability of the bioretention area, as well as contribute pollutant loads to receiving waters. By design, bioretention facilities are located in areas where phosphorous and nitrogen levels are often elevated and these should not be limiting nutrients. If in question, have soil analyzed for fertility.
- 5. Mulch: Replace mulch annually in bioretention facilities where heavy metal deposition is likely (e.g., contributing areas that include industrial and auto dealer/repair parking lots and roads). In residential lots or other areas where metal deposition is not a concern, replace or add mulch as needed to maintain a 2 to 3 inch depth at least once every two years.
- 6. Soil: Soil mixes for bioretention facilities are designed to maintain long-term fertility and pollutant processing capability. Estimates from metal attenuation research suggest that metal accumulation should not present an environmental concern for at least 20 years in bioretention systems. Replacing mulch in bioretention facilities where heavy metal

deposition is likely provides an additional level of protection for prolonged performance. If in question, have soil analyzed for fertility and pollutant levels.

Maintenance Standards

A summary of the routine and major maintenance activities recommended for bioretention areas is shown in Table 5-1. Detailed Routine and major maintenance standards are listed in Tables 5-2 and 5-3.

Table 5-1: Bioretention Routine and Major Maintenance Quick Guide

Inspection and Maintenance A	ctivities Summary
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Routine Maintenance

- Repair small eroded areas and ruts by filling with gravel. Overseed bare areas to reestablish vegetation
- Remove trash and debris and rake surface soils to mitigate ponding
- Remove accumulated fine sediments, dead leaves and trash to restore surface permeability
- Remove any evidence of visual contamination from floatables such as oil and grease
- Eradicate weeds and prune back excess plant growth that interferes with facility operation. Remove invasive vegetation and replace with non-invasive species
- Remove sediment and debris accumulation near inlet and outlet structures to alleviate clogging
- Clean and reset flow spreaders (if present) as needed to restore original function
- Mow routinely to maintain ideal grass height and to suppress weeds
- Periodically observe function under wet weather conditions

Major Maintenance

- Repair structural damage to flow control structures including inlet, outlet and overflow structures
- Clean out under-drain, if present, to alleviate ponding. Replace media if ponding or loss of infiltrative capacity persists and revegetate
- Regrade and revegetate to repair damage from severe erosion/scour channelization and to restore sheet flow
- Take photographs before and after major maintenance (encouraged)

Table 5-2: Routine Maintenance – Bioretention

Defect or Problem	Condition When Maintenance is Needed	Results Expected When Maintenance Is Performed	Frequency
Erosion	Splash pads or spreader incorrectly placed; eroded or scoured areas due to flow channelization, or higher flows.	No erosion on surface of basin. No erosion or scouring evident. For ruts or bare areas less than 12 inches wide, damaged areas repaired by filling with crushed gravel. The grass will creep in over the rock in time.	Annually prior to wet season. After major storm events (>0.75
Standing Water	When water stands in the basin between storms and does not drain freely (with 36-48 hours after storm event).	Water drains completely from basin as designed and surface is clear of trash and debris. Underdrains (if installed) are cleared.	in/24 hrs) if spot checks of some basins indicate widespread damage/
Loss of Surface Permeability	Accumulation of fine sediments, dead leaves, trash and other debris on surface	Surface permeability restored. Surface layer removed and replaced with fresh mulch.	maintenance needs
Visual Contaminants and Pollution	Any visual evidence of oil, gasoline, contaminants or other pollutants.	No visual contaminants or pollutants present.	
Vegetation	Weeds, excessive plant growth, plants interfering with basin operation, plants diseased or dying	Basin tidy, plants healthy and pruned. Any plants that interfere with function are removed. Invasive or non-acclimated plants replaced.	Monthly (or as dictated by agreement
Inlet/Overflow	Inlet/outlet areas clogged with sediment and/or debris.	Material removed so that there is no clogging or blockage of the inlet or overflow area.	between County and landscape contractor
Trash and Debris	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (one standard garbage can).	Trash and debris removed and facility looks well kept.	

Table 5-3: Major Maintenance – Bioretention

Defect or Problem	Condition When Maintenance is Needed	Results Expected When Maintenance Is Performed	Frequency
Standing water	When water stands in the basin between storms and does not drain freely (with 36-48 hours after storm event).	Filter media (sand, gravel, and topsoil) and vegetation removed and replaced.	Annually prior to wet season
Erosion/ Scouring	Bare spots greater than 12 inches	No erosion on surface of basin. Large bare areas are regraded and reseeded/replanted.	As needed

BMP Inspection Log

Date	Maintenance Performed	Re-Inspection Date	Comments





APPENDIX E: Geotechnical Findings



APPENDIX M Hydrology and Hydraulics Report

TENTATIVE TRACT MAP NO.45378

Hydrology and Hydraulics Report

April 22, 2016

Prepared for:

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1 PROJECT DESCRIPTION

The approximate 25.4-acre Alpine Pointe Development Lot 1 & 2 Tract No. 45378 is located north of La Puente Road, south of Meadow Pass Road, east of North Lemon Avenue and West of Broken Lance Road, in the City of Walnut, Los Angeles County, California. The subject site consists of three Assessor's Parcel Numbers (APNs) 8709-093-001, -002, and -003, and the associated address 800 Meadow Pass Road. The subject site currently consists of the Brookside Equestrian Center and associated equestrian land uses and is generally located northwest of the confluence of State Route 57 (SR-57) and SR-60, north of Valley Boulevard, and south of Amar Road in a residential area of the City of Walnut. A vicinity map is provided as Figure 1 and Project Site map as Figure 2.

The proposed development includes 28 single family residential community lots which will occupy approximately 12.7 acres of the site. The development area will also include the construction of private streets, wet and dry utilities, a recreation center, improvements to the existing trail adjacent to Lemon Creek, sidewalk improvements adjacent to and along the private streets, three biofiltration devices, and vegetated landscaped areas.

The objectives of this report are outlined below:

- Quantify the pre- and post-development 25- and 50-year hydrology values for the two project site discharge locations (not including upstream tributary area),
- Quantify the capacity of existing and proposed, on-site storm drain infrastructure,
- Quantify the capacity of off-site storm drain infrastructure,
- Show that the proposed project will not have a hydrologic or hydraulic adverse impact, as compared to pre-development conditions.

Refer to the project specific Standard Urban Stormwater Mitigation Plan (SUSMP), prepared by Michael Baker International on April 22, 2016, for information pertaining water quality and hydromodification mitigation measures.

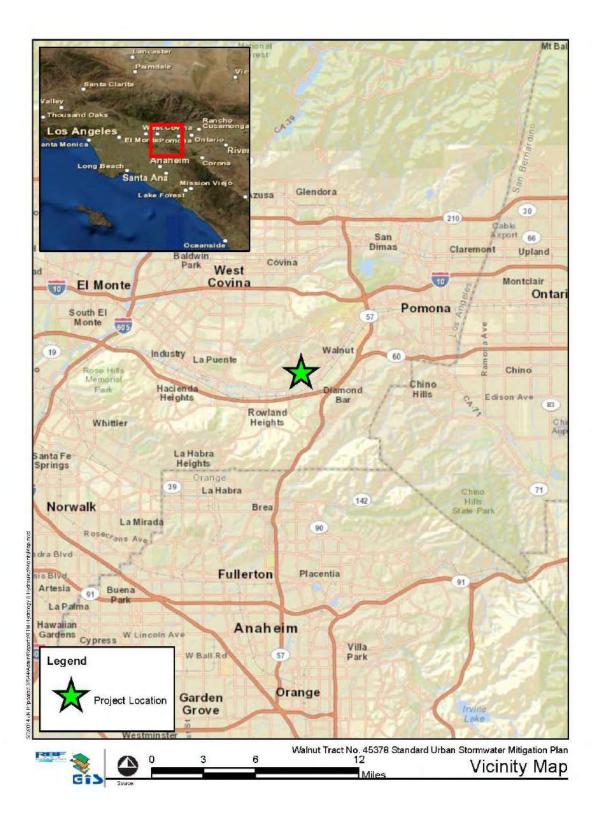


Figure 1: Project Vicinity and Location Map.

Figure 2: Project Site Map



1.1 Pre-Development Conditions

The project site receives run-on from approximately 10.3 acres of developed land north of Meadow Pass Road. There is existing storm drain infrastructure on-site, although there are no catch basins or inlets to the existing storm drain lines within the project limits. Flow from the hills above the project site is conveyed in the street gutters to catch basins on Meadow Pass Road and Colt Lane. Three storm drain conduits convey the flow from the catch basins on Meadow Pass Road to Lemon Creek. Refer to Map 1, the Pre-Development Condition Hydrologic Work Map, for on-site infrastructure.

The 24" storm drain line to the east receives flow from three catch basins at the corners of Colt Lane and Meadow Pass Road. The hydrologic conditions and hydraulics of this 24" line were not analyzed as no on-site flow would be added to the existing line in the proposed condition. In order to address potential site impacts, flows from the tributary area to the upstream end of the system were not considered run-on.

The discussion below outlines the significant drainage nodes and flow paths under pre-development conditions. Refer to 'Section 3 Hydraulics' for more information pertaining to existing and proposed storm drain infrastructure. Refer to Map 1 of this report for the Pre-Development Hydrologic Work Map.

Node 3A: Represents the inlet to the existing 81" culvert at the creek crossing. Flow from subarea 1A, approximately 1.87 acres, and 2A, about 6.26 acres, sheet flow to this point. Subarea 1A will remain unaltered in the proposed condition whereas flow from subarea 2A will be redirected to a point farther downstream to Node 6AB.

Subarea 5B: Project site run-on conveyed to Lemon Creek, approximately 3.81 acres in size. A catch basin on the north side of Meadow Pass Road captures runoff from the area where it enters an 18" storm drain pipe. Runoff is conveyed to a confluence with a 33" pipe and continues southerly, as pipe flow, and is ultimately discharged into Lemon Creek within Subarea 4A, which is approximately 6.29 acres.

Subarea 6B: Project site run-on conveyed to Lemon Creek, approximately 6.49 acres. Catch basins on the north and south sides of Meadow Pass Road capture runoff from the area where it enters a 33" storm drain pipe. Runoff is conveyed to the confluence mentioned above and continues southerly, as pipe flow, and is ultimately discharged into Lemon Creek within Subarea 4A.

Node 7AB: Represents a confluence location for pipe flow from subareas 5B and 6B, sheet flow from subarea 4A, and open channel flow from Node 3A. The node is located immediately upstream of the 72" culvert and Lemon Creek crossing. Runoff continues south as open channel flow to Node 10A.

Node 10A: Represents a confluence immediately upstream of the trail bridge crossing. This point receives the open channel flow from node 7AB and sheet flow from subareas 8A and 9A, 6.55 and 2.53 acres in size respectively.

Node 13A: Represents a confluence immediately upstream of the La Puente Road culvert crossing. This point receives the open channel flow from node 10A and sheet flow from subareas 11A and 12A, 3.15 and 1.89 acres in size respectively.

1.2 Post-Development Conditions

Proposed improvements will not result in a significant diversion of runoff. Runoff from the site under pre-development conditions enters Lemon Creek as entirely sheet flow with the exception of off-site pipe flow from Subareas 4B and 5B. The post-development conditions will convey most of the runoff as pipe flow into Lemon Creek. The discussion below outlines the significant drainage nodes and flow paths under post-development conditions. Refer to Map 2 of this report for the Post-Development Hydrologic Work Map.

Subarea 1A: This area increased in size in comparison to the pre-developed condition by approximately 2.62 acres due to the addition of area on the right bank (looking downstream). Proposed grading directs a portion of this area downstream through pipe flow to Node 6AB.

Subarea 2B: The runoff in this area will flow into catch basins at the Street A roundabout. The subarea was slightly reduced in size compared to the pre-developed condition due to area being added to subarea 1A and slight changes in boundary lines. The flow will no longer enter Lemon Creek upstream of the bridge crossing. Instead it will be conveyed as pipe flow and discharge into the creek downstream of the bridge at Node 6AB.

Subarea 3B: Runoff flows from the north high point in Street A to the catch basins west of the bridge. Area on the opposite side of Lemon Creek from Lot 17 was added due to the proposed grading and slope of the road. The subarea measures approximately 6.54 acres.

Subarea 5B: Same as pre-development condition.

Subarea 6B: Same as pre-development condition.

Node 6AB: Represents the discharge point of pipe flow from Subareas 2B, 3B, 4B, 5B, and the addition of open channel flow from Subarea 1A. Runoff continues southerly to Node 8A as open channel flow.

Node 8A: Corresponds to Node 7AB of the pre-development conditions. This node receives open channel flow from node 6AB and sheet flow from subarea 7A. The node is located immediately upstream of the 72" culvert and Lemon Creek crossing. Runoff continues south as open channel flow to Node 10A.

Subarea 9A: Represents an initial subarea starting at Lot 18 and ending at a proposed catch basin at the end of the cul-de-sac. Runoff is then directed as pipe flow to Node 13A at the La Puente Road culvert.

Subarea 10A: Runoff from the undeveloped area along Lemon Creek (3.97 acres) is added to the channel at Node 10A. Runoff continues south as open channel flow to Node 13A.

Node 13A: Remains unchanged from the pre-development conditions. Represents a confluence immediately upstream of the La Puente Road double 10'x5' box culvert. This node will still receive open channel flow from Node 10A and runoff from Subarea 11A.

2 HYDROLOGY

Lemon Creek is a tributary stream to San Jose Creek which is part of the larger San Gabriel River Watershed system. Lemon Creek enters the project site at the northeast end of the site and exits the site to the south at the double 5'x10' box at La Puente Road. A tributary stream to Lemon Creek passes under Lemon Avenue through an 81-inch culvert. This stream joins the main reach of Lemon Creek at a confluence point in the center of the project site. There are three storm drain lines that enter the project site from Meadow Pass Road to the north. Currently, there are no catch basins within the project limits. The combination of on-site storm drain infrastructure and off-site hydrology flow means that local and regional hydrology has been analyzed.

2.1 Regional Hydrologic Methodology

Existing hydrology reports for the area were sought in order to determine the proper design flows that would be used to analyze the hydraulics of Lemon Creek through the project site. Michael Baker contacted the Los Angeles Department of Public Works and was provided with minimal data from a hydrology study performed in 1972 for the San Jose Creek Watershed. The data included 50-year design flows for the tributary branches of San Jose Creek and a map of the delineated drainage areas of those branches. The flow rates provided were calculated based on Zone Method and a 50-year frequency rainfall event. A flow of 2,021 cfs enters the site in Lemon Creek before reaching the stream confluence. Flow from the Lemon Avenue culvert adds 1,153 cfs to Lemon Creek for a total flow of 3,182 cfs. At the La Puente Road culvert the flow measures 3,255 cfs.

Since the Los Angeles County Department of Public Works (LACDPW) Water Resources Department has changed its hydrology methodology from that used in 1972, the validity of these flow rates from San Jose Creek study was analyzed. The main areas of concern are the changes in land use, percent impervious surface area, and transition from rainfall zone curves to isohyets. The San Jose Creek study assumed 21-percent imperviousness for the watershed and used a 24-hour, 50-year frequency, zone mass curve with a cumulative rainfall depth of 8-inches.

To calculate the current imperviousness of the watershed upstream of the project site, the tributary drainage area to the project site was delineated using the San Jose Creek hydrology map and aerial photography. Current land uses for the watershed were referenced from the LACDPW Water Resources Publications website. This website contains links to the LACDPW Hydrology Manual, LACDPW GIS database of soils and land uses, and Modified Rational Method Hydrology Support Files. The current land uses were cross referenced with the delineated drainage area using ArcGIS. From this intersection of elements, the area that each land use occupied of the total area was drainage area was determined. Each land use was assigned a percent impervious number in accordance with the LACDPW Hydrology Manual Appendix D table. Using the composite imperviousness equation specified in Section 6.3 of the LACDPW Hydrology Manual, it was concluded that the current imperviousness of the watershed is 20.5%, slightly under the 21% used in the San Jose Creek study.

The project site is located in the San Dimas hydrology map for the 50-year, 24-hour isohyet. The rainfall depth at the project site is 6.7-inches, 1.3-inches lower than the 8-inch rainfall zone used in the San Jose Creek study.

The minimal change in imperviousness for the watershed, and decrease in rainfall depth, mean that the flow values from the San Jose Creek study will be on the conservative side but still acceptable for analyzing the hydraulics through Lemon Creek.

2.2 Local Hydrologic Methodology

HydroCalc 0.2.0 was used for Modified Rational Method hydrologic modeling of the project site and upstream tributary area, in accordance with the Los Angeles County Department of Public Works Hydrology Manual (January 2006). A CSV file with the hydrologic information of each subarea was imported into the program. This study includes pre- and post-development hydrologic analyses for the 25- and 50-year storm events.

On-site drainage basins were delineated using project specific, one-foot contour topography, and the proposed site plan. Off-site drainage basins were delineated using United States Geological Services (USGS) 10-foot contour topography and aerial photography obtained from Environmental Data Resources Inc. (EDR).

Runoff coefficients were determined based upon land-use and hydrologic soil type support files from the LACDPW Water Resources Publications website, and supplemented with aerial topography. Under predevelopment, Subareas 2A and 4A are modeled as '2700 – Horse Ranches.' The remaining areas are modeled as '3100 – Vacant Undifferentiated.' Under pre- and post-development conditions, the off-site areas are modeled as '1245 – Religious Facilities' and Subarea 12A/11A (pre-development/post-development) is modeled as '1243 – Fire Stations.' Under post-development, Subareas 1A, 7A, and 9A are modeled as '3100 – Vacant Undifferentiated. The project site is modeled as "1111 – High-Density Single Family Residential" under post-development conditions. Refer to Table 1 below, for Percent Impervious values used in hydrologic calculations.

Table 1: Hydrologic Land Use Types

Land Use Types	Percent Impervious
1111 – High-Density Single Family Residential	42%
1243 – Fire Stations	91%
1245 – Religious Facilities	82%
2700 – Horse Ranches	42%
3100 – Vacant Undifferentiated	1%

Soil types were selected according to the soil classification maps provided on the LACDPW Water Resources Publications website. Three soil types were present within the project site limits. Soil number 89 – Upper San Gabriel River-X can be found to the northwest, number 17 – Yolo Clay Loam, runs along the northern site limits, and number 2 – Altamont Clay Loam, covers most of the site to La Puente Road.

Rainfall depth was determined from the San Dimas 50-Year 24-Hour Isohyet. A depth of 6.7 inches was chosen for the project hydrology. The soil, land use, and rainfall data was compiled in a CSV file that was then imported the HydroCalc Program. Refer to Appendix A for the San Dimas Isohyet and soil type map. Refer to Appendix B for the HydroCalc input data for each subarea.

2.2.1 Hydrology Design Flows

The two tables below summarize the hydrologic analyses for the project site discharge locations under pre- and post-development conditions. The change in flow was also analyzed at the river confluence of Lemon Creek and the 81-inch RCP culvert. Flow generated from the off-site hydrologic areas was not considered in the summary tables below. The flow from the off-site area was analyzed when determining the capacity of the existing and proposed storm drain infrastructure in Section 3 – Hydraulics. Refer to Appendix B for all HydroCalc input and output.

Table 2: Hydrologic Summary - Discharge to Lemon Creek (Node 7AB-pre and 8A-post development)

	Total Area	25-Year	50-Year
	(ac)	(cfs)	(cfs)
Pre	15.58	43.89	50.47
Post	16.27	45.96	55.60
*Off-Site Area and Flow Omitted			

Table 3: Hydrologic Summary - Discharge to La Puente Road Culvert (Node 13A)

	Total Area	25-Year	50-Year
	(ac)	(cfs)	(cfs)
Pre	28.54	77.60	91.04
Post	28.54	76.26	92.16
*Off-Site Area and Flow Omitted			

Discharge flows from the project site into the upper portion of Lemon Creek increased slightly. The tributary area to this point increased by approximately 0.70 acres, adding 2.07 cfs to the Creek during a 25-year storm event and 5.13 cfs during a 50-year event. The total amount of flow from the project site is discharged at Node 13A into the La Puente Road culvert. The total flow from the site in the predevelopment condition for the 50-year storm was 91 cfs. In the Post-development condition this number increased to approximately 92 cfs. The total change in flow between the pre- and post-development conditions is minimal and would not have a significant impact on the existing hydraulics of Lemon Creek.

2.2.2 Project Mitigation

The off-site storm drain culvert at La Puente Road immediately south of the project site was originally designed for a 25-year storm event. As shown on 2 of 5 on the Storm Drain Improvement Plans for P.M. No. 14987(included in Appendix D of this report), 1,750 cfs has been used to size the existing off-site system between station 10+72.00 and 19+02.64. The upstream end of the double 5'x10' box culvert under La Puente Road is identical to Node 13A in both the pre- and post-development conditions.

The proposed project's 1-cfs increase in the 50-year design flow between pre- and post-development is not expected to adversely impact the off-site storm drain system. The 50-year design flow will overtop the exiting culvert at La Puente Road in both the pre- and post-development conditions and the small increase in on-site flow will be negligible.

3 HYDRAULICS

3.1 Regional Hydraulics

Lemon Creek experiences large flows due to its large tributary area upstream of the project site. Flow enters the project site at the northeast limits as open channel flow through the main reach. Downstream of this point there is discharge point from an 81-inch culvert under Lemon Avenue. The Lemon Creek channel and 81-inch culvert can be seen on Map 1, the Existing Hydrologic Work Map. A flow of 2,021 cfs enters the site in Lemon Creek before reaching the confluence. Flow from the Lemon Avenue culvert adds 1,153 cfs to Lemon Creek for a total flow of 3,182 cfs. At the La Puente Road culvert the flow measures 3,255 cfs. Four culverts are located along the Lemon Creek reach within the site limits and serve as trail crossings across the creek. A study of the pre- and post-development hydraulics of the Creek was conducted in order to compare the existing and proposed improvements to the project site.

3.1.1 Model Setup

The hydraulics of the Lemon Creek reach and culverts were modeled using the Army Corp of Engineer's River Analysis Program, HEC-RAS. Data entered into the program consists of topography, river flow data, and cross sections along the river reach. A topographic map of the project site was taken and the data imported into TERRAModel. The contour lines were extracted from this file and imported into AutoCAD Civil 3D. Using AutoCAD Civil 3D, an existing 3-dimensional surface was created from the contour lines. This surface was then exported as an .xml file. Using ArcGIS, the .xml surface file was imported and converted into a TIN surface.

A stream centerline, flow path, and left and right bank lines were drawn for Lemon Creek in AutoCAD Civil 3D using the referenced contour lines and topo map as guides. Cross section lines were drawn across Lemon Creek perpendicular to the flow path and contour lines of the stream. Cross section lines were drawn at locations where the channel changed geometry or contained a culvert. The stream centerline, bank lines, and cross section lines were then imported into the same ArcGIS file containing the existing TIN surface.

Using the HEC-GeoRAS tool within ArcGIS, cross-sections along the channel were cut across the surface. Information about the cross sections, including the location of the bank line points on each cross section and distances to the next downstream cross section, were calculated using the HEC-GeoRAS tools. This information was exported to HEC-RAS from ArcGIS.

HEC-RAS uses a geometry data file, cross sections, bridge/culvert builder, and flow data to analyze the hydraulics of the channel. The water surface elevations at each cross section and culvert are displayed in the program. A profile plot of the water surface elevation is also produced. The flow data used in both the existing and proposed conditions was that of the San Jose Creek hydrology study. At the upstream end of Lemon Creek, station 31+05, the 2,021 cfs flow was added to the model. Refer to Maps 3 and 4 for the existing and proposed HEC-RAS station numbers. At station 23+27, flow from the culvert was added to this section; however, the total flow of 3,255 cfs was used to account for the added on-site flow.

3.1.2 Existing Regional Hydraulics

Map 3, the 50-Year Existing Floodplain, shows the extent of the flooding that occurs in the Lemon Creek reach in the pre-development conditions. All four culverts do not have the capacity to convey the 50-year design flows. The existing 81-inch pipe culvert, at station 26+26 in the Lemon Creek reach, experiences a water surface elevation of 595.3 feet, with approximately 1,460 cfs flowing over the top of the trail. The existing 72-inch pipe culvert at station 22+30 experiences the most flooding in both the pre- and post-development conditions. Major flooding occurs at this point due to the 1,153 cfs entering the Lemon Creek reach from the 81-inch culvert from Lemon Avenue. The top width of the WSE extends from the lower trail on the east side of the creek to the 81-inch concrete pipe culvert from Lemon Avenue. The water surface for the 50-year design flow is 584.5 feet.

The bridge located at station 14+13 includes a 10.25-ft high by 13.5-ft wide arch culvert. A water surface elevation of 579.0 feet at this location is a result of lack of capacity of the bridge to convey the 50-year design flow of 3,255 cfs. The flooded width at this bridge also extends about 150 feet past the east bank due to the low elevations in the open field. The 72-inch pipe culvert at station 11+16 is also undersized and most of the flow overtops this culvert resulting in a water surface elevation of 573.2 feet.

The existing double 10'x5' box culvert under La Puente road is undersized for 50-year design flows and does not have the capacity to convey the entire 3,255 cfs flow through the culvert. The lack of capacity means that water will pond upstream of the road until it reaches an elevation in which it will flow over the road as weir flow. In order to determine the controlling water surface elevation at the La Puente Road culvert, hydraulic calculations had to be performed for surface overflow and culvert flow simultaneously for the road crossing. This analysis was performed using an iterative approach of culvert (inlet control) hydraulics via WSPGW and Bentley FlowMaster. The system was set up in WSPGW initially from the HEC-RAS cross section at station 11+02, to the outlet of the double 7'x8' box culvert downstream. Refer to Appendix D for P.M. No. 14987 plans of the downstream box culvert. A FlowMaster model using a Broad Crested Weir was set up for the surface flows. A weir elevation of 571.5 feet was used and crest lengths of 400 and 300 feet used for the pre- and post-development conditions respectively.

Since these two programs are not linked, flow combinations were evaluated (totaling the 50-year design flow) until both water surface elevations matched. For example, at a specific flow rate, the max HGL was found in WSPGW at the headworks of the culvert. The remainder of the 50-year flow was then modeled in FlowMaster over the road surface (above the culvert). If the max resulting FlowMaster HGL was higher than the WSPGW HGL, then more flow had to be added to the WSPGW model, or vice versa. This iterative approach of adding and/or subtracting flows from the WSPGW model was performed until the two model HGLs matched. This indicates that the appropriate flow and hydraulic head was utilized for the WSPGW and FlowMaster models. Consequently, the capacity of the existing La Puente culvert and the water surface elevation for the HEC-RAS model, for the 50-year design storm was found. The culvert capacity of the double 5'x10' box was 2,000 cfs and the starting water surface elevation for the existing condition HEC-RAS model is 572.5 feet.

Refer to Appendix C for all WSPGW, HEC-RAS, and FlowMaster input and output data.

3.1.3 Proposed Regional Hydraulics

To determine the starting water surface elevation in the proposed condition, the same process with WSPGW and FlowMaster was utilized. The crest length was reduced to 300 feet as the Post Development conditions and proposed lots would constrict the overflow on the road by about 100 feet in comparison to the Pre Development condition. The resulting water surface elevation was 572.75 feet, 3 inches above the Post Development elevation. The water conveyed through the culvert measured 2,025 cfs, slightly higher than the existing condition.

At station 26+61, the existing 81-inch RCP will remain in place for the post development condition with a bridge to be built over Lemon Creek just downstream of this culvert and trail crossing. The bridge will span the width of the creek and as a result, will not affect the creek hydraulics upstream of station 23+27 as compared to the existing condition. Flooding in the post development condition will not have any effect on the proposed grading along the banks of the creek. Flooding along the east bank of the Lemon Creek was a concern at the bridge/culverts located at station 14+13 and 11+16. The low elevation of the east bank in the pre development condition resulted in major flooding towards San Vicente Drive and overtopping of both trail crossings. In order to address the issue, the downstream culvert at 11+31 will be removed so the channel does not experience a constriction. In addition, the trail across the bridge at 14+26 will be graded in such a way to act as a small levee to keep water from entering the proposed road. The result of these improvements yields a water surface elevation at the bridge of 578.2 feet.

Downstream of the bridge, the water surface at station 11+51 is 573.2 feet. Flooding in this area is a result of the undersized culvert at La Puente Road. The ponding depth at the bridge does not allow water to be conveyed efficiently through these sections. The flood waters will inundate the water quality control basin and proposed road. However, the proposed pad elevations on Lots 34, 35, 36, and 37 are above the water surface elevation. The pad elevation of Lot 34 is 577 feet, about 4.5 feet above the water surface elevation at station 12+58 which measured 572.5 feet. Lot 37 has an elevation of 574 feet, 1.25 feet above overflow water surface elevation which is 572.75 feet.

3.1.4 Existing Local Hydraulics

Existing on-site infrastructure includes 24-inch, 18-inch, and 33-inch storm drain pipes. No as-built plans were available for the systems. Flow through these pipes is strictly from off-site flows as no on-site catch basins are present. The 24 inch pipe receives flow from 3 catch basins located at the intersection of Colt Lane and Meadow Pass Road. Hydraulic calculations were not analyzed for this pipe as no on-site flow will be added to the system. The discharge point for this pipe is located at station 29+40 on the Lemon Creek reach. The 18 inch and 33 inch pipes receive flow from catch basins located on Meadow Pass Road. The two pipes join at a confluence and discharge into Lemon Creek at station 24+46. Refer to Map 1 for the location of the existing storm drain lines and Map3, for the existing HEC-RAS stations.

Bentley's Flow Master has been used to perform a full flow capacity computation for the existing storm drain lines capacities. A slope of 2% was assumed and the peak 25-year design flow rates analyzed. The full flow capacity of the existing 18-inch and 33-inch RCPs is 14.9 and 74.8 cfs respectively. The capacity of 18-inch RCP exceeds the 8.3 cfs entering from Subarea 5B. The existing capacity of the 33-inch RCP exceeds the 14.9 cfs from Subarea 6B upstream of the pipe confluence and the 23.2 cfs from the addition of flow from both Subarea 5B and 6B.

Refer to Appendix C for all FlowMaster input and output data.

3.1.5 Proposed Local Hydraulics

The proposed storm drain lines have been designed to convey the 25-year design flows to Lemon Creek. Refer to Map 2 for the location of the proposed storm drain lines. To convey flow from Subarea 2B to Subarea 3B in the post-development condition, a 21-inch pipe is proposed. The full flow capacity of the 21-inch RCP is 22.4 cfs, which exceeds the 11.2 cfs flow entering from Subarea 2B during a 25-year storm event. To convey flow from Subarea 5B to the mainline 33-inch RCP, an 18-inch pipe is proposed which has a capacity of 14.9 cfs. The flow produced from Subarea 5B is 9.1 cfs, below the 18-inch pipe's full flow capacity.

The proposed 33-inch RCP has a capacity of 74.8 cfs. In the post-development condition, the flow at the confluence of the proposed 18-inch and 33-inch RCPs is 23.6 cfs. This flow was determined by the adding the peak flows of Subarea 5B and 6B. At the discharge location of the 33-inch pipe into Lemon Creek the flow measures 52.3 cfs. This discharge flow is the addition of all peak flows from Subareas 2B, 3B, 5B, and 6B.

All proposed on-site inlets and storm drains will be sized to comply with Los Angeles County Department of Public Works drainage design criteria.

4 CONCLUSIONS

The proposed project will not adversely impact the hydrologic and hydraulic properties of the site and tributary area. The proposed project will increase the 50-year total discharge to the existing La Puente Road culvert by 1 cfs, compared to pre-development conditions. Per P.M. No. 14987 storm drain improvement plans, the off-site system was designed to accommodate a 25-year 1,750-cfs flow rate from the upstream reach of Lemon Creek.

The post-development conditions by La Puente Road will increase the weir flow of water across the road by a small amount. The change in water surface elevation at the road increases from 572.5 feet to 572.75 feet, an increase of 3 inches. This change is a result of the higher elevations at the proposed road and building pads which cause a slight constriction of the flooded width outside of the existing stream banks. Approximately 2,025 cfs will be conveyed through the existing culvert, while the remaining 1,230 cfs will flow over La Puente Road at a depth of about 1.25 feet.

The proposed hydromodification basins seen in Map 2 are anticipated to provide some level of peak flow attenuation and have not been accounted for at this discretionary stage. Addressing the stream stability of Lemon Creek was outside of the scope of this preliminary tentative map study and should be addressed during final engineering.

5 REFERENCES

Reference 1

Los Angeles County Department of Public Works (LACDPW) Hydrology Manual (January 2006)

Reference 2

LACDPW Publications Hydrology Map GIS http://ladpw.org/wrd/hydrologygis/

Reference 3

LACDPW Publications Modified Rational Method Hydrology Support Files: Soil Types http://ladpw.org/wrd/Publication/index.cfm

Reference 4

LACDPW Publications Modified Rational Method Hydrology Support Files: Land Use 2005 http://ladpw.org/wrd/Publication/index.cfm



INTERNATIONAL
14725 Alton Parkway, Irvine, CA 92618
Phone: (949) 472-3505 · MBAKERINTL.COM

MAP 1
CITY OF WALNUT
EXISTING CONDITION
HYDROLOGIC WORK MAP



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MAP 2
CITY OF WALNUT
PROPOSED CONDITION
HYDROLOGIC WORK MAP



LEGEND

50-YEAR FLOODPLAIN HEC-RAS CROSS SECTION FLOW PATH

HEC-RAS STATION AND WATER SURFACE ELEV.



INTERNATIONAL

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EXISTING CONDITION

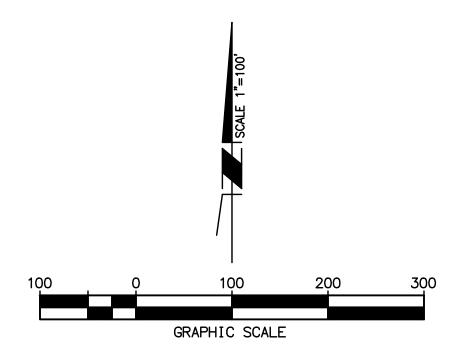
MAP 3 **CITY OF WALNUT 50-YEAR FLOODPLAIN**

GRAPHIC SCALE

LEGEND

50-YEAR FLOODPLAIN
HEC-RAS CROSS SECTION
FLOW PATH

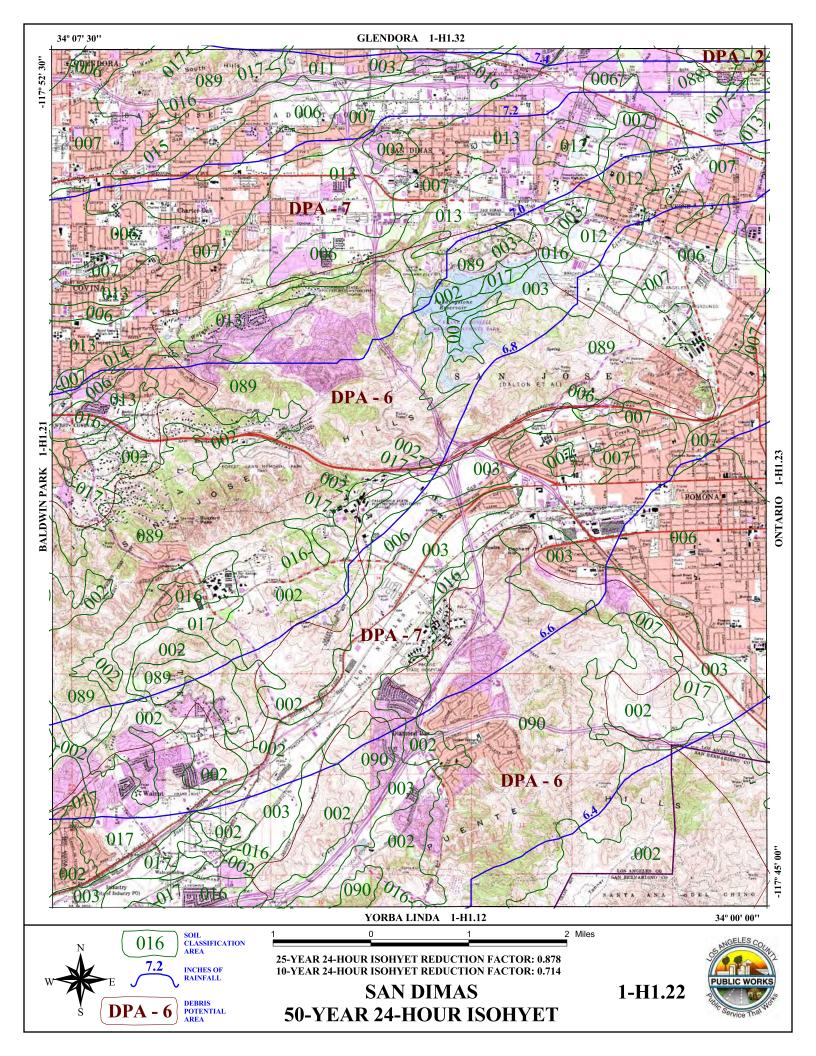
10+00 572.0 HEC-RAS STATION AND WATER SURFACE ELEV.





Appendix A: Project Information

• San Dimas 50-Year 24-Hour Isohyet and Soil Classification



Appendix B: HydroCalc Hydrology

Pre-Development

- 25-YR
- 50-YR

Post-Development

- 25-YR
- 50-YR

Pre-Development HydoCalc

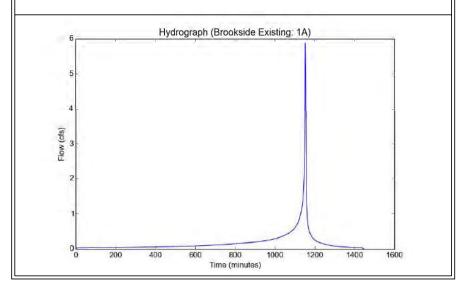
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Input Parameters

Project Name	Brookside Existing
Subarea ID	1A
Area (ac)	1.87
Flow Path Length (ft)	623.8
Flow Path Slope (vft/hft)	0.128246233
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	3.5097 0.896
Undeveloped Runoff Coefficient (Cu)	
Developed Runoff Coefficient (Cd)	0.896
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.8807
Burned Peak Flow Rate (cfs)	5.8807
24-Hr Clear Runoff Volume (ac-ft)	0.3705
24-Hr Clear Runoff Volume (cu-ft)	16137.0701



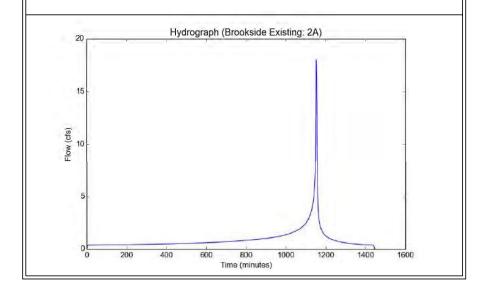
Peak Flow Hydrologic Analysis

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Input Parameters

Project Name	Brookside Existing
Subarea ID	2A
Area (ac)	6.26
Flow Path Length (ft)	739.9
Flow Path Slope (vft/hft)	0.075685904
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.42
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	3.2215
Undeveloped Runoff Coefficient (Cu)	0.889
Developed Runoff Coefficient (Cd)	0.8936
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	18.0214
Burned Peak Flow Rate (cfs)	18.0214
24-Hr Clear Runoff Volume (ac-ft)	1.8608
24-Hr Clear Runoff Volume (cu-ft)	81056.8005



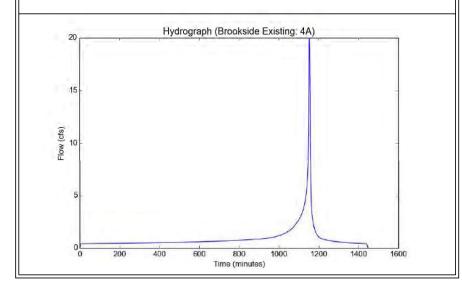
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Input Parameters

Project Name	Brookside Existing
Subarea ID	4A
Area (ac)	7.45
Flow Path Length (ft)	949.3
Flow Path Slope (vft/hft)	0.067418098
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.42
Soil Type	17
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.9963
Undeveloped Runoff Coefficient (Cu)	0.8924
Developed Runoff Coefficient (Cd)	0.8956
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	19.9921
Burned Peak Flow Ratè (cfs)	19.9921
24-Hr Clear Runoff Volume (ac-ft)	1.9036
24-Hr Clear Runoff Volume (cu-ft)	82919.2725



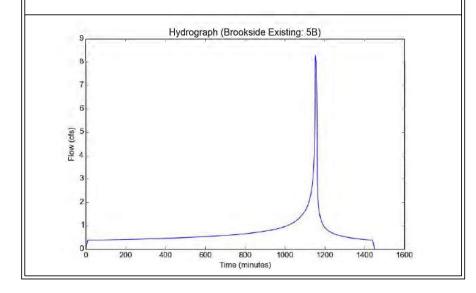
Peak Flow Hydrologic Analysis

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Input Parameters

Project Name	Brookside Existing
Subarea ID	5B
Area (ac)	3.81
Flow Path Length (ft)	1009.4
Flow Path Slope (vft/hft)	0.023776501
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.82
Soil Type	89
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Modeled (25-yr) Rainfall Depth (in)	5.8826	
Peak Intensity (in/hr)	2.5339	
Undeveloped Runoff Coefficient (Cu)	0.6807	
Developed Runoff Coefficient (Cd)	0.8605	
Time of Concentration (min)	10.0	
Clear Peak Flow Rate (cfs)	8.3077	
Burned Peak Flow Rate (cfs)	8.3077	
24-Hr Clear Runoff Volume (ac-ft)	1.4321	
24-Hr Clear Runoff Volume (cu-ft)	62382.423	



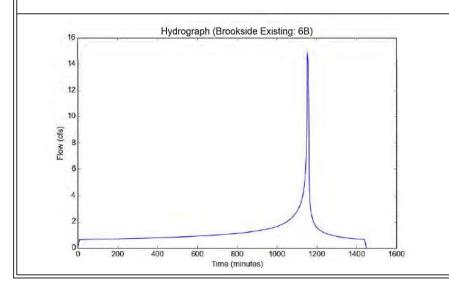
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Input Parameters

Project Name	Brookside Existing
Subarea ID	6B
Area (ac)	6.49
Flow Path Length (ft)	1255.8
Flow Path Slope (vft/hft)	0.070871158
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.82
Soil Type	89
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

5.8826
2.6625
0.6879
0.8618
9.0
14.8921
14.8921
2.4395
106265.745



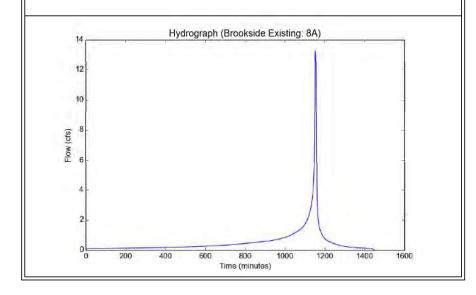
Peak Flow Hydrologic Analysis

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Input Parameters

Project Name	Brookside Existing
Subarea ID	8A
Area (ac)	5.39
Flow Path Length (ft)	1116.4
Flow Path Slope (vft/hft)	0.083751344
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

•	
Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.8141
Undeveloped Runoff Coefficient (Cu)	0.8754
Developed Runoff Coefficient (Cd)	0.8757
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	13.2824
Burned Peak Flow Rate (cfs)	13.2824
24-Hr Clear Runoff Volume (ac-ft)	1.0671
24-Hr Clear Runoff Volume (cu-ft)	46483.9761



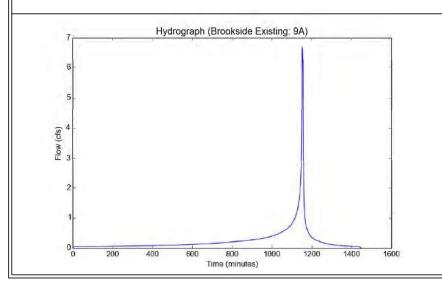
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Input Parameters

Project Name	Brookside Existing
Subarea ID	9A
Area (ac)	2.53
Flow Path Length (ft)	912.2
Flow Path Slope (vft/hft)	0.060293795
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

5.8826 2.9963
0.8835
0.8837
7.0
6.6989
6.6989
0.501
21825.6526



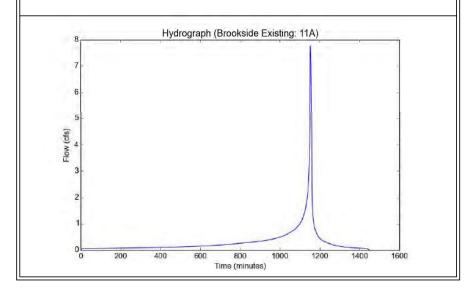
Peak Flow Hydrologic Analysis

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Input Parameters

Project Name	Brookside Existing
Subarea ID	11A
Area (ac)	3.15
Flow Path Length (ft)	890.9
Flow Path Slope (vft/hft)	0.040408576
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.8141
Undeveloped Runoff Coefficient (Cu)	0.8754
Developed Runoff Coefficient (Cd)	0.8757
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	7.7625
Burned Peak Flow Rate (cfs)	7.7625
24-Hr Clear Runoff Volume (ac-ft)	0.6236
24-Hr Clear Runoff Volume (cu-ft)	27165.9601
` ,	



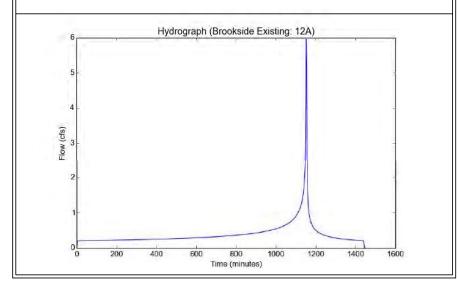
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Input Parameters

Project Name	Brookside Existing
Subarea ID	12A
Area (ac)	1.89
Flow Path Length (ft)	508.8
Flow Path Slope (vft/hft)	0.074685535
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.91
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in) Peak Intensity (in/hr)	5.8826 3.5097
Undeveloped Runoff Coefficient (Cu)	0.896
Developed Runoff Coefficient (Cd)	0.8996
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.9676
Burned Peak Flow Rate (cfs)	5.9676
24-Hr Clear Runoff Volume (ac-ft)	0.7858
24-Hr Clear Runoff Volume (cu-ft)	34230.606



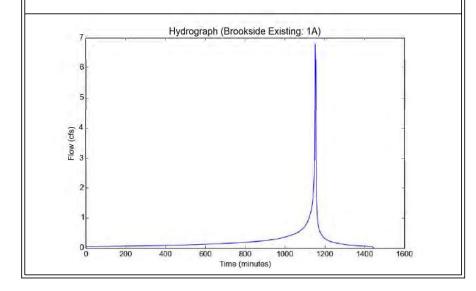
Peak Flow Hydrologic Analysis

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Input Parameters

Project Name	Brookside Existing
Subarea ID	1A
Area (ac)	1.87
Flow Path Length (ft)	623.8
Flow Path Slope (vft/hft)	0.128246233
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Modeled (50-yr) Rainfall Depth (in)	6.7	
Peak Intensity (in/hr)	3.9974	
Undeveloped Runoff Coefficient (Cu)	0.9078	
Developed Runoff Coefficient (Cd)	0.9077	
Time of Concentration (min)	5.0	
Clear Peak Flow Rate (cfs)	6.785	
Burned Peak Flow Rate (cfs)	6.785	
24-Hr Clear Runoff Volume (ac-ft)	0.4638	
24-Hr Clear Runoff Volume (cu-ft)	20201.5437	
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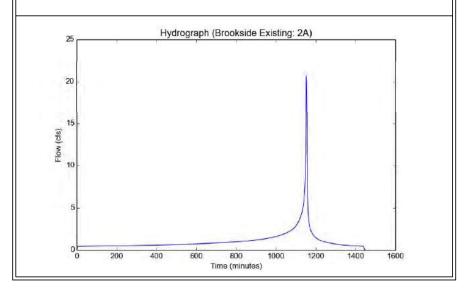
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Input Parameters

Project Name	Brookside Existing
Subarea ID	2A
Area (ac)	6.26
Flow Path Length (ft)	739.9
Flow Path Slope (vft/hft)	0.075685904
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.42
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.6691
Undeveloped Runoff Coefficient (Cu)	0.8998
Developed Runoff Coefficient (Cd)	0.8999
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	20.6696
Burned Peak Flow Rate (cfs)	20.6696
24-Hr Clear Runoff Volume (ac-ft)	2.2013
24-Hr Clear Runoff Volume (cu-ft)	95890.2902



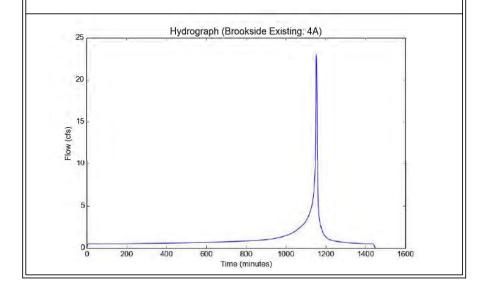
Peak Flow Hydrologic Analysis

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Input Parameters

Brookside Existing
4A
7.45
949.3
0.067418098
6.7
0.42
17
50-yr
0
False

Modeled (50-yr) Rainfall Depth (in)	6.7	
Peak Intensity (in/hr)	3.4127	
Undeveloped Runoff Coefficient (Cu)	0.9084	
Developed Runoff Coefficient (Cd)	0.9048	
Time of Concentration (min)	7.0	
Clear Peak Flow Rate (cfs)	23.0054	
Burned Peak Flow Rate (cfs)	23.0054	
24-Hr Clear Runoff Volume (ac-ft)	2.2268	
24-Hr Clear Runoff Volume (cu-ft)	96998.32	
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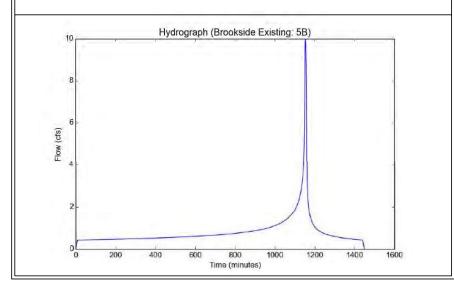
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Input Parameters

Project Name	Brookside Existing
Subarea ID	5B
Area (ac)	3.81
Flow Path Length (ft)	1009.4
Flow Path Slope (vft/hft)	0.023776501
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.82
Soil Type	89
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

6.7
3.0325
0.7081
0.8655
9.0
9.9994
9.9994
1.637
71307.1908



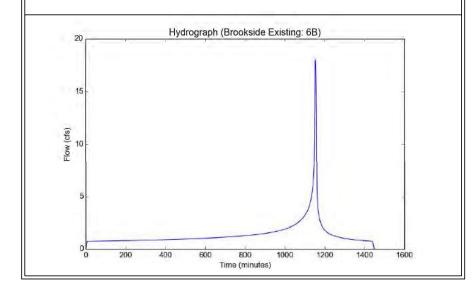
Peak Flow Hydrologic Analysis

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Input Parameters

Project Name	Brookside Existing
Subarea ID	6B
Area (ac)	6.49
Flow Path Length (ft)	1255.8
Flow Path Slope (vft/hft)	0.070871158
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.82
Soil Type	89
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.2051
Undeveloped Runoff Coefficient (Cu)	0.7155
Developed Runoff Coefficient (Cd)	0.8668
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	18.03
Burned Peak Flow Rate (cfs)	18.03
24-Hr Clear Runoff Volume (ac-ft)	2.7885
24-Hr Clear Runoff Volume (cu-ft)	121468.4812
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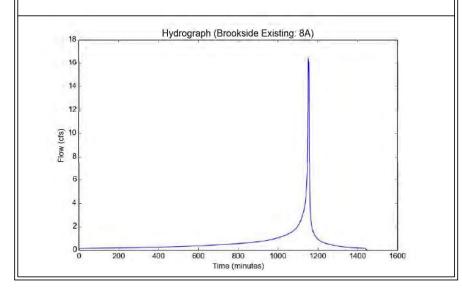
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Input Parameters

Project Name	Brookside Existing
Subarea ID	8A
Area (ac)	5.39
Flow Path Length (ft)	1116.4
Flow Path Slope (vft/hft)	0.083751344
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

.7
.4127
.8936
.8937
.0
6.4391
6.4391
.3363
8208.6293



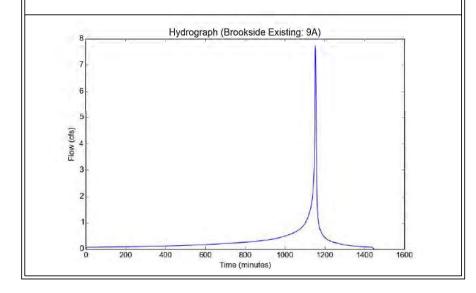
Peak Flow Hydrologic Analysis

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Input Parameters

Project Name	Brookside Existing
Subarea ID	9A
Area (ac)	2.53
Flow Path Length (ft)	912.2
Flow Path Slope (vft/hft)	0.060293795
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.4127
Undeveloped Runoff Coefficient (Cu)	0.8936
Developed Runoff Coefficient (Cd)	0.8937
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	7.7163
Burned Peak Flow Rate (cfs)	7.7163
24-Hr Clear Runoff Volume (ac-ft)	0.6272
24-Hr Clear Runoff Volume (cu-ft)	27322.4178
` '	



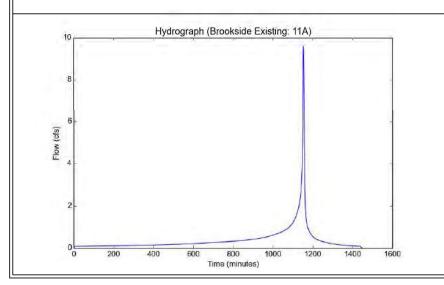
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Input Parameters

Project Name	Brookside Existing
Subarea ID	11A
Area (ac)	3.15
Flow Path Length (ft)	890.9
Flow Path Slope (vft/hft)	0.040408576
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

6.7
3.4127
0.8936
0.8937
7.0
9.6073
9.6073
0.7809
34018.0301



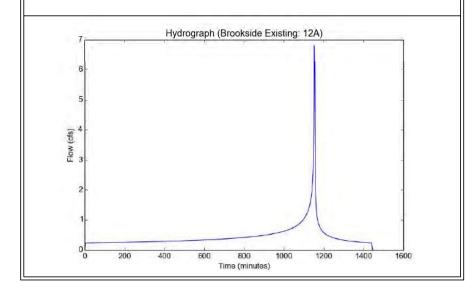
Peak Flow Hydrologic Analysis

 $\label{prop:likelihood} File \ location: H:\ /pdata/137644/\ Calcs/Strmwater/\ Hydrology/\ Hydro\ Calc\ Results/\ Brookside\ Existing\ Report.\ pdf\ Version: Hydro\ Calc\ 0.2.0-beta$

Input Parameters

Project Name	Brookside Existing
Subarea ID	12A
Area (ac)	1.89
Flow Path Length (ft)	508.8
Flow Path Slope (vft/hft)	0.074685535
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.91
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.9974
Undeveloped Runoff Coefficient (Cu)	0.9078
Developed Runoff Coefficient (Cd)	0.9007
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.8049
Burned Peak Flow Rate (cfs)	6.8049
24-Hr Clear Runoff Volume (ac-ft)	0.8989
24-Hr Clear Runoff Volume (cu-ft)	39154.4483
` ,	



Post-Development HydroCalc

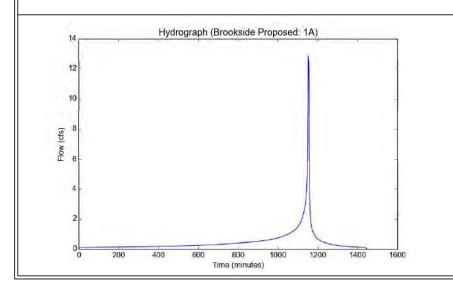
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Input Parameters

Project Name	Brookside Proposed
Subarea ID	1A
Area (ac)	4.49
Flow Path Length (ft)	727.0
Flow Path Slope (vft/hft)	0.11
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.07
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

- u.p.u	
Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	3.2215
Undeveloped Runoff Coefficient (Cu)	0.889
Developed Runoff Coefficient (Cd)	0.8898
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	12.8703
Burned Peak Flow Rate (cfs)	12.8703
24-Hr Clear Runoff Volume (ac-ft)	0.9545
24-Hr Clear Runoff Volume (cu-ft)	41579.8256



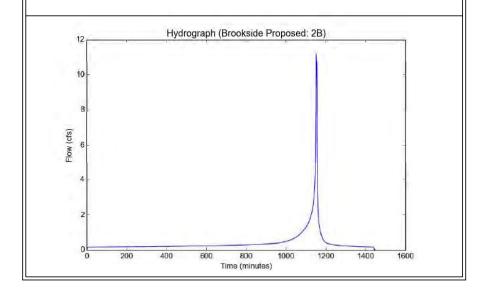
Peak Flow Hydrologic Analysis

 $\label{proposed} File \ location: Ht/pdata/137644/Calcs/Strmwater/Hydrology/HydroCalc\ Results/Brookside\ Proposed\ Report.pdf\ Version: HydroCalc\ 0.2.0-beta$

Input Parameters

Project Name	Brookside Proposed
Subarea ID	2B
Area (ac)	3.85
Flow Path Length (ft)	578.0
Flow Path Slope (vft/hft)	0.045
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.301
Soil Type	17
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	3.2215
Undeveloped Runoff Coefficient (Cu)	0.901
Developed Runoff Coefficient (Cd)	0.9007
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	11.1714
Burned Peak Flow Rate (cfs)	11.1714
24-Hr Clear Runoff Volume (ac-ft)	0.84
24-Hr Clear Runoff Volume (cu-ft)	36590.4413
` ,	



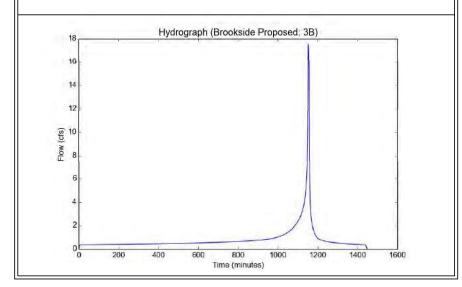
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Input Parameters

Project Name	Brookside Proposed
Subarea ID	3B
Area (ac)	6.54
Flow Path Length (ft)	820.0
Flow Path Slope (vft/hft)	0.0433
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.42
Soil Type	17
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

- arpar recourse	
Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.9963
Undeveloped Runoff Coefficient (Cu)	0.8924
Developed Runoff Coefficient (Cd)	0.8956
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	17.5501
Burned Peak Flow Rate (cfs)	17.5501
24-Hr Clear Runoff Volume (ac-ft)	1.671
24-Hr Clear Runoff Volume (cu-ft)	72790.8781



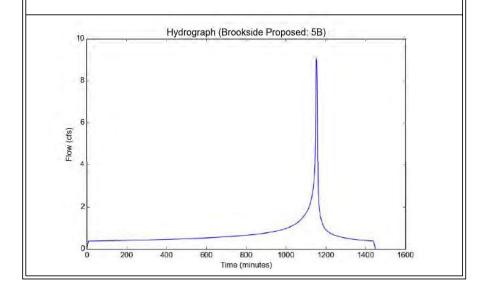
Peak Flow Hydrologic Analysis

 $\label{proposed} File \ location: Ht/pdata/137644/Calcs/Strmwater/Hydrology/HydroCalc\ Results/Brookside\ Proposed\ Report.pdf\ Version: HydroCalc\ 0.2.0-beta$

Input Parameters

Project Name	Brookside Proposed
Subarea ID	5B
Area (ac)	3.81
Flow Path Length (ft)	1009.0
Flow Path Slope (vft/hft)	0.0238
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.82
Soil Type	17
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.6625
Undeveloped Runoff Coefficient (Cu)	0.8796
Developed Runoff Coefficient (Cd)	0.8963
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	9.0926
Burned Peak Flow Rate (cfs)	9.0926
24-Hr Clear Runoff Volume (ac-ft)	1.4518
24-Hr Clear Runoff Volume (cu-ft)	63240.6667
· ,	



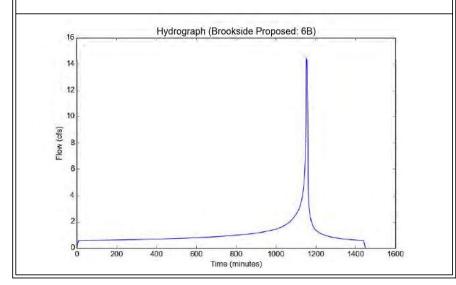
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Input Parameters

Project Name	Brookside Proposed
Subarea ID	6B
Area (ac)	6.49
Flow Path Length (ft)	1256.0
Flow Path Slope (vft/hft)	0.0693
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.7
Soil Type	89
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.6625
Undeveloped Runoff Coefficient (Cu)	0.6879
Developed Runoff Coefficient (Cd)	0.8364
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	14.4523
Burned Peak Flow Rate (cfs)	14.4523
24-Hr Clear Runoff Volume (ac-ft)	2.1727
24-Hr Clear Runoff Volume (cu-ft)	94644.8512



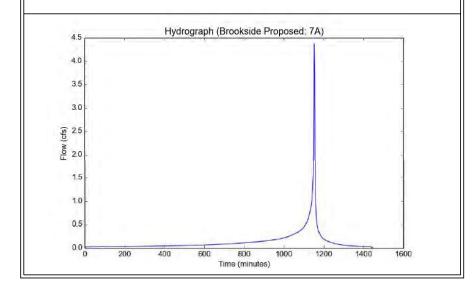
Peak Flow Hydrologic Analysis

 $\label{prop:section} File \ location: H:/pdata/137644/Calcs/Strmwater/Hydrology/HydroCalc\ Results/Brookside\ Proposed\ Report.pdf\ Version: HydroCalc\ 0.2.0-beta$

Input Parameters

Project Name	Brookside Proposed
Subarea ID	7A
Area (ac)	1.39
Flow Path Length (ft)	400.0
Flow Path Slope (vft/hft)	0.1
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	3.5097
Undeveloped Runoff Coefficient (Cu)	0.896
Developed Runoff Coefficient (Cd)	0.896
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.3712
Burned Peak Flow Rate (cfs)	4.3712
24-Hr Clear Runoff Volume (ac-ft)	0.2754
24-Hr Clear Runoff Volume (cu-ft)	11994.9345



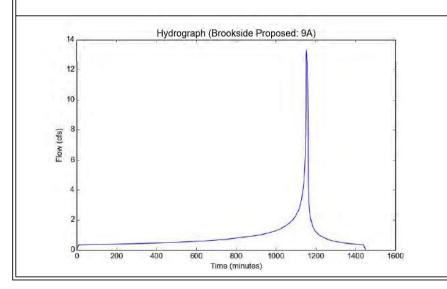
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Input Parameters

Project Name	Brookside Proposed
Subarea ID	9A
Area (ac)	5.98
Flow Path Length (ft)	1310.0
Flow Path Slope (vft/hft)	0.046
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.42
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

5.8826
2.5339
0.8631
0.8786
10.0
13.3128
13.3128
1.7769
77403.4785



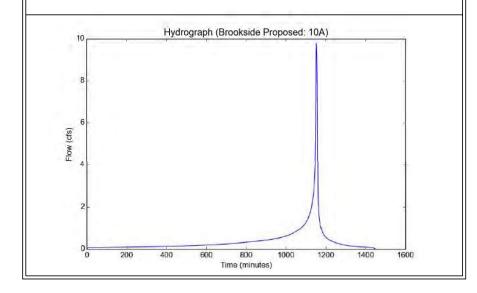
Peak Flow Hydrologic Analysis

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Input Parameters

Brookside Proposed
10A
3.97
920.0
0.06
6.7
0.01
2
25-yr
0
False

Modeled (25-yr) Rainfall Depth (in)	5.8826
Peak Intensity (in/hr)	2.8141
Undeveloped Runoff Coefficient (Cu)	0.8754
Developed Runoff Coefficient (Cd)	0.8757
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	9.7832
Burned Peak Flow Rate (cfs)	9.7832
24-Hr Clear Runoff Volume (ac-ft)	0.786
24-Hr Clear Runoff Volume (cu-ft)	34237.7338
` ,	



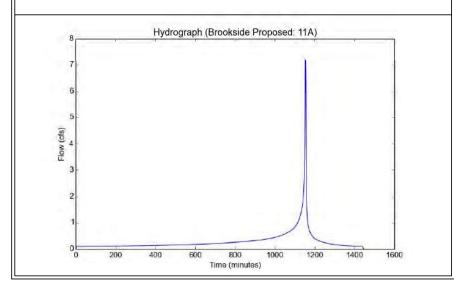
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Input Parameters

Project Name	Brookside Proposed
Subarea ID	11A
Area (ac)	2.29
Flow Path Length (ft)	533.0
Flow Path Slope (vft/hft)	0.0713
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.26
Soil Type	2
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in) Peak Intensity (in/hr)	5.8826 3.5097
Undeveloped Runoff Coefficient (Cu)	0.896
Developed Runoff Coefficient (Cd)	0.897
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.2096
Burned Peak Flow Rate (cfs)	7.2096
24-Hr Clear Runoff Volume (ac-ft)	0.5921
24-Hr Clear Runoff Volume (cu-ft)	25793.0332



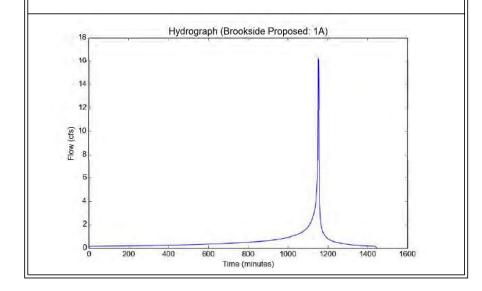
Peak Flow Hydrologic Analysis

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Input Parameters

Project Name	Brookside Proposed
Subarea ID	1A
Area (ac)	4.49
Flow Path Length (ft)	727.0
Flow Path Slope (vft/hft)	0.11
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.07
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False
	0 False

O diput i toodito	
Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.9974
Undeveloped Runoff Coefficient (Cu)	0.9078
Developed Runoff Coefficient (Cd)	0.9072
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	16.283
Burned Peak Flow Rate (cfs)	16.283
24-Hr Clear Runoff Volume (ac-ft)	1.1817
24-Hr Clear Runoff Volume (cu-ft)	51472.8041



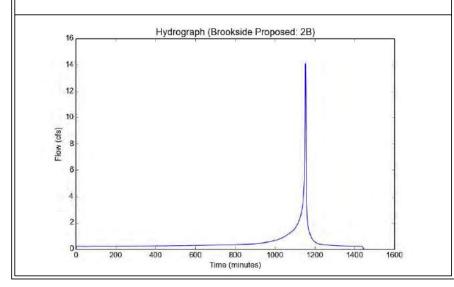
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Input Parameters

Project Name	Brookside Proposed
Subarea ID	2B
Area (ac)	3.85
Flow Path Length (ft)	578.0
Flow Path Slope (vft/hft)	0.045
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.301
Soil Type	17
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

6.7
3.9974
0.9217
0.9152
5.0
14.0847
14.0847
0.9933
43268.7323



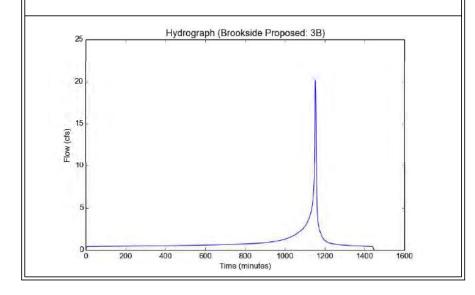
Peak Flow Hydrologic Analysis

 $\label{proposed} File \ location: Ht/pdata/137644/Calcs/Strmwater/Hydrology/HydroCalc\ Results/Brookside\ Proposed\ Report.pdf\ Version: HydroCalc\ 0.2.0-beta$

Input Parameters

Project Name	Brookside Proposed
Subarea ID	3B
Area (ac)	6.54
Flow Path Length (ft)	820.0
Flow Path Slope (vft/hft)	0.0433
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.42
Soil Type	17
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.4127
Undeveloped Runoff Coefficient (Cu)	0.9084
Developed Runoff Coefficient (Cd)	0.9048
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	20.1953
Burned Peak Flow Rate (cfs)	20.1953
24-Hr Clear Runoff Volume (ac-ft)	1.9548
24-Hr Clear Runoff Volume (cu-ft)	85150.2031
Time of Concentration (min) Clear Peak Flow Rate (cfs) Burned Peak Flow Rate (cfs) 24-Hr Clear Runoff Volume (ac-ft)	7.0 20.1953 20.1953 1.9548



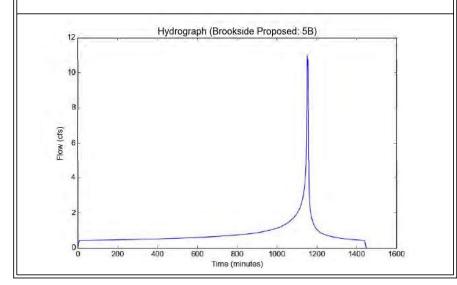
 $\label{prop:linear} File \ location: Ht/pdata/137644/Calcs/Strmwater/Hydrology/HydroCalc \ Results/Brookside \ Proposed \ Report.pdf \ Version: HydroCalc \ 0.2.0-beta$

Input Parameters

Project Name	Brookside Proposed
Subarea ID	5B
Area (ac)	3.81
Flow Path Length (ft)	1009.0
Flow Path Slope (vft/hft)	0.0238
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.82
Soil Type	17
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

6.7
3.2051
0.9004
0.9001
8.0
10.9912
10.9912
1.6628
72433.3835



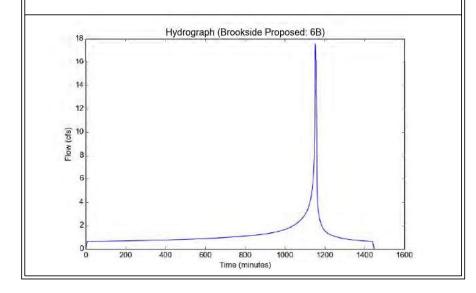
Peak Flow Hydrologic Analysis

 $\label{prop:section} File \ location: H:/pdata/137644/Calcs/Strmwater/Hydrology/HydroCalc\ Results/Brookside\ Proposed\ Report.pdf\ Version: HydroCalc\ 0.2.0-beta$

Input Parameters

Project Name	Brookside Proposed
Subarea ID	6B
Area (ac)	6.49
Flow Path Length (ft)	1256.0
Flow Path Slope (vft/hft)	0.0693
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.7
Soil Type	89
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.2051
Undeveloped Runoff Coefficient (Cu)	0.7155
Developed Runoff Coefficient (Cd)	0.8446
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	17.5694
Burned Peak Flow Rate (cfs)	17.5694
24-Hr Clear Runoff Volume (ac-ft)	2.4914
24-Hr Clear Runoff Volume (cu-ft)	108524.1132
Developed Runoff Coefficient (Cd) Time of Concentration (min) Clear Peak Flow Rate (cfs) Burned Peak Flow Rate (cfs) 24-Hr Clear Runoff Volume (ac-ft)	0.8446 8.0 17.5694 17.5694 2.4914



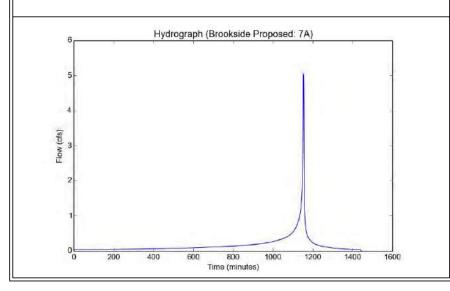
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Input Parameters

Project Name	Brookside Proposed
Subarea ID	7A
Area (ac)	1.39
Flow Path Length (ft)	400.0
Flow Path Slope (vft/hft)	0.1
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.9974
Undeveloped Runoff Coefficient (Cu)	0.9078
Developed Runoff Coefficient (Cd)	0.9077
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.0434
Burned Peak Flow Rate (cfs)	5.0434
24-Hr Clear Runoff Volume (ac-ft)	0.3447
24-Hr Clear Runoff Volume (cu-ft)	15016.1207



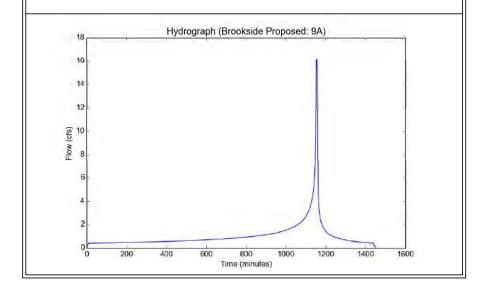
Peak Flow Hydrologic Analysis

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Input Parameters

Brookside Proposed
9A
5.98
1310.0
0.046
6.7
0.42
2
50-yr
0
False

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.0325
Undeveloped Runoff Coefficient (Cu)	0.8845
Developed Runoff Coefficient (Cd)	0.891
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	16.1574
Burned Peak Flow Rate (cfs)	16.1574
24-Hr Clear Runoff Volume (ac-ft)	2.1025
24-Hr Clear Runoff Volume (cu-ft)	91586.0885
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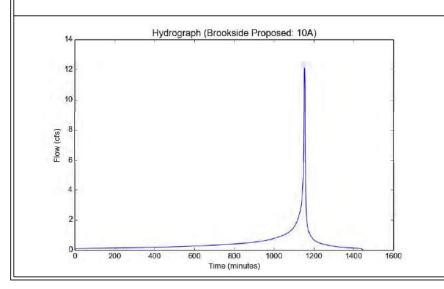
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Input Parameters

Project Name	Brookside Proposed
Subarea ID	10A
Area (ac)	3.97
Flow Path Length (ft)	920.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.01
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.4127
Undeveloped Runoff Coefficient (Cu)	0.8936
Developed Runoff Coefficient (Cd)	0.8937
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	12.1082
Burned Peak Flow Rate (cfs)	12.1082
24-Hr Clear Runoff Volume (ac-ft)	0.9842
24-Hr Clear Runoff Volume (cu-ft)	42873.5173
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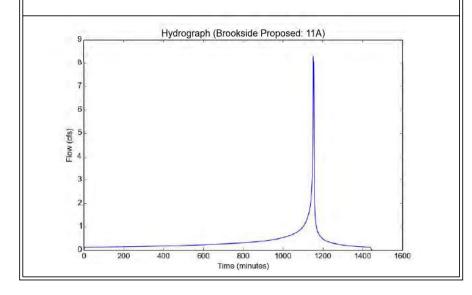
Peak Flow Hydrologic Analysis

 $\label{proposed} File \ location: Ht/pdata/137644/Calcs/Strmwater/Hydrology/HydroCalc\ Results/Brookside\ Proposed\ Report.pdf\ Version: HydroCalc\ 0.2.0-beta$

Input Parameters

Project Name	Brookside Proposed
Subarea ID	11A
Area (ac)	2.29
Flow Path Length (ft)	533.0
Flow Path Slope (vft/hft)	0.0713
50-yr Rainfall Depth (in)	6.7
Percent Impervious	0.26
Soil Type	2
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Modeled (50-yr) Rainfall Depth (in)	6.7
Peak Intensity (in/hr)	3.9974
Undeveloped Runoff Coefficient (Cu)	0.9078
Developed Runoff Coefficient (Cd)	0.9057
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.2912
Burned Peak Flow Rate (cfs)	8.2912
24-Hr Clear Runoff Volume (ac-ft)	0.7127
24-Hr Clear Runoff Volume (cu-ft)	31044.9875
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Appendix C: HEC-RAS Input and Output Data

- WSPGW Input and Output
- Existing HEC-RAS Output
- Proposed HEC-RAS Output
- FlowMaster Worksheets

$W \subseteq U \subseteq W \subseteq $
FILE: LC-EX.WSW W S P G W - EDIT LISTING - Version 14.06 Date: 5- 6-2014 Time: 2:50:53
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1
CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) $\dot{Y}(7)$ Y(8) Y(9) Y(10)
CODE NO TYPE PIER/PIP WIDTH DIAMETER WIDTH DROP
CD 1 3 0 .000 7.000 16.000 .000 .000 .00 CD 2 3 0 .000 5.000 20.000 .000 .000 .00
CD 3 5 0 .000 CD 4 5 0 .000
CD 5 5 0 .000 FILE: W S P G W - EDIT LISTING - Version
14.06 Date: 5- 6-2014 Time: 2:50:53 WATER SURFACE PROFILE - CROSS SECTION POINT
LISTING PAGE 2
CARD SECT NO OF X(1), Y(1) X(2), Y(2) X(3), Y(3) X(4), Y(4) X(5), Y(5) X(6), Y(6) X(7), Y(7)
CODE NO POINTS $X(8)$, $Y(8)$ $X(9)$, $Y(9)$ $X(10)$, $Y(10)$ $X(11)$, $Y(11)$ $X(N)$, $Y(N)$ $X(N+1)$, $Y(N+1)$ $X(35)$, $Y(35)$
PTS 3 12 .000 573.000 21.410 572.970 38.300 572.000 61.790 567.000 70.790 559.810 80.790 559.810 89.790 567.000
PTS 150.500 570.570 164.070 571.050 171.810 570.680 237.200 571.500 310.090 573.050
PTS 4 7 .000 573.000 32.290 567.300 49.210 560.010 60.480
PTS 5 7 .000 573.000 31.530 567.980 47.890 560.630 54.900
560.630 57.860 566.090 124.150 571.590 284.020 574.020 W S P G W
PAGE NO 1 WATER SURFACE PROFILE - TITLE CARD LISTING
HEADING LINE NO 1 IS - Lemon Creek
HEADING LINE NO 2 IS -
HEADING LINE NO 2 IS -
HEADING LINE NO 2 IS - HEADING LINE NO 3 IS -
HEADING LINE NO 3 IS - W S P G W PAGE NO 2
HEADING LINE NO 3 IS - W S P G W PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING ELEMENT NO 1 IS A SYSTEM OUTLET * * *
HEADING LINE NO 3 IS - W S P G W PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING ELEMENT NO 1 IS A SYSTEM OUTLET * * * U/S DATA STATION INVERT SECT
HEADING LINE NO 3 IS - W S P G W PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING ELEMENT NO 1 IS A SYSTEM OUTLET * * * W S ELEV 1110.100 551.410 1 551.410
HEADING LINE NO 3 IS - WSPGW PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING ELEMENT NO 1 IS A SYSTEM OUTLET WS ELEV 110.100 551.410 1 551.410 ELEMENT NO 2 IS A WALL EXIT U/S DATA STATION INVERT SECT
HEADING LINE NO 3 IS - W S P G W PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING ELEMENT NO 1 IS A SYSTEM OUTLET * * W S ELEV 1110.100 551.410 1 ELEMENT NO 2 IS A WALL EXIT U/S DATA STATION INVERT SECT 110.100 551.410 1 ELEMENT NO 3 IS A REACH * *
HEADING LINE NO 3 IS - W S P G W PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING ELEMENT NO 1 IS A SYSTEM OUTLET * * * * W S ELEV 1110.100 551.410 1 551.410 ELEMENT NO 2 IS A WALL EXIT U/S DATA STATION INVERT SECT 1110.100 551.410 1 ELEMENT NO 3 IS A REACH U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
HEADING LINE NO 3 IS - W S P G W PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING ELEMENT NO 1 IS A SYSTEM OUTLET * * * W S ELEV U/S DATA STATION INVERT SECT 1110.100 551.410 1 ELEMENT NO 2 IS A WALL EXIT U/S DATA STATION INVERT SECT 1110.100 551.410 1 ELEMENT NO 3 IS A REACH U/S DATA STATION INVERT SECT 1110.100 551.410 1 ELEMENT NO 3 IS A REACH ANG PT MAN H 1356.890 553.380 1 .013
HEADING LINE NO 3 IS - W S P G W PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING W S P G W W S
HEADING LINE NO 3 IS - W S P G W PAGE NO 2
HEADING LINE NO 3 IS - W S P G W PAGE NO 2
HEADING LINE NO 3 IS - W S P G W PAGE NO 2 WATER SURFACE PROFILE - ELEMENT CARD LISTING W S P G W WATER SURFACE PROFILE - ELEMENT CARD LISTING W S ELEV

.000 .000 ELEMENT NO 6 IS A TRANSITION	1881.590 .000		1	.013
U/S DATA		INVERT	SECT	N
RADIUS ANGLE	1902.640	557.730	2	.013
40.000 -30.152				
ELEMENT NO 7 IS A REACH	*	*	*	
U/S DATA	STATION	INVERT	SECT	N
RADIUS ANGLE	ANG PT			
		558.600	2	.013
	.000			
ELEMENT NO 8 IS A WALL ENT			*	
U/S DATA		INVERT		FP
_	1988.640			. 500
ELEMENT NO 9 IS A TRANSITION		*	*	
U/S DATA	STATION	INVERT	SECT	N
RADIUS ANGLE			_	
200	2008.640	559.810	3	.014
.000 .000			*	
ELEMENT NO 10 IS A TRANSITION				
U/S DATA	STATION	INVERT	SECT	N
RADIUS ANGLE	2070 170	F.CO. 010		0.40
102 120 10 250	20/0.1/0	560.010	4	.040
183.138 19.250	.1.	*	*	
ELEMENT NO 11 IS A TRANSITION			• • • • • • • • • • • • • • • • • • • •	
U/S DATA	STATION	INVERT	SECT	N
RADIUS ANGLE	2000 200	FCO C20	г	040
60.094 19.250	2090.360	560.630	5	.040
60.094 19.250 ELEMENT NO 12 IS A SYSTEM HEAR	DWORKS		*	*
	CTATION	INVERT		
U/S DATA W S ELEV	STATION	TINVERI	SECT	
W 3 ELEV	2000 360	560.630	5	
.000	2030.300	300.030	J	
.000				

Date: 5- 6-2014 Time: 2:50:57

W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373

WATER SURFACE PROFILE LISTING

Lemon Creek

| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height / | Base Wt | No Wth | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | Or I.D. | ZL | Prs/Pip L/Elem |Ch Slope | 7.00 | 16.00 .00 -|-564.59 1110.100 557.105 2000.00 21.95 7.48 7.000 16.000 0 - | --1--1-WALL EXIT .00 5.693 557.103 2000.00 21.96 1110.100 551.410 7.49 564.59 .00 7.00 16.00 7.000 16.000 0 .00 BOX 246.790 .0080 .0072 1.78 5.69 .013 5.815 559.195 2000.00 21.50 7.17 1356.890 553.380 566.37 .23 7.00 7.000 16.000 .00 0 16.00 .0080 .0068 1.05 .00 BOX 154 556 6.04 .013 1511.446 554.612 5.946 560.558 2000.00 21.02 6.86 567.42 .22 7.000 .00 7.00 16.00 16.000 0 186.684 .0080 .0062 1.15 .013 .00 BOX 6.17 1.52 6.236 562.336 2000.00 20.05 7.000 16.000 1698.130 556.100 6.24 568.58 .00 7.00 16.00 .00 0 0 51.416 6.24 -6.363 562.872 2000.00 19.65 5.99 568.86 -|- -| .0051 .43 1749.546 556.509 .00 7.00 16.00 .013 7.000 16.000 .00 0 -|- -|-36 1.37 5.55 - | --1-.0080 .0051 82.908 6.36 .00 .00 BOX --- WARNING - Flow depth near top of box conduit ----7.00 16.00 7.000 16.000 .00 0 .0 1832.454 557.169 -1-- | -49.136 .0080 .00 BOX .00

FILE: LC-EX.WSW

W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373 WATER SURFACE PROFILE LISTING Date: 5- 6-2014 Time: 2:50:57

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Lemon Creek

	****	+++++++++	++++++	+++++++				++++++	****	+++++++
Invert Depth Station Elev (FT)	Elev (CFS		Head	Grd.El.	Elev	Depth	Width	DiaFT	Base Wt or I.D. ZL	
L/Elem Ch Slope ********	i i	i	SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall ZR	
1881.590 557.560 7.000	564.560 2000			569.51			16.00		16.000 .00	0 .0
TRANS STR .0081	·		.0042	.09	7.00	1.19		.013		BOX
		.00 20.00	6.21	569.94	.00	5.00		5.000	20.000 .00	0 .0
86.000 .0101 WALL ENTRANCE	1	1 1		1.04			4.21			BOX
	564.769 2000			570.98	.00		20.00	5.000	20.000 .00	0 .0
TRANS STR .0605	· · · · · · · · · · · · · · · · · · ·	1	.0071	.14	6.17	1.58	ı	.014		BOX
2008.640 559.810 12.728 - - TRANS STR .0033				572.65 					J - J -	0 .0 - TR-OPEN
2070.170 560.010 12.581		.00 3.18	1	572.75	1.35	l	199.37	.040		0 .0
- TRANS STR .0307	-	-				.31		.040	-	IR-OPEN
2090.360 560.630 11.983	572.613 2000	.00 3.34					189.03	' 	5	0 .0

Date: 5- 6-2014 Time: 2:50:57

W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373 WATER SURFACE PROFILE LISTING Lemon Creek

******	*****	*******	*****	******	******	*****	*****	*****	******	******	*****	******	*****	****	***
1	Invert	Depth	Water	Q I	Vel	Vel	Energy	Super	Critical	Flow Top	Height/	Base Wt		No Wt	th
Station		(FT)	Elev -	(CFS) 	(FPS)	Head				Width		or I.D.		Prs/	Pip
L/Elem		- 			1	SF Ave				Norm Dp		 X-Fall		Type	Ch
******	******	******	******	********	******	******	*****	*****	*****	*****	*****	******	****	* * * *	* * *
1110.100	551.410	5.745	557.155	2025.00	22.03	7.54	564.69	.00	7.00	16.00	7.000	16.000	.00	1	. 0
-1														-	• •
WALL EXI	Т														
1110.100	551.410	5.744	557.154	2025.00	22.04	7.54	564.69	.00	7.00	16.00	7.000	16.000	.00	0	.0
- 1														-	
246.790	.0080					.0072	1.78	5.74	1.62	5.60	.013	.00	.00	BOX	
1356.890	553.380	5.865	559.245	2025.00	21.58	7.23	566.48	.23	7.00	16.00	7.000	16.000	.00	0	.0
-														-	
147.348	.0080					.0068	1.01	6.10	1.57	5.60	.013	.00	.00	BOX	
1504.238	554.555	5.986	560.540	2025.00	21.14	6.94	567.48	.22	7.00	16.00	7.000	16.000	.00	0	.0
- 193.892	.0080				1	 .0062	1.21	6.21	1.52	5.60	.013	.00		I - BOX	
193.892	.0080	1 1				.0062	1.21	0.21	1.52	J.60	.013	.00	.00	I	
1698.130	556.100	6.278	562.378	2025.00	20.16	6.31	568.69	.00	7.00	16.00	7.000	16.000	.00	0	.0
36.962	.0080				1	I	21	6.28		5.60	.013	.00	.00	I- BOX	
1											1			1	
1735.092	556.394	6.363	562.757	2025.00	19.89	6.14	568.90	.00	7.00	16.00	7.000	16.000	.00	0	.0
91.961	.0080	11			1	.0053	.48	6.36		5.60	.013	.00		BOX	
				WARN	NG - Flo	w depth	near top	of box c	onduit			-			
1827.052	557.126	6.673	563.799	2025.00	18.97	I	569.38	.00	7.00	16.00	7.000	16.000	0.0	1	0
1827.052		6.6/3 										16.000	.00	1-	.0
54.538	.0080		'			.0063	.34	6.67	1.29	5.60	.013	.00	.00		
				WARNI	ING - Flo	w depth	near top	of box c	onduit			-			

FILE: LC-EX.WSW

W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373 WATER SURFACE PROFILE LISTING Date

WATER SURFACE PROFILE LISTING Date: 5- 6-2014 Time: 2:50:57
Lemon Creek

PAGE 2

******	*****	*****	*****	******	******	*****	*****	*****	******	******	******	*****	*****	*****
		Depth		Q I	Vel	Vel	- 51		Critical					No Wth
Station	Elev	(FT)	Elev	(CFS)	(FPS)	Head			Depth			or I.D.	ZL	Prs/Pip
L/Elem	Ch Slope ******		 ******	******		SF Ave		 SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR ****	Type Ch
1881.590		7.000	564.560	2025.00		5.08	569.64	7.00		16.00	7.000	16.000	.00	0 .0
TRANS STR	1					.0076	.16	7.00	1.20		.013	.00	.00	BOX
1902.640	557.730	6.008	563.738	2025.00	20.25	6.37	570.11	.00	5.00	20.00	5.000	20.000	.00	0 .0
86.000 WALL EN						.0125	1.07	6.01		4.25	.013	.00	.00	BOX
1988.640	558.600 		564.810 	2025.00	20.25	6.37		.00	5.00 	20.00	5.000	20.000	.00	0 .0
TRANS STR	.0605	l I		1		.0073	.15	6.21	1.60	l	.014	.00	.00	BOX
2008.640	559.810	12.986	572.796	2025.00	2.47			.37		273.71	I	3	1 –	0 .0
TRANS STR	1	 			'	.0012	.08			1	.040	1	' I	IR-OPEN
2070.170	560.010	12.830	572.840 	2025.00	2.97	.14	572.98 	1.28	7.24	216.80		- 4	-	0 .0
TRANS STR	1			1		.0015	.03	1	.30 I	I	.040	I	I	IR-OPEN
2090.360		12.230	572.860	2025.00	3.12	.15	573.01 	1.36	8.34	206.83		5 	I -	0 .0

Date: 5- 6-2014 Time: 2:50:57

WATER SURFACE PROFILE LISTING

Lemon Creek

| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical|Flow Top|Height/|Base Wt| | No Wth | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El.| Elev | Depth | Width | Dia.-FT|or I.D.| ZL | Prs/Pip L/Elem |Ch Slope | 00 7.00 16.00 00 22.11 7.59 .00 564.80 1110.100 557.205 2050.00 7.000 16.000 0 - | --1--1-WALL EXIT 551.410 .00 5.793 557.203 2050.00 22.12 7.60 564.80 .00 7.00 16.00 7.000 1110.100 16.000 0.0 .00 BOX 246.790 .0080 .0072 1.79 5.79 5.65 .013 5.913 559.293 2050.00 21.67 7.29 566.58 1356.890 553.380 .23 7.00 7.000 16.000 .00 16.00 9 -1-.0080 .0069 .00 BOX 139 159 6.15 .013 6.024 560.513 2050.00 21.27 7.02 567.54 1496.049 554.489 .22 7.000 .00 7.00 16.00 16.000 0 -1-202.081 .0080 .0063 1.27 .013 6.25 1.53 00 .00 1698.130 556.100 6.318 562.418 2050.00 20.28 6.39 568.80 .00 7.000 0 .0 7.00 16.00 16.000 39 - - - . 12 -1-.0058 6.32 ----- WARNING - Flow depth near top of box conduit -----1719.142 556.267 .00 -|- -|-.0054 .55 -1--|- -|------ WARNING - Flow depth near top of box conduit ------1821.196 557.079 -|- -| 60.394 .0080 -1-

----- WARNING - Flow depth near top of box conduit -----

FILE: LC-EX.WSW

W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373 WATER SURFACE PROFILE LISTING Date

WATER SURFACE PROFILE LISTING Date: 5- 6-2014 Time: 2:50:57
Lemon Creek

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+++++++	++++++++	+++++++						++++++	+++++++	+++++++	++++++	++++++		++++++
	Invert	Depth	Water	Q I	Vel	Vel	Energy	Super	Critical	Flow Top	Height/	Base Wt		No Wth
Station		(FT)	Elev	(CFS)	(FPS)	Head			Depth		DiaFT	or I.D.	ZL	Prs/Pip
	 Ch Slope			1		 SF Ave			 Froude N			 X-Fall	 7.R	 Tvpe Ch
, -	******	* * * * * * * *	 ******	********	*****									1 * * * * * * *
	i	i i	i	i				i	i İ	i	i	i		i
1881.590			564.560	2050.00	18.30	5.20	569.76	7.00	7.00	16.00	7.000	16.000	.00	0.0
TRANS STR	1					.0078	.16	7.00	1.22		.013	.00	.00	BOX
1902.640	557.730		563.718	2050.00	20.50	6.53	570.24	.00	5.00	20.00	5.000	20.000	.00	0 .0
	•			1										1-
86.000 WALL EN						.0128	1.10	5.99	1.62	4.29	.013	.00	.00	BOX
WILLE DIV				I				I	I		1	1	l	I
1988.640	558.600		564.816	2050.00	20.50		571.34	.00	5.00	20.00	5.000	20.000	.00	0 .0
	1			1										-
TRANS STR	.0605					.0075	.15	6.22	1.62	1	.014	.00	.00	BOX
2008.640	559.810	13.207	573.017	2050.00	2.33	.08	573.10	.37	8.58	307.74	1	3	l	0 .0
-													-	-
TRANS STR	.0033					.0011	.07	13.57	.24		.040			IR-OPEN
2070.170	560.010	13.046	573.056	2050.00	2.81	.12	573.18	1.21	7.28	227.97		4		0 .0
		15.040	J/J.036	2030.00							I	-	I –	1-
TRANS STR	.0307					.0013	.03	14.25	.28		.040			IR-OPEN
	1		l I					I	l	I		1		1
2090.360		12.443	573.073	2050.00	2.96		573.21	1.27	8.38	216.91	I	5		0.0
_	ı- -		I	1			- -			ı –		1	_	1-

Date: 5- 6-2014 Time: 2:50:57

WATER SURFACE PROFILE LISTING

Lemon Creek

| Invert | Depth | Water | Q | Vel Vel | Energy | Super | Critical|Flow Top|Height/|Base Wt| | No Wth L/Elem |Ch Slope | 00 7.00 16.00 .00 1110.100 557.253 2075.00 22.19 7.65 564.90 7.000 16.000 0 -1-- | --1--1-WALL EXIT 551.410 .00 5.842 557.252 2075.00 22.20 7.65 564.90 .00 7.00 16.00 7.000 1110.100 16.000 0.0 .0080 .00 BOX 246.790 .0072 1.79 5.84 5.70 .013 5.961 559.341 2075.00 21.76 7.35 566.69 1356.890 553.380 .24 7.00 7.000 16.000 .00 16.00 5 -1-.0080 .0069 .00 BOX 129 563 6.20 .013 7.11 567.58 1486.453 554.413 6.060 560.473 2075.00 21.40 .23 7.000 .00 7.00 16.00 16.000 0 211.677 .0080 .0063 1.34 .013 6.29 1.53 1698.130 556.100 -|- - - -3.321 .0080 00 .00 6.356 562.456 2075.00 20.40 6.46 568.92 7.000 0 .0 .00 7.00 16.00 16.000 46 - 1 - .02 -1-.0059 6.36 ----- WARNING - Flow depth near top of box conduit -----1701.451 556.126 .00 -|- -|-055 .63 -|- -|--1-.0055 ----- WARNING - Flow depth near top of box conduit ------1814.827 557.029 -|- 66.763 .0080

----- WARNING - Flow depth near top of box conduit ------

FILE: LC-EX.WSW

W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373 WATER SURFACE PROFILE LISTING Date: 5- 6-2014 Time: 2:50:57

Lemon Creek

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******	******	*******	*******	*******	******	******	******	******	*******	*******	******	*******	****	******
	Invert	Depth	Water	0 1	Vel	Vel	Energy	Super	Critical	Flow Top	Height/	Base Wt		No Wth
Station		(FT)	Elev	(CFS)	(FPS)	Head				Width	DiaFT	or I.D.	ZL	Prs/Pip
				!	1							11		-
	Ch Slope			********		SF Ave			Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
^^^^^	^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^	1 ^ ^ ^ ^ ^ ^ ^	^ ^ ^ ^ ^ ^ ^ ^		^^^^^			^ ^ ^ ^ ^ ^ ^	1	^ ^ ^ ^ ^ ^ ^ ^	1	^ ^ ^ ^ ^	^^^^	1
1881.590	557.560	7.000	564.560	2075.00	18.53	5.33	569.89	7.00	7.00	16.00	7.000	16.000	.00	0 .0
-					1							11	-	-
TRANS STR	.0081					.0080	.17	7.00	1.23		.013	.00	.00	BOX
									1					1
1902.640	557.730	5.967	563.697	2075.00		6.69	570.38	.00	5.00	20.00	5.000	20.000	.00	0 .0
86.000	.0101	-			1	.0131	1.12	5.97	1.64	4.32	.013	.00	.00	BOX
WALL EN						.0101		0.37	1.01	1.02	.010	.00	.00	2011
	I	1 1	l 1	I		1			I	1		1 1		1
1988.640		6.222	564.822	2075.00	20.75		571.51	.00	5.00	20.00	5.000	20.000	.00	0.0
	1			1	1						1	-		-
TRANS STR	.0605					.0076	.15	6.22	1.64	1	.014	.00	.00	BOX
2008.640	559.810	13.430	573.240	2075.00	2.19	.07	573.31	.32	8.63	307.74	1	3		0 .0
_				1	1	1						11	-	1-
TRANS STR	.0033					.0009	.06	13.75	.22		.040			IR-OPEN
	l		l l					l	1	I	1	1 1		1
2070.170	560.010	13.257	573.267	2075.00	2.67	.11	573.38	1.09	7.34	227.97	1	4		0 .0
TRANS STR	.0307			1		.0011	.02		.25	-	.040	11	_	IR-OPEN
1141110 0111	. 0507	1 1		ı		.0011	.02	14.55	1	ı	1	1 1		II. OLEN
2090.360	560.630	12.650	573.280	2075.00	2.81	.12	573.40	1.15	8.41	216.91		5		0 .0
-													-	-

LC.EDT

Page	LC.EDT .
LISTING CARD SECT CHN NO OF AVE PIER PAGE 1 CARD SECT CHN NO OF AVE PIER PAGE 1 CODE NO TYPE PIER/PIP WITCH DAMERER WIDTH DAMER WIDTH DAME	
Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10) CODE NO TYPE PIER/PIP WIDTH DIAMETER WIDTH DOOD CD 1 3 0 0.000 7.000 16.000 .000 .000 .000 .000 CD 2 3 0 0.000 .000 .000 .000 .000 .000 CD 3 5 0 0.000 CD 4 5 0 0.000 CD 5 5 0 0.000 CD 5 5 0 0.000 CD 6 5 5 0 0.000 CD 70.000 10.000 .000 .000 .000 .000 .000 CD 1 5 5 0 0.000 CD 1 5 5 0 0.000 CD 1 5 5 0 0.000 CD 2 1 3 0 0.000 .000 .000 .000 .000 .000 .0	LISTING PAGE 1
CODE NO TYPE PIER/PIP WIDTH DIAMETER WIDTH DROP CD 1 3 3 0 .000 7.000 16.000 .000 .000 .000 .000 .000 .00	CARD SECT CHN NO OF AVE PIER HEIGHT I BASE $ZL = ZR = INV = Y(1) = Y(3) = Y(4) = Y(5) = Y(6) = Y(7) = Y(8) = Y(9) = Y(10)$
CD 2 3 5 0 .000 5.000 20.000 .000 .000 .000 .0	
CD 3 5 5 0 .000 CD CD 5 5 5 0 .000 CD CD CD 5 5 5 0 .000 CD	CD 1 3 0 .000 7.000 16.000 .000 .000 .00
## FILE:	CD 2 3 0 .000 5.000 20.000 .000 .000 .00
## FILE:	CD 4 5 0 .000
LISTING CARD SECT NO OF X(1) , Y(1)	
LISTING CARD SECT NO OF X(1) Y(1) X(2) , Y(2) X(3) , Y(3) X(4) , Y(4) X(5) , Y(5) X(6) X(7) , Y(7) Y(7) X(N) , Y(N) X(N+1),Y(N+1) X(35) , Y(35) EVALUATION (N) X(N+1),Y(N+1) X(35) , Y(35) PTS 3 12 000 573.000 21.410 572.970 38.300 572.000 61.790 PTS 3 12 000 573.000 22.420 574.000 295.020 574.000 298.000 PTS 3 10.090 575.000 00.790 559.810 89.790 567.000 PTS 46 6.000 66.720 568.160 84.440 572.000 PTS 575.000 66.720 568.160 84.440 572.000 PTS 70.000 573.000 31.530 567.980 47.890 560.630 54.900 PTS 70.000 573.000 573.000 31.530 567.980 47.890 560.630 54.900 PTS 70.000 573.000 573.000 31.530 567.980 47.890 560.630 54.900 PTS 70.000 573.000 573.000 31.530 567.980 47.890 560.630 54.900 PTS 70.000 573.000 573.000 76.010 572.000 W S P G W WATER SURFACE PROFILE - TITLE CARD LISTING HEADING LINE NO 1 IS - WE SELEV WE SELEV WE SELEV WE SELEV 1110.100 551.410 1 ELEMENT NO 2 IS A WALL EXIT U/S DATA STATION INVERT SECT WE SELEV 1110.100 551.410 1 ELEMENT NO 3 IS A REACH W/S DATA STATION ANG PT MAN H RADIUS ANGLE ANGLE STATION INVERT SECT N MAN H RADIUS ANGLE STATION INVERT SECT N MAN H 14.06 Date: 5- 6-2014 Time: 1:43:27	
X(5) , Y(5)	LISTING PAGE 2
CODE NO POINTS X(8), Y(8) X(9), Y(9) X(10), Y(10) X(11), Y(11) X(N), Y(N) X(N+1),Y(N+1) X(35), Y(35) PTS 3 12	
PTS 3	CODE NO POINTS $X(8)$, $Y(8)$ $X(9)$, $Y(9)$ $X(10)$, $Y(10)$ $X(11)$, $Y(11)$
PTS	
PTS	PTS 3 12 .000 573.000 21.410 572.970 38.300 572.000 61.790
PTS	PTS 189.930 571.060 192.420 574.000 295.020 574.000 298.000
50.630 57.860 566.090 65.700 567.300 76.010 572.000 W S P G W PAGE NO WATER SURFACE PROFILE - TITLE CARD LISTING HEADING LINE NO 2 IS - HEADING LINE NO 3 IS - WATER SURFACE PROFILE - ELEMENT CARD LISTING WATER SURFACE PROFILE - TITLE CARD LISTING WATER S	
PAGE NO HEADING LINE NO 1 IS - Lemon Creek	
PAGE NO 1	560.630 57.860 566.090 65.700 567.330 76.010 572.000
HEADING LINE NO 1 IS - Lemon Creek	
HEADING LINE NO 2 IS -	
HEADING LINE NO 3 IS - W S P G W PAGE NO 2	
PAGE NO 2	HEADING LINE NO 2 IS -
PAGE NO 2	
PAGE NO	HEADING LINE NO 3 IS -
PAGE NO	
WATER SURFACE	
S ELEV	WATER SURFACE PROFILE - ELEMENT CARD LISTING
S ELEV	U/S DATA STATION INVERT SECT
S51.410	W S ELEV
U/S DATA	551.410
1110.100 551.410 1	LLLMLNI NO 2 13 A WALL LAII
V/S DATA	1110.100 551.410 1
1356.890 553.380 1 .013 .000 .000 .000 0 ELEMENT NO 4 IS A REACH	U/S DATA STATION INVERT SECT N
.000 .000 .000 0 ELEMENT NO 4 IS A REACH	1356.890 553.380 1 .013
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H 1698.130 556.100 1 .013 999.980 19.552 .000 1 ELEMENT NO 5 IS A REACH * * * U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H	.000 .000 0
1698.130 556.100 1 .013 999.980 19.552 .000 1 ELEMENT NO 5 IS A REACH * * * U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H	U/S DATA STATION INVERT SECT N
999.980 19.552 .000 1 ELEMENT NO 5 IS A REACH * * * U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H	
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H	999.980 19.552 .000 1
	U/S DATA STATION INVERT SECT N
I ANEU	

		LC.	EDT		
		1881.590	557.560	1	.013
.000	.000	.000	1	_	1013
	A TRANSITION		*	*	
ELEMENT NO 0 19	U/S DATA		INVERT	SECT	N
PARTIG	ANGLE	STATION	TIVVEICE	JLCI	14
KADIU	ANGLE	1902.640	557.730	2	.013
40,000	-30.152	1302.040	337.730	2	.013
ELEMENT NO 7 IS		*	*	*	
ELEMENT NO / 15					N.
DARTIK	U/S DATA			SECT	N
RADIUS	ANGLE		MAN H	2	013
000	000	1988.640	558.600	2	.013
	.000	.000	0	*	
ELEMENT NO 8 IS	A WALL ENT	RANCE			
	U/S DATA	STATION	INVERT		FP
		1988.640			. 500
ELEMENT NO 9 IS	A TRANSITION		*	*	
	U/S DATA	STATION	INVERT	SECT	N
RADIUS	ANGLE				
		2008.640	559.810	3	.014
.000	.000				
ELEMENT NO 10 IS	A TRANSITION	*	*	*	
	U/S DATA	STATION	INVERT	SECT	N
RADIUS	ANGLE				
		2070.170	560.010	4	.040
183.138	19.250				
ELEMENT NO 11 IS	A TRANSITION	*	*	*	
	U/S DATA		INVERT	SECT	N
RADIUS	•				
10.15201	7	2090.360	560.630	5	.040
60.094	19.250	2030.300	300.030	•	10.0
ELEMENT NO 12 IS		DWORKS		*	*
ELLINEITI ITO IL IS	U/S DATA		INVERT	SECT	
W S ELEV	U/J DATA	SIAITON	TIAAFI	JLCI	
W J LLLV		2090.360	560.630	5	
.000		2090.300	300.030	J	
.000					

WATER SURFACE PROFILE LISTING

Lemon Creek

| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height / | Base Wt | No Wth | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | Or I.D. | ZL | Prs/Pip L/Elem |Ch Slope | 00 7.00 | 16.00 -|-1110.100 557.054 21.87 7.43 564.48 7.000 16.000 0 -1--1-WALL EXIT 7.43 564.48 1110.100 551.410 5.643 557.053 1975.00 21.88 .00 7.00 16.00 7.000 .00 16.000 0 .00 246.790 .0080 .0072 1.78 5.64 .013 BOX 5.765 559.145 1975.00 21.41 7.12 566.26 1356.890 553.380 .23 7.00 7.000 16.000 .00 0 16.00 .0080 .0068 1.09 .00 160 781 5.99 .013 BOX 1517.671 554.662 5.904 560.565 1975.00 20.91 6.79 567.35 .22 7.000 .00 7.00 16.00 16.000 0 180.459 .0080 .0061 1.11 .013 .00 6.12 1.52 6.17 568.46 6.192 562.292 1975.00 19.94 1698.130 556.100 .00 7.00 16.00 7.000 16.000 .00 0 0 .36 6.19 -6.363 562.977 1975.00 19.40 5.84 568.82 -|- -.0050 .37 7.00 1762.707 556.614 .00 16.00 7.000 16.000 .00 0 -|-36 1.36 5.50 .0080 .013 74.745 6.36 .00 .00 BOX --- WARNING - Flow depth near top of box conduit ----7.00 16.00 6.673 563.882 1975.00 18.50 5.31 569.19 7.000 16.000 .00 .00 1837.452 557.209 0.0 .013 44.138 .0080 .00 BOX .00

W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373

WATER SURFACE PROFILE LISTING

Lemon Creek

| Invert | Depth | Water | Q | Vel Vel | Energy | Super | Critical|Flow Top|Height/|Base Wt| | No Wth L/Elem |Ch Slope | 1881.590 557.560 16.00 7.000 0 - .013 -|-TRANS STR .0081 1.17 .00 BOX .00 ----- WARNING - Flow depth near top of box conduit ------6.015 563.745 1975.00 19.75 -|- -|- -|- -|-5.00 20.00 5.000 20.000 1902.640 557.730 .00 0 .0 - - - | -- | -- | -86.000 .0101 .00 .00 BOX WALL ENTRANCE 32 .00 6.164 564.764 1975.00 19.75 -|- -|- -|- -|-- 1 5.00 6.06 570.82 20.00 5.000 20.000 .00 0.0 1988.640 558.600 -1-TRANS STR .0605 .0069 .14 1.56 .014 .00 BOX 6.16 .00 40 559.810 -|--1 .13 572.44 12.502 572.312 1975.00 .29 8.55 0 .0 -1-.08 12.79 .040 TRANS STR .0033 .0013 IR-OPEN .31 572.56 1.06 7.14 2070.170 560.010 12.236 572.246 1975.00 -1-.0307 TRANS STR 2090.360 560.630 11.533 572.163 1975.00 5.50 0 .0

$\,$ W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373 $\,$

WATER SURFACE PROFILE LISTING

WATER SURFACE Lemon Creek

| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height / | Base Wt | No Wth | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia. - FT | Or I.D. | ZL | Prs/Pip L/Elem |Ch Slope | 7.00 | 16.00 .00 1110.100 557.105 2000.00 21.95 7.48 564.59 7.000 16.000 0 - | --1--1-WALL EXIT .00 5.693 557.103 2000.00 21.96 1110.100 551.410 7.49 564.59 .00 7.00 16.00 7.000 16.000 0 .00 BOX 246.790 .0080 .0072 1.78 5.69 .013 5.815 559.195 2000.00 21.50 7.17 1356.890 553.380 566.37 .23 7.00 7.000 16.000 .00 0 16.00 .0080 .0068 1.05 .00 154 556 6.04 .013 BOX 1511.446 554.612 5.946 560.558 2000.00 21.02 6.86 567.42 .22 7.000 .00 7.00 16.00 16.000 0 186.684 .0080 .0062 1.15 1.52 .013 .00 6.17 6.236 562.336 2000.00 20.05 7.000 16.000 1698.130 556.100 6.24 568.58 .00 7.00 16.00 .00 0 0 51.416 6.24 -6.363 562.872 2000.00 19.65 5.99 568.86 -|- -| .0051 .43 1749.546 556.509 .00 7.00 16.00 .013 7.000 16.000 .00 0 -|- -|-36 1.37 5.55 - | --1-.0080 .0051 82.908 6.36 .00 .00 BOX --- WARNING - Flow depth near top of box conduit ----7.000 16.000 .00 0 .0 1832.454 557.169 -1-- | -49.136 .0080 .00 BOX .00

W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373

110	gram rackage	DCIIGI Wa	mocr. 10	, ,		
		WATER	SURFACE	PROFILE	LISTING	
Lemon Cre	ek					

| Invert | Depth | Water | Q | Vel Vel | Energy | Super | Critical|Flow Top|Height/|Base Wt| | No Wth L/Elem |Ch Slope | 1881.590 557.560 7.000 0 - .013 -|-TRANS STR .0081 1.19 .00 BOX .00 ----- WARNING - Flow depth near top of box conduit --5.995 563.724 2000.00 20.00 6.21 569.94 -|- -|- -|- -|- -|- -|- -|- -|-6.21 569.94 .00 -|- -|- -|-.0121 1.04 5.99 5.00 20.00 5.000 20.000 1902.640 557.730 0 .0 .00 .013 - | -- | -86.000 .0101 1.58 4.21 .00 .00 BOX WALL ENTRANCE 98 .00 6.169 564.769 2000.00 20.00 6.21 570.98 -|- -|- -|- -|- -|- -|- -|-5.00 | 20.00 5.000 20.000 .00 0.0 1988.640 558.600 TRANS STR .0605 .014 .0071 .14 6.17 1.58 .00 BOX .00 40 559.810 10 12.714 572.524 2000.00 -|- -|- -|- -| .12 572.65 .28 161.99 3 -|-99 .23 - | -.07 .040 .0012 TRANS STR .0033 12.99 IR-OPEN .30 572.75 1.01 7.19 2070.170 560.010 12.446 572.456 2000.00 TRANS STR .0307 0 .0

$\,$ W S P G W - CIVILDESIGN Version 14.06 Program Package Serial Number: 1373

WATER SURFACE PROFILE LISTING

Lemon Creek

| Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height / | Base Wt | No Wth | Elev | (FT) | Elev | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | Or I.D. | ZL | Prs/Pip L/Elem |Ch Slope | 7.00 | 16.00 .00 2025.00 564.69 1110.100 557.155 22.03 7.54 7.000 16.000 0 -1--1-WALL EXIT 1110.100 551.410 5.744 557.154 2025.00 22.04 7.54 564.69 .00 7.00 16.00 7.000 16.000 .00 0 246.790 .0080 .0072 1.78 5.74 .013 .00 BOX 5.865 559.245 2025.00 21.58 7.23 566.48 1356.890 553.380 .23 7.00 7.000 .00 0 16.00 16.000 .0080 .0068 1.01 .00 BOX 147 348 6.10 .013 1504.238 554.555 5.986 560.540 2025.00 21.14 6.94 567.48 .22 7.000 .00 7.00 16.00 16.000 0 193.892 .0080 .0062 1.21 .013 .00 6.21 1.52 6.278 562.378 2025.00 20.16 7.000 1698.130 556.100 6.31 568.69 .00 7.00 16.00 16.000 .00 0 0 -6.363 562.757 2025.00 19.89 6.14 568.90 -|- -|-.0053 .48 1735.092 556.394 .00 7.00 16.00 7.000 16.000 .00 0 -|- -|-36 1.39 5.60 - | --1-.0080 .013 91.961 6.36 .00 .00 BOX --- WARNING - Flow depth near top of box conduit ----7.000 16.000 .00 1827.052 557.126 0.0 - | -54.538 .0080 .00 BOX .00

	rrogram	r achage	OCTIVE NO.	mocr. ro			
			WATER	SURFACE	PROFILE	LISTING	
Lemon	Creek						

******	******	******	******	******	*****	******	*****	******	*****
Invert Dept	th Water	Q Vel	Vel Energy	Super	Critical	Flow Top	Height/	Base Wt	No Wth
Station Elev (FT)	Elev	(CFS) (FPS)							Prs/Pip
- - L/Elem Ch Slope	- -	-11	- SF Ave HF	-				- :	-
******* ****** *****	 *** *******	 * * * * * * * * * * * * * *	% AVE NF			*******	*****	X=rall	Type Ch
i	iii	i '	i	i	i i	j		i i	i
1881.590 557.560 7.0		2025.00 18.08	5.08 569.64	7.00	7.00	16.00	7.000	16.000 .00	0 .0
	- -	- - -	l l		-	1		-	-
TRANS STR .0081	1	1	.0076 .16	7.00	1.20	1	.013	.00 .00	BOX
1902.640 557.730 6.0	008 563.738	2025.00 20.25	6.37 570.11	.00	5.00	20.00	5.000	20.000 .00	0 .0
-11-	- -	-		-				-	-
86.000 .0101			.0125 1.07	6.01	1.60	4.25	.013	.00 .00	BOX
WALL ENTRANCE									
1988.640 558.600 6.2	210 564.810	2025.00 20.25	6.37 571.18	.00	5.00	20.00	5.000	20.000 .00	0 .0
- -	- -	-		-				-	1-
TRANS STR .0605			.0073 .15	6.21	1.60		.014	.00 .00	BOX
1 1	1	1	1	1	1	I			1
2008.640 559.810 12.9	966 572.776	2025.00 2.68	.11 572.89	.26	8.64			3	0 .0
- - TRANS STR .0033	-11-	-11	.0010 .0	13.23	.22		.040	11-	IR-OPEN
.0005	1 1	I	.0010	13.23		I	.010	1 1	111 01111
2070.170 560.010 12.6	595 572.705	2025.00 4.24	.28 572.98	.95	7.24	78.78		4	0 .0
- -	- -	- - -	1	-		1		-	-
TRANS STR .0307	1	1	.0018 .0	1 13.65	.30		.040	1	IR-OPEN
2090.360 560.630 12.0	002 572.632	2025.00 5.17	.42 573.05	1.25	8.41	69.73		I I	0 .0
			.42 3/3.03	1.23		09./3			0.0

LemonCreekEX.rep

HEC-RAS Version 4.1.0 Jan 2010 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

X	X	XXXXXX	XX	XX		XX	XX	×	X	XXXX
X	X	X	X	X		X	X	X	X	X
X	X	X	X			X	X	X	X	X
XXXX	XXX	XXXX	X		XXX	XX	XX	XXX	XXX	XXXX
X	X	X	X			X	X	X	X	×
X	X	X	X	X		X	X	X	X	X
X	X	XXXXXX	XX	XX		X	X	X.	X	XXXXX

PROJECT DATA

Project Title: Lemon Creek Project File: LemonCreek.prj Run Date and Time: 5/8/2014 8:03:07 AM

Project in English units

PLAN DATA

Plan Title: Lemon Creek Exist 13.5' BR Plan File :

h:\pdata\137644\ca\cs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.p01

Geometry Title: Lemon Creek_Existing_2014-04-17
Geometry File :
h:\pdata\137644\Calcs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.g09

Flow Title : Flow 01 Flow File :

h:\pdata\137644\Ca\cs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.f01

Plan Summary Information: Number of: Cross Sections = Multiple Openings = Inline Structures = Lateral Structures = 28

Culverts 0

Ó ŏ Bridges

Computational Information
water surface calculation tolerance = 0.01
critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

= 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Flow 01

Page 1

LemonCreekEX.rep

Flow File : h:\pdata\137644\Calcs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.f01

Flow Data (cfs)

River	Reach	RS	50-YR
LemonCreek	Reach1	3105.06	2021
LemonCreek	Reach1	2271.00	3182
LemonCreek	Reach1	1000.00	3255

Boundary Conditions

River Downstream	Reach	Profile	Upstream
LemonCreek Known WS = 572.5	Reach1	50-YR	

GEOMETRY DATA

Geometry Title: Lemon Creek_Existing_2014-04-17
Geometry File:
h:\pdata\137644\Calcs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.g09 CROSS SECTION

RIVER: LemonCreek RS: 3105.06 REACH: Reach1

INPUT. ...

Descript	on:								
Station B		Data	num=	150					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	654.99	.4	654.77	1.67	654	3.62	652.85	5.04	652
6.78	651	7.94	650.35	10.24	649	11.9	648	13.58	647.02
15.77	645.75	18.57	644	22.19	641.77	26.7	639	27.18	638.7
28.97	637.6	30.74	636.52	31.58	636	32.48	635.47	33.23	635
34.25	634.4	35.55	633.61	36.92	633	39.04	632.25	39.71	632
42.27	631.09	42.55	631	44.43	630.33	47.95	629	50.26	628.13
50.65	628	53.89	627.17	54.77	626.63	55.74	626	57.33	625
58.94	624	60.54	623	63.76	621	64.57	620.53	66.21	619.5
66.98	619	68.58	618	68.96	617.77	70.59	616.75	71.8	616
72.66	615.48	74.17	614.53	76.27	613.22	77.88	612.21	78.58	611.78
80.35	610.68	81.42	610	83.04	609	84.32	608.25	84.82	608
86.36	607.14	86.94	607.13	89.6	607.19	92.31	607	95.13	607.01
97.2	607.01	99.63	607	101.58	606.22	102.77	605.76	104.47	605
106.86	604.14	107.5	603.86	109.59	603	111.17	602.33	111.91	602
114.24	601	115.64	600.42	116.62	600	118.45	599.23	119.4	598.82
121.27	598	123.58	597.02	123.66	596.99	125.89	596	128.15	595
131.13	593.7	132.24	593	133.27	592.36		592	135.52	591.09
135.59	591	137.23	590.97	137.6	590.97	138.91	591	139.84	590.99
140.7	590.99	141.39	591	141.51	590.74	141.56	590	141.62	589
141.86	588.46	142	588	142.29	587.97	142.84	587.97	143.09	588
143.83	588.26	146.02	589	148.6	589.93	148.95	590.07	150.53	591
151.46	591.74	151.86	592	152.77	592.82	153.07	593	154.2	594
154.49	594.27	155.32	595	156.14	595.7	156.48	596	157.38	596.76
157.68	597	158.83	597.97	158.88	598	161.95	600.55	162.51	601
162.92	601.35	164.92	603	166.2	604	167.54	605.12	168.66	606

168.94 606.24 171.11 173.85 610.33 175 178.1 614 179.26 199.95 613.97 201.97 225.73 614.36 235.23	608 1 611.33 1 614 613.98 2	04.41	609 612 613.99 614 614.49	172.63 176.29 189.57 206.55 242.83	609.28 612.45 613.87 614 614.6	173.45 177.63 191.68 216.51 250	610 613.63 613.87 614.19 614.71
Manning's n Values Sta n Val Sta 0 .035 86.36 178.1 .035	num= n Val .024	6 Sta 99.63	n Val .07	Sta 135.52	n Val .04	5ta 150.53	n Val .07
Bank Sta: Left Right 99.63 178.1		Left Cha	nne1	Right 61.56	coeff	Contr.	Expan.
CROSS SECTION OUTPUT Pro		1945	0.00	02730		7.5	
E.G. Elev (ft)	599.43	Eleme	nt		L	eft OB	Channe1
Right OB Vel Head (ft)	2.39	Wt. n	-val.				0.058
W.S. Elev (ft)	597.04	Reach	Len.	(ft)		73.02	70.23
61.56 Crit W.S. (ft)	597.04	Flow.	Area (sq ft)			162.91
E.G. Slope (ft/ft)	0.036860	Area	(sq ft)			162.91
Q Total (cfs)	2021.00	Flow	(cfs)				2021.00
Top width (ft)	34.21	Тор w	ridth (ft)			34.21
Vel Total (ft/s)	12.41	Avg.	vel. (ft/s)			12.41
Max Chl Dpth (ft)	9.07	Hydr.	Depth	(ft)			4.76
Conv. Total (cfs)	10526.7	conv.	(cfs)				10526.7
Length Wtd, (ft)	70.23	Wette	d Per.	(ft)			40.99
Min Ch El (ft)	587.97	Shear	(1b/s	q ft)			9.15
Alpha	1.00	Strea	m Powe	r (1b/ft	5) 2	50.00	0.00
0.00 Frctn Loss (ft)	0.92	Cum V	olume	(acre-ft))	1.70	15.65
2.94 C & E Loss (ft) 1.04	0.55	Cum S	A (acr	es)		1.27	1.79

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

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LemonCreekEX.rep

Manning's n values were composited to a single value in the main channel. Note:

CROSS SECTION

RIVER: LemonCreek REACH: Reach1 RS: 3034.83 INPUT

Data Sta .65 8.8 17.43 24.26	num= Elev 654.16 649.9 645.59	150 Sta .98 12.58	Elev 654	Sta	Elev	Sta	Elev
.65 8.8 17.43 24.26	Elev 654.16 649.9	Sta .98				Sta	Flev
.65 8.8 17.43 24.26	654.16 649.9	. 98				Sta	Flev
8.8 17.43 24.26	649.9	12.58	654	1 12			
8.8 17.43 24.26	649.9	12.58		1.43	653.75	2.95	653
17.43 24.26			648	14.58	647	15.17	646.71
24.26		18.6	645	19.64	644.49	20.61	644
27.0	642.22	26.52	641.11	28.7	640	30.07	639.35
37.9	635.38	38.66	635	44.26	632,16	46.49	631.04
48.54	630	50.32	629	50.49	628.89	56.79	625
60.78	622.54	61.68	622	62.54	621.47	63.32	621
66.59	619	69.89	617	70.63	616.54	75.9	613.36
79.06	611.46	81.49	610	81.97	609.89	82.18	609.88
89.03	608.91	93.18	608.15	94.03	608	95.87	607
99.58	605	102.99	603.17	104.72	602.23	105.26	601.95
107.32	600.85	109.2	599.84	110.81	599	113.57	597.54
116.52	596	117.37	595.55	122.16	593	124.59	591.72
126.64	591.12	126.98	591	129.43	590.19	130.03	590
		139.71	587		586.63	143.1	586
137.13	587.76			140.99			
148.73	584.39	149.3	584.32	149.9	584.27	150.2	584.27
151	585	152.49	586.5	153.97	588	154.59	588.62
155.95	590	156.63	590.7	157.3	591.37	158.71	592.82
159.97	594.1	160.98	595	161.97	596	163.03	597
166.19	600	167.23	601	167.94	601.67	169.32	603
171.89	605.44	173.96	607.43	175.19	608.63	176.61	610
177.65	611.16	177.74	611.19	178.31	611.24	179.59	611.38
184.92	611.67	186.19	611.72	186.99	611.79	187.99	611.9
188.65	612	190.22	612.41	192.45	613	193.25	613
205.84	613.47	207.42	613.5	207.81	613.52	209.4	613.53
213.11	613.63	217.97	613.71	224.33	613.82	227.26	613.82
229.65	614	230.15	614	233.33	614.03	233.5	614.04
250.84	614.37	254.01	614.41	254.32	614.42	263.46	614.53
270.28	614.54	271.05	614.55	277.22	614.79	277.56	614.81
286.2	614.92	291.64	615	291.91	615	300	615.1
es	num=	7					
Sta		Sta	n Val	Sta	n Val	Sta	n Val
81.49	.024	93.18	.07	146.49	.04	151	.07
188.21	.035						
					coeff		Expan
	81.49 188.21	Sta n Val 81.49 .024 188.21 .035 Right Lengths	Sta n Val Sta 81.49 .024 93.18 188.21 .035 Right Lengths: Left C	Sta n Val Sta n Val 81.49 .024 93.18 .07 188.21 .035 Right Lengths: Left Channel	Sta n Val Sta n Val Sta 81.49 .024 93.18 .07 146.49 188.21 .035 Right Lengths: Left Channel Right	Sta n Val Sta n Val Sta n Val 81.49 .024 93.18 .07 146.49 .04 188.21 .035 Right Lengths: Left Channel Right Coeff	Sta n Val Sta n Val Sta n Val Sta 81.49 .024 93.18 .07 146.49 .04 151 188.21 .035

CROSS SECTION OUTPUT Profile #50-YR

E.G. Elev (ft)	597.44	Element	Left OB	Channe1
Right OB Vel Head (ft)	0.55	Wt. n-Val.		0.068
W.S. Elev (ft)	596.88	Reach Len. (ft)	141.38	132.96
132.46 Crit W.S. (ft)		Flow Area (sq ft)		338.80
E.G. Slope (ft/ft)	0.006641	Area (sq ft)		338.80
Q Total (cfs)	2021.00	Flow (cfs)		2021.00

Top Width (ft)	48.09	monCreekEX.rep Top Width (ft)		48.09
vel Total (ft/s)	5.97	Avg. Vel. (ft/s)		5.97
Max chl Dpth (ft)	12.61	Hydr. Depth (ft)		7.05
Conv. Total (cfs)	24799.5	Conv. (cfs)		24799.5
Length Wtd. (ft)	132.96	Wetted Per. (ft)		55.69
Min Ch El (ft)	584.27	Shear (1b/sq ft)		2.52
Alpha	1.00	Stream Power (1b/ft s)	300.00	0.00
0.00 Freth Loss (ft)	0.61	Cum Volume (acre-ft)	1.70	15.25
2.94 C & E Loss (ft) 1.04	0.06	Cum SA (acres)	1.27	1.72

Note: Manning's n values were composited to a single value in the main channel. CROSS SECTION

RIVER: LemonCreek REACH: Reach1 RS: 2901.87

INPUT									
Descripti									
Station E	levation	Data	num=	142					
Sta	Elev	Sta	Elev	Sta		Sta		Sta	Elev
0	655.86	. 17	655.77	3.23	654.22	3.91	653.86	5.6	653
7.92	651.81	9.49	651	13.39	649	13.82	648.77	15.34	648
15.84	647.73	17.28	647	19.22	646	20.57	645.31	21.8	644.67
23.1	644	23.77	643.66	25.05	643	26.28	642.37	26.99	642
28.94	641	30.87	640	32.82	639	33.63	638.58	35.63	637.55
38.65	636	40.59	635	41.54	634.52	42.54	634	43.54	633.49
44.49	633	45.57	632.45	47.5	631.45	48.38	631	49.94	630.14
51.81	629	53.31	628	55.18	626.88	56.61	626	58.17	625
59.62	624.09	61.31	623	61.53	622.87	62.87	622	64.37	621.12
66.24	620	66.47	619.87	67.92	619	68.64	618.59	70.46	617.51
72.31	616.4	72.97	616	74.54	615	76.01	614.06	76.46	613.78
78.09	612.75	80.84	611	88.66	610.32	92.2	610	94.42	608.96
96.44	608	98.66	606.95	99.4	606.61	99.88	606.37	101.19	605.65
102.28	605	103.93	604	104.4	603.71	105.63	603	106.12	602.69
107.1	602	108.82	601	109.63	600.52	110.53	600	111.26	599.57
112.24	599	113.95	598	114.53	597.67	117.37	596	117.84	595.72
119.08	595	120.78	594	121.18	593.74	121.9	593.38	122.56	593
123,46	592.47	124.24	592	124.82	591.68	127.69	590	127.92	589.87
129.38	589	130.1	588.59	131.08	588	133.92	586.3	134.55	585.91
136.17	584.96	137.82	583.97	138.03	583.85	139.81	582.78	140.9	582.11
141.09	582	149.24	581.685	150.82		153.89	581.71	154.89	583.24
155.36	584	156.01	585	156.4	585.64	156.64	586	157.28	587
157.66	587.62	158.54	589	159.02	589.68	159.23	590	159.79	590.79
160.39	591.79	161.13	593	161.63	593.87	162.29	594.96	162.87	595.96
163.46	597	164.62	599	170.43	599.97	170.49	600	175.15	600.33
184.09	601	187.25	601.01	188, 18	601.01	188.7	601.02	191.36	601.02
221.77	601.46	245.88	601.79	246.37	601.79	258.43	602	263.3	602.15
263.6	602.15	266.1	602.18	269.94	602.23	279.75	502.41	293.61	602.64
294.59	602.65	300	602.74			2000			
Manning's	n Value:	5	num=	4					
Sta	n val	Sta	n val	Sta	n val	Sta	n val		
0	.035	80.84	.024	92.2	.07	164.62	.035		

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		Lemont	eekEx.re	P			
Bank Sta: Left Right 92.2 164.62	Lengths:	Left C 123.39	hannel 123.28	Right 123.54	Coeff	Contr.	Expan.
CROSS SECTION OUTPUT Pro	file #50-	-YR					
E.G. Elev (ft)	596.76	Ele	ment		L	eft OB	Channe'
Right OB Vel Head (ft)	0.34	Wt.	n-val,				0.070
W.S. Elev (ft)	596.42	. Rea	ch Len.	(ft)	1	23.39	123.28
123.54 Crit W.S. (ft)		Flo	w Area (sq ft)			431.14
E.G. Slope (ft/ft)	0.003404	Are	a (sq ft)			431.14
Q Total (cfs)	2021.00) F1o	w (cfs)				2021.00
Top Width (ft)	46.47	тор	width (ft)			46.47
vel Total (ft/s)	4.69	Avg	. vel. (ft/s)			4.69
Max Chl Dpth (ft)	14.73	B Hyd	r. Depth	(ft)			9.28
Conv. Total (cfs)	34641.2	2 Con	v. (cfs)				34641.2
Length Wtd. (ft)	123.28	8 Wet	ted Per.	(ft)			58.55
Min Ch El (ft)	581.69) She	ar (1b/s	q ft)			1.56
Alpha 0.00	1.00	Str	eam Powe	r (1b/ft	s) 3	00.00	0.00
Freth Loss (ft) 2.94	0.55	Cum	Volume	(acre-ft)	1.70	14.07
C & E Loss (ft) 1.04	0.07	2 Cum	SA (acr	es)		1.27	1.57
CROSS SECTION							
RIVER: LemonCreek REACH: Reachl	RS: 2778	3.59					
INPUT Description: Station Elevation Data Sta Elev 5ta 0 651.29 .66 9.01 646.91 12.92 21.09 641 22.06 30.82 637.56 33.89 37.07 635 38.45 44.69 631.2 45.14 49.35 628.7 52.31 54.59 625.91 56.2 59.63 623.15 59.83 65.22 620 66.95 74.24 615 75.15 78.64 612 79.07 83.73 608.2 83.99 99.83 605.48 100.28 103.74 603.73 103.87 111.91 601 112.94	num= E1 ev 650:97 645:640.51 631;631 627:22 623 619:611.7 608:608.42 608:42 600:48	145 Sta 2.74 17.02 25.69 34.36 39.32 45.38 52.74 56.8 60.54 68.39 75.91 79.58 85.34 101.19 106.43 113.87	Elev 649.95 643 638.76 636.71 633.64 630.87 624.73 622.63 614.29 607 605 603 603	Sta 4.83 19.08 26.38 35.44 40.71 47.09 53.08 57.19 61.7 68.73 77.27 80.98 86.85 102.57 109.68	Elev 648.94 642 638.51 630 626.8 624.54 613 601.26 606.83 604.31 602.11	Sta 6.76 19.62 28.3 36.11 42.94 48.69 53.95 58.23 63.22 69.28 77.91 81.3 903.17 110.17	Elev 648 641.72 638 635.62 632 629.07 626.24 621.15 617.71 610.54 610 604 601.87

	L	emoncre	ekEX. re	n			
116.81 598.53 118.94 125.68 594 127.11 137.36 588 139.32 143.2 584.99 146.66 156.78 586 157.11 164.12 591.26 165.14 167.94 594 169. 178.9 596.13 189. 213.14 599 216.91 243.2 601.48 243.6 249.48 602 253.33 267.23 602.23 268.22 280.62 603 282.46	1 593.27 1 2 587.27 1 2 587.3 1 3 586.23 1 4 592 1 3 595 1 3 597.3 2 5 601.53 2 4 601.99 2 4 602.27 2	50.42 5 59.38 66.07 69.57 92.78 25.14 46.38 54.29 69.95	597 592 586.85 79.288 587.85 592.66 595.03 597.29 600 601.77 602 602.37 603.32	123.1 131.15 141.28 152.3 159.58 166.53 171.15 201.2 227.52 248.22 258.33 271.21 289.78	595.31 591.19 586 583 588 593 595.19 598 600.2 601.92 602.43 604	124.34 131.51 142.72 155.14 163.75 167.93 177.37 205.31 237.14 248.68 261.12 278.59 300	594.69 591 585.25 584.89 591 594 596 598.35 601 601.94 602.1 602.88 604.17
	n val	6 Sta 99.83	n va1 .07		n Val .04	Sta 152.3	n Val .07
Bank Sta: Left Right 99.83 169.57	Lengths:		annel 92.69		Coeff	Contr.	Expan.
CROSS SECTION OUTPUT PR	rofile #50-Y	R					
E.G. Elev (ft)	596.19	Elem	ent		L	eft OB	Channe1
Right OB Vel Head (ft)	0.52	Wt.	n-val.				0.066
0.035 W.S. Elev (ft)	595.67	Reac	h Len.	(ft)		80.84	92.69
98.27 Crit W.S. (ft)		Flow	Area (sq ft)			347.96
	0.006004	Area	(sq ft)			347.96
1.78 Q Total (cfs)	2021.00	F1ow	(cfs)				2018.19
7.82 Top width (ft)	52.45	Тор	width (ft)			47.17
5.28 vel Total (ft/s)	5.78	Avg.	vel. (ft/s)			5.80
1.58 Max Chl Dpth (ft)	16.38	Hydr	. Depth	(ft)			7.38
0.34 Conv. Total (cfs)	26083.0	Conv	. (cfs)				26046.7
36.3 Length Wtd. (ft)	92.72	Wett	ed Per.	(ft)			57.93
5.32 Min Ch El (ft)	579.29	Shea	r (1b/s	q ft)			2.25
0.13 Alpha	1.01	Stre	am Powe	r (1b/ft	5) 3	00.00	0.00
0.00 Frctn Loss (ft)	0.51	Cum	Volume	(acre-ft)		1.70	12.97
2.94 C & E Loss (ft) 1.03	0.02	Cum	SA (acr	es)		1.27	1.44

Note: Manning's n values were composited to a single value in the main channel. CROSS SECTION

RIVER: LemonCreek REACH: Reach1

RS: 2685.90

TUDUT					eekEX.re				
INPUT Descripti	on:								
Station E Sta 0 3.77 12.89 22.39 29.7 37.85 50.03	1 Evation Elev 629.11 626.77 622 618 614.85 611 608	Data Sta .17 5.09 13.82 23.05 31.66 39.87 78.63 88.08 97.77 19.47 111.88 116.72 119.25 125.91 131.53 137.18 143.16 149.84 155.91 162.42 172.09 173.9 184.82 203.44 210.7	599.79 598.81 598.21 597.43 594 591. 588 584.94 577.486 584.66 588. 593 594.84 596. 597.	100.51 117.6 121.96 126.63 132.65 138.21 144.77 152.21 156.53 163.79 173.04 174.11 186.41 203.38	599.69 598.62 598.01 596 593.62 590.37 587.48 581.79 585.01 588.7 593.49	101.2 114.57 117.74 122.61 128.61 134.09 139.12 146.54 152.42 158.48	619 616.28 613.57 609 606.65 599.99 599.63 598.66 592.59 587 583.05 583.05 583.05 583.05 583.05 583.05	3.08 10.97 21.64 29.34 33.89 77.81 84.86 94.06 98.43 104.95 115.49 118.37 123.92 129.71 141.03 146.81 152.78 159.13 167.93 173.46 120.01 207.15 237.82	622.82 618.33 615.612.93 608.22 606.4 601.06 599.95 599.36 598.42 597.8 592.589 582.91 582.91 586.34 593.77
281.73	600.3	285.05	603	300	601.09				
Manning's Sta 0 146.81	n Val .07 .04	Sta 42.26 152.78					n Val .024		.07
Bank Sta: 1: CROSS SEC					thannel 25	Right 27.91	Coeff	Contr.	Expan.
CROSS SEC	11011 001	roi ric	7111E #30	16					
E.G. El	ev (ft)		595.60				L	eft OB	Channel
Vel Hear	d (ft)		0.4	4 Wt.	n-Val.				0.065
W.S. El	ev (ft)		595.2	2 Rea	ch Len-	(ft)		32.36	25.00
Crit W.	s. (ft)					(sq ft)			374.81
9.74 E.G. Sl	ope (ft/	ft)	0.004969	9 Are	a (sq ft	:)			374.81
Q Total	(cfs)		2021.00) Flo	w (cfs)				2001.05
Top Wid	th (ft)		67.4	1 Тор	width ((ft)			50.28
17.13 Vel Tota	al (ft/s)	5.20	5 Avg	. vel. ((ft/s)			5.34
Max Chl	Doth (f	t)	17.7	4 HVC	r. Depth	(ft)			7.45
0.57 Conv. To	otal (cf	s)	28670.	1 Con	v. (cfs)				28387.0
283.1 Length	wtd. (ft)	25.69	9 Wet	ted Per.	(ft)			62.42

LemonCreekEX.rep

17.19				
Min Ch El (ft) 0.18	577.49	Shear (1b/sq ft)		1.86
Alpha 0.00	1.02	Stream Power (1b/ft 5)	300.00	0.00
Frctn Loss (ft) 2.92	0.07	Cum Volume (acre-ft)	1.70	12.20
C & E Loss (ft)	0.06	Cum SA (acres)	1.27	1.34

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1

RS: 2660.90

INPUT Description: Station Elevation Data O 630.28 1.17 629.59 2.14 629 3.81 628 4.86 627.38 5.46 627 6.7 626.27 7.14 626 8.5 625.19 10.35 624.1 11.79 623.24 15.08 621.62 17.19 620.62 18.46 620 19.26 619.62 20.53 619 22.56 618 24.49 617.02 24.64 616.95 26.86 616 27.34 615.81 28.98 615 31.14 614.15 31.66 613.92 34.15 612.8 35.91 612 39.45 610.4 40.29 610 42.06 609.23 42.92 608.85 43.61 608.64 46.2 608 46.84 608 50.12 607.83 51.12 607.8 52.48 607.77 74.51 607 76.9 606 76.91 606 79.93 604.76 81.79 604 86.1 602.23 88.79 601.12 89.33 600.96 93.76 599.62 95.38 599 97.43 598.18 98.13 597.91 100.41 597 103.17 596 106.2 594.89 107.78 594.57 109.73 594.24 111.07 594 115.97 593.09 116.48 593.01 117.12 592.98 118.35 592.81 119.98 592.55 123.04 592.126.66 591.33 130.37 590.67 131.01 590.56 132.1 590.28 132.33 590.23 132.68 590.14 133.1 589.91 134.94 588.93 136.02 588 138.38 586.39 590.14 133.1 589.91 134.94 588.93 136.02 588 138.38 586.39 139.56 584.95 140.73 584 141.89 582.96 143.04 582 144.21 581.144.77 580.54 145.45 580 146.08 579.46 665 579 147.46 577 155.58 577 153.57 580 153.93 580.37 154.45 581 155.17 581.55 158.1 585.6 158.51 586 159.05 586.35 159.67 586.73 159.86 586.82 162.48 587.74 163.19 588 164.84 588.59 165.94 589 167.28 589.48 179.38 592.61 175.85 592.59 179.3 593.18 186.06 593.72 187.59 593.09 169.74 590.38 171.35 591.172.42 591.39 173.8 592.61 175.85 597.57 177.47 593.59 177.47 593.39 177.38 595.61 175.85 597.57 177.47 593.39 177.3 591.19 100.55 599.47 600.26 197.32 595.81 198.08 596.59 199.1 596.27 201.53 597.49 201.85 597.59 201.26 603.23 275.35 603.26 282.79 599.36 228.29 599.4 230.99 600 236.59 601 238.82 601.41 239.61 601.48 240.01 601.55 241.04 601.65 242.17 601.71 246.98 602 551.64 603.55 283.51 603.57 294.77 604 203.00 604.03										
Station Elevation Data num= 146 Sta Elev Sta Elev <td>INPUT</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	INPUT									
Station Elevation Data		on:								
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132.33 175.38 Bank Sta: Left Right Manning's n Values Sta: 104.77 S84.95 140.73 S84. 141.89 S82.96 143.04 S82. 144.21 S81. 144.77 S80.54 145.45 S80. 146.08 S79.46 146.65 S79. 147.46 S77 155.58 577 153.57 S80. 153.93 S80.37 154.45 S81. 155.17 S81.75 S82.09 156.17 S83. 156.41 S83.34 156.92 S84. 157.42 S84.73 S86.82 162.48 S87.74 163.19 S88. 164.84 S88.59 165.94 S89.167.28 S89.48 168.68 S90. 169.74 S90.38 171.35 S91. 172.42 S91.39 179.3 S93.18 S92.69 190.8 S94.190.8 S94.29 190.8 S94.32 193.73 S95.10 S98.10 S98.1										
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162.48 587.74 163.19 588 164.84 588.59 165.94 589 167.28 589.48 168.68 590 169.74 590.38 171.35 591 172.42 591.39 173.8 592.175.38 592.61 175.85 592.79 177.47 593 179.3 593.18 186.06 593.72 187.67 593.83 189.39 594 190.8 594.32 193.73 595 194.83 595.26 197.32 595.81 198.08 596 199.1 596.27 201.53 597 202.88 597.41 203.25 597.47 204.58 597.55 204.77 597.59 211.02 598.01 215.93 598.18 225.26 599 225.68 599.04 228.09 599.36 228.29 599.4 230.99 600 236.59 601 238.82 601.41 239.61 601.48 240.01 601.53 241.04 601.63 242.17 601.71 246.98 602 251.64 602.25 256.1 602.6 262.19 603 274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 604 604.63 604.63 604.03 604.	158.1	585.6	158.51	586	159.05	586.35	159.67	586.73	159.86	586.82
168.68 590 169.74 590.38 171.35 591 172.42 591.39 173.8 592 175.38 592.61 175.85 592.79 177.47 593 179.3 593.18 186.06 593.72 187.67 593.83 189.39 594 190.8 594.32 193.73 593.18 186.06 593.72 197.32 595.81 198.08 596 199.1 596.27 201.53 597 202.88 597.41 203.25 597.47 204.58 597.55 204.77 597.59 211.02 598.01 215.93 598.18 225.26 599 225.68 599.04 228.09 599.36 228.29 599.4 230.99 600 236.59 601 238.82 601.41 239.61 601.48 240.01 601.53 241.04 601.63 242.17 601.71 246.98 602 251.64 602.25 256.1 602.6 262.19 603 274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 Manning's n Values nume 8 n val Sta n val Sta n val Sta n val 3 54 0 0 07 46.2 0.24 74.51 0.07 116.48 0.02 132.33 0.07 146.65 0.4 153.57 0.7 175.38 0.035 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 132.33 175.38	162.48	587.74	163.19	588	164.84	588.59	165.94	589	167.28	589.48
175.38 592.61 175.85 592.79 177.47 593 179.3 593.18 186.06 593.72 187.67 593.83 189.39 594 190.8 594.32 193.73 595 194.83 595.26 197.32 595.81 198.08 596 199.1 596.27 201.53 597 202.88 597.41 203.25 597.47 204.58 597.55 204.77 597.59 211.02 598.01 215.93 598.18 225.26 599 225.68 599.04 228.09 599.36 228.29 599.4 230.99 600 236.59 601 238.82 601.41 239.61 601.48 240.01 601.53 241.04 601.63 242.17 601.71 246.98 602 251.64 602.25 256.1 602.6 262.19 603 274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 604 601.63 200 604.03 604.03 604.03 604.03 604.03 604.03 604.03 604.03 604.03 604.03 604.03 605.00 604.03 605.00 604.03 605.00 606.00 605.0				590.38		591		591.39	173.8	592
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197.32 595.81 198.08 596 199.1 596.27 201.53 597 202.88 597.41 203.25 597.47 204.58 597.55 204.77 597.59 211.02 598.01 215.93 598.18 225.26 599 225.68 599.04 228.09 599.36 228.29 599.4 230.99 600 236.59 601 238.82 601.41 239.61 601.48 240.01 601.53 241.04 601.63 242.17 601.71 246.98 602 251.64 602.25 256.1 602.6 262.19 603 274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 300 604.03 Manning's n values	187.67				190.8					
203.25 597.47 204.58 597.55 204.77 597.59 211.02 598.01 215.93 598.18 225.26 599 225.68 599.04 228.09 599.36 228.29 599.4 230.99 600 236.59 601 238.82 601.41 239.61 601.48 240.01 601.53 241.04 601.63 242.17 601.71 246.98 602 251.64 602.25 256.1 602.6 262.19 603 274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 604 604.03 604.0	197.32	595.81	198.08		199.1					
225.26 599 225.68 599.04 228.09 599.36 228.29 599.4 230.99 600 236.59 601 238.82 601.41 239.61 601.48 240.01 601.53 241.04 601.63 242.17 601.71 246.98 602 251.64 602.25 256.1 602.6 262.19 603 274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 300 604.03	203.25	597.47								
236.59 601 238.82 601.41 239.61 601.48 240.01 601.53 241.04 601.63 242.17 601.71 246.98 602 251.64 602.25 256.1 602.6 262.19 603 274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 300 604.03 num= 8	225.26		225.68			599 36		599.4		
242.17 601.71 246.98 602 251.64 602.25 256.1 602.6 262.19 603 274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 604 604.03 60								601 53		
274.12 603.23 275.35 603.26 282.76 603.55 283.51 603.57 294.77 604 Manning's n values nume 8										
300 604.03 Manning's n Values num= 8 Sta n Val Sta n Val Sta n Val Sta n Val 0 .07 46.2 .024 74.51 .07 116.48 .024 132.33 .07 146.65 .04 153.57 .07 175.38 .035 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 132.33 175.38 72.46 70 72.44 .1 .3										
Manning's n Values num= 8 Sta n Val 0 .07 46.2 .024 74.51 .07 116.48 .024 132.33 .07 146.65 .04 153.57 .07 175.38 .035 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 132.33 175.38 72.46 70 72.44 .1 .3			213.33	003,20	202.10	003.33	203.31	003.31	234.11	004
Sta n Val Sta n Val <th< td=""><td>300</td><td>004.03</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	300	004.03								
Sta n Val Sta n Val <th< td=""><td>Manging's</td><td>n Value</td><td></td><td>num-</td><td>8</td><td></td><td></td><td></td><td></td><td></td></th<>	Manging's	n Value		num-	8					
0 .07 46.2 .024 74.51 .07 116.48 .024 132.33 .07 146.65 .04 153.57 .07 175.38 .035 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 132.33 175.38 72.46 70 72.44						n val	Cta	n wal	Cta	n v-1
146.65 .04 153.57 .07 175.38 .035 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 132.33 175.38 72.46 70 72.44 .1 .3										
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 132.33 175.38 72.46 70 72.44 .1 .3							110.40	.024	132.33	.07
132.33 175.38 72.46 70 72.44 .1 .3	140.05	.04	133.37	.07	1/3.30	.033				
132.33 175.38 72.46 70 72.44 .1 .3	pank star	Laft	Picht	Longthe	· Laft c	hannal	Pight	Cooff	Contr	Evnan
				Lengths				coell		
	Ineffecti		num=	2	12,40	70	12.44			

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LemonCreekEX.rep

Sta L	Sta R	Elev	Permanent
0	146.63	590	F
153.38	300	590	F

CROSS	SECTION	CUITPUT	Profile	#50-VP

E.G. Elev (ft)	595.53	Element	Left OB	Channel 1
Right OB Vel Head (ft)	0.24	wt. n-val.	0.026	0.065
0.035 W.S. Elev (ft)	595.30	Reach Len. (ft)	72.46	70.00
72.44 Crit W.S. (ft)	590.01	Flow Area (sq ft)	70.69	433.13
30.14 E.G. Slope (ft/ft)	0.001662	Area (sq ft)	70.69	433.13
30.14 Q Total (cfs)	2021.00	Flow (cfs)	343.49	1608.62
68.89 Top width (ft)	89.91	Top width (ft)	27.24	43.05
19.62 Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)	4.86	3.71
2.29 Max Chl Dpth (ft) 1.54	18.30	Hydr. Depth (ft)	2.59	10.06
Conv. Total (cfs) 1689.6	49568.1	Conv. (cfs)	8424.7	39453.8
Length Wtd. (ft) 19.86	70.00	Wetted Per. (ft)	27.74	54.65
Min Ch El (ft)	577.00	Shear (1b/sq ft)	0.26	0.82
0.16 Alpha	1.06	Stream Power (1b/ft s)	300.00	0.00
0.00 Frctn Loss (ft)		Cum Volume (acre-ft)	1.67	11.97
2.91 C & E Loss (ft) 0.99		Cum SA (acres)	1.26	1.31

CULVERT

RIVER: LemonCreek REACH: Reach1 RS: 2625.92

INPUT
Description: Culvert #4
Distance from Upstream XS = 5
Deck/Roadway Width = 60
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2
Sta Hi Cord Lo Cord Sta Hi
132.33 590.23 175.38 59

5ta Hi Cord Lo Cord 175.38 592.38

Upstream Bridge Cross Section Data Station Elevation Data num=

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	630.28	1.17	629.59	2.14	629	3.81	628	4.86	627.38
5.46	627	6.7	626.27	7.14	626	8.5	625.19	10.35	624.1
11.79	623.24	15.08	621.62	17.19	620.62	18.46	620	19.26	619.62
20.53	619	22.56	618	24.49	617.02	24.64	616.95	26.86	616
27.34	615.81	28.98	615	31.14	614.15	31.66	613.92	34.15	612.8
35.91	612	39.45	610.4	40.29	610	42.06	609.23	42.92	608.85
43.61	608.64	46.2	608	46.84	608	50.12	607.83	51.12	607.8

				LemonC	reekEX.re	n			
81.79 95.38 106.2 116.48 126.66 132.68 139.56 144.77 155.54 158.1 162.48 175.38 187.67 203.25 225.26 236.59 242.17	607.77 604 5999 594.89 591.01 591.33 590.14 584.95 580.54 587.74 592.61 593.83 595.81 593.83 595.81 597.47 601.71 603.23 604.03	107.78 117.12 130.37 133.1 140.73 145.45 153.57 156.17 158.51 163.19 169.74 175.85 189.39 198.08 204.58 225.68 238.82 246.98	602.23 598.18 594.57 592.98 590.67 589.91 580 580 580 583 586 592.79 594 592.79 594 601.41 602 603.26	76.9 88.79 98.13 109.73 118.35 131.01 134.94 141.89 146.08 153.93 156.41	606 601.12 597.91 594.24 592.81 590.56 588.93 582.96 579.46 580.37 583.34 586.35 593 594.32 596.27 597.59 599.36	76.91 89.33 100.41 111.07 119.98 132.1 136.02	579 581 584	93.76 103.17 115.97 123.04 132.33 138.38 144.21 147.46 155.17 157.42 159.86 167.28	593.09 592 590.23 586 581
146.65	n val .07 .04	sta 46.2 153.57	num= n Val .024 .07	8 5ta 74.51 175.38	n Val .07 .035	Sta 116.48	n Val .024	Sta 132,33	n Val
Bank Sta: Ineffecti Sta L 0 153.38 Downstrea num= Sta 135.61	146.63 300 am Deck, 2 Hi Cord	590 590 7Roadway	Coordina Sta	ites Hi Cord	Expan3				
Downstrea Station E 9.27 18.45 24.59 36.14 42.99 52.83 60.03 90.08 96.99 106.55 118.71 131.82 137.27 144.98 155.09 159.52 162.13 167.78 172.03	m Bridge Elevation 637.8 633.6 628.21 6255 619.6 65.7,6 661.13 608.6 604.5 599.29 592.76 585.71 585.51 578.81 577.79.31	e Cross S n pata 1.54 9.96 18.86 28.39 36.3 44.6 53.82 83.31 19.49 118.94 118.9	ection E num= Elev 637 632.65 628 623.01 618.9 615 600.7 607.7 607.7 5598.27 5598.27 5585.71 585.02 585.71 585.78 577.8 577.8 577.8	143 Sta 4.49 11.18 20.77 32.33 38.51 45.29 55.53 85.87 92.41 99.97 110.6 124.08 135.61 147.72 160.76 164.83 169.66 173.21 176.12	614.68 609.93 607 602.41 597.26 590 585.63 585 581 575	47.65 57.7 87.33 93.96 101.81 112.5 128.92 135.78 143.44 158.39 160.9 166.24 170.73 173.69	613.57 609 605.88 601.36 586.71 585.67 585.57 579.84 575 578.74 580 584	48.85 58.06 89.11 94.48 103.28 116.47 137.07 144.68 153.05 159.11 161.1 166.48 171.16 174.21 177.07	608.84 604.67 601 595 586 585.69 584.15 579 576 579

Elev 5ta 635 632 13.62 630.74 627 22.44 626.13 620.94 35.21 619.42 617.86 40.74 616.82 614.68 47.65 613.57 609.93 57.7 609 607 87.33 605.88 602.41 93.96 601.36 597.26 101.81 596 590 112.5 588.71 585.63 128.92 585.67 Sta Elev 4.49 635.48 11.18 627 20.77 627 32.33 620.94 38.51 617.86 45.29 614.68 55.53 609.93 85.87 607 92.41 602.41 99.97 597.26 110.6 590 124.08 585.63 0 637.8 1.54 637 9.27 633 9.96 632.65 18.45 628.21 18.86 628 24.59 625 28.39 623.01 36.14 619 36.3 618.9 42.99 615.76 44.6 615 52.83 611.13 53.82 610.67 60.03 608 83.31 607.1 90.08 604 90.82 603.5 96.99 599.29 98.48 598.27 106.55 592.76 109.49 590.76 118.71 585.71 118.94 585.71 Page 11 Page 12

LemonCreekEX.rep 194.08 594.92 195.19 203.25 596.88 203.86 218.2 600 220.42 234.57 602.84 235.69 241.23 603 245.38 187.1 593.34 190.35 596.88 203.86 600.46 600 220.42 600.46 602.84 235.69 603 603 245.38 603.06 603.31 268.64 603.4 197.76 595.72 598.02 596 599 207.88 199.11 208.73 213.41 600.46 223 603 236.19 601 226.11 601.56 228.87 237.5 603.01 238.75 602 603.01 603 241.23 603.26 262.38 603.62 300 246.61 603.07 249.9 603.12 258.33 282.27 603.6 283.22 603.4 281.77 603.6 282.27 603.89 Manning's n Values num= Val Sta .07 60.03 .04 153.05 n Val n Val Sta .024 85.87 .07 177.28 n Val Sta .07 116.47 .035 Sta n Val 0 .07 Sta n val Sta n val .024 135.61 .07 146.17 Bank Sta: Left Right 135.61 177.28 Ineffective Flow num Sta L Sta R Elev 0 146.63 585 Coeff Contr. Expan. .1 2 num= Elev Permanent 585 F 585 F 153.38 300 0 horiz. to 1.0 vertical 0 horiz. to 1.0 vertical Upstream Embankment side slope Downstream Embankment side slope = Downstream Embankment side slope Maximum allowable submergence for weir flow = Elevation at which weir flow begins = Energy head used in spillway design = Spillway height used in design = Weir crest shape = .98 = Broad Crested Number of Culverts = 1 Culvert Name Rise Shape Span Culvert #1 Circular 6.75 FHWA Chart # 2 - Corrugated Metal Pipe Culvert FHWA Scale # 1 - Headwall Solution Criteria = Highest U.S. EG Top n Bottom n Depth Blocked Entrance Loss Coef Culvert Upstrm Dist Length Exit Loss Coef .024 .024 0 Upstream Elevation = 577 Centerline Station = 150 Downstream Elevation = 575 Centerline Station = 150 CROSS SECTION

143

7.33 15.02 22.9 35.62 42.47 48.85 58.06 89.11 94.48 103.28 116.47

130.47

Elev 634

625.88 619.26 616 608.84 601 595 586

585.69

num=

Elev 637

Sta

0

RIVER: LemonCreek RS: 2590.90 REACH: Reach1

Sta 1.54

INPUT Description: Station Elevation Data Elev 637.8

	1.0	monCreekEX.re	n				
131.82 585.51 134.87 137.27 584 138.98 144.98 578.81 146.17 155.09 577 156.7 159.52 579.31 160.24 162.13 581 162.99 167.78 585 169.3 172.03 588 172.53 175.04 590.71 175.43 177.28 592.01 179.08 187.1 593.34 190.35 197.76 595.72 199.11 208.73 598.02 213.41 226.11 601.56 228.87 237.5 603.01 238.75 249.9 603.12 258.33 282.27 603.6 283.22	585.02 13 582.85 1 578. 14 577.8 15 579.65 16 586.16 586.16 588.52 17 591.17 592.1 1 594.19 596.20 599.2 602.23 603.24	5.61 585 41.7 581 7.32 575 7.12 575 7.12 579 6.83 583.08 9.66 586.29 3.21 589 6.12 591.59 83.4 594.92 3.25 596.88 18.2 600 4.57 602.84 6.12 600 6.38 603.31 300 603.89	135.78 143.44 152.4 158.39 160.9 166.24 170.73 173.69 176.61 184.92 195.19 203.86 220.42 235.69 245.38 268.64	585 579.84 575 578.74 580 584 587 589.63 591.82 593.22 595.19 597 600.46 603.4	137.07 144.68 153.05 159.11 166.48 171.16 174.21 177.07 186.1 195.55 207.88 223 236.19 246.61 281.77	584.15 579 576 576 580.31 584.15 587.41 590 592 593.29 593.27 597.85 601 603.01 603.07 603.6	
Manning's n Values Sta n Val Sta 0 .07 60.03 146.17 .04 153.05		8 Sta n Val 5.87 .07 7.28 .035	Sta 116.47	n Val .024	Sta 135.61	n Val .07	
Bank Sta: Left Right 135.61 177.28 Ineffective Flow num= Sta L Sta R Elev 0 146.63 585 153.38 300 585 CROSS SECTION OUTPUT Pro	24 Permanent F F	eft Channel .97 25	Right 32.13	Coeff	Contr.	Expan.	
E.G. Elev (ft)	588.44	Element		L	eft ob	channe1	
Right OB Vel Head (ft)	0.67	Wt. n-val.			0.024	0.064	
w.s. Elev (ft)	587.78	Reach Len.	(ft)		24.97	25.00	
32.13 Crit W.S. (ft)	585.01	Flow Area (44.08	269.14	
	0.006487		22.0		44.08	269.14	
Q Total (cfs)	2021.00	Flow (cfs)		3	52.82	1668.18	
Top width (ft)	57.83	Top width (ft)		21.74	36.09	
Vel Total (ft/s)	6.45	Avg. Vel. (ft/s)		8.00	6.20	
Max Chl Dpth (ft)	12.78	Hydr. Depth	(ft)		2.03	7.46	
Conv. Total (cfs)	25092.1	Conv. (cfs)		4	380.5	20711.6	
Length wtd. (ft)	24.99	Wetted Per.	(ft)		22.36	44.38	
Min Ch El (ft)	575.00	Shear (1b/s	q ft)		0.80	2.46	
Alpha	1.03	Stream Powe	r (1b/ft	s) 3	00.00	0.00	
0.00 Frctn Loss (ft)	0.15	Cum Volume	(acre-ft)		1.67	11.42	
2.91 C & E Loss (ft) 0.98	0.01	Cum SA (acr	es)		1.22	1.25	

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LemonCreekEX.rep Manning's n values were composited to a single value in the main channel. Note:

CROSS SECTION

RIVER: LemonCreek REACH: Reach1 RS: 2565.90

INPUT										
Descripti Station E	on: levation	Data	num=	150						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	638.14	2.09	E1ev 638.06	3.43	638	4.76	637.33	6.75	636.34	
8.79	635.31	9.42	635	14.83	632.28	15 37	632		630.75	
19.94	629.7	22.09	628.63	24.28	627.52	26.54	626.39	28.92 35.27	625.19	
30.68	624.31	32.88	623	33.27	622.79	34.62	622	35.27	621.65	
36.39	621	37.38	620.48	38.21	620	39.58	619.24	40.09	619	
41.93	618	43.89	617	45.83	616	46.76	615.57	47.2	615.38	
50.39 62.91	614.08	51.61 65.4	613.57	55.46	612	57.94 66.36	611	58.4 67.12	610.82 607.85	
79.82	609 607	87.52	606.26	91 02	606	93.1	604.64	94.21	603.8	
95.79	602.62	97.94	601	99.24	600	100.05	599.44	100.63	599	
101.47	598.34	103.25	601 597 592	104.99	595.7	105.91	595	107.24	594	
108.26	593.21	109.93	592	110.75	591.38	112.29	590.23	113.9	589.02	
114.65	588.43	116.21	587	116.34	586.89	117.3	586	118.39	585	
119.55	584.68		584.54	121.89	584.51	126.13	584.46	129.75	584.44	
130.71	584.45	130.89	584.47	132.49	584.51	134.13	584.44	136.41	584.32	
136.81	584.32	137.14	584	138.35	583.1	139.12	582.58	139.96	582	
141.46	581	142.41	580.38	146.17	578	147.23	577.26	147.62	577 577	
147.74	576.86	148.33	576 578	149.67 153.24	575.96	150.63	576 578.99	151.88	578.99	
152.26 154.78	577.29 578		578 578.58	156.49	577.58 579.15	154.38 157.74	579.62	158.8	580	
159.15	580.11	162.8	581	165.67	581.69	170.36	579.02	172.19	583.52	
173.72	584		584.81	176.53	585.02	178.59	583 586	179.2	586.28	
180.71	584 587 593	187.08	590.02	189.08	591	191.06	592	192.09	592.6	
192.83	593	193.19	593.09	195.53	593.69	196.51	594	198.45	594.38	
204.32	595.54	206.74	596	208.26	596.3	211.89	597	214.76	597.56	
217.04	598 599.67	218.74	598.34	222.93	599.17	224.57	599.49	225.83	599.65	
226.44	599.67	226.61	599.7	227.93	599.79	229.07	599.94	232.47	601	
235.17	601.46	238.69	602	242.35	602.54	246.51	603	252.75 281.64	603	
255.08 284.62	603.01	269.32 288.07	603.23	269.69 293.55	603.24	276.45 294.38	603.34	300	603.41	
	603.46		603.5		603.59		003.0	300	003.00	
Manning's Sta 0 147.74	n value	.5	num=	8		***				
Sta	n vai	Sta	n vai	01 02	n vai	110 FF	n Val .024	126 41	n Val	
147 74	04	151 88	.024	193 19	035	119.33	.024	150.41	.07	
							1000			
Bank Sta:	Left	Right	Lengths	: Left C	hannel	Right	Coeff	Contr.	Expan.	
					03.31	12.33				
CROSS SEC	TION OUT	PUT Pro	T11e #50	-YR						
E.G. El	ev (ft)		588.2	8 E1e	ment		- (eft OB	Channe	1
Right OB	J / C+ 5		0.5	7				0.035	0.007	
								0.025	0.067	
W.S. El 72.59	ev (ft)		587.6	5 Rea	ch Len.	(ft)		62.79	63.51	
W.S. El 72.59 Crit W.	5. (ft)			Flo	w Area (sq ft)		60.72	290.76	
E.G. Sl Q Total	ope (ft/	ft)	0.00545	8 Are	a (sq ft)		60.72	290.76	
Q Total	(cfs)		2021.0	0 F1o	w (cfs)		5	43.97	1477.03	

	Le	monCreekEX.rep		
Top Width (ft)	66.59	Top Width (ft)	20.91	45.68
Vel Total (ft/s)	5.75	Avg. Vel. (ft/s)	8.96	5.08
Max Chl Dpth (ft)	11.69	Hydr. Depth (ft)	2.90	6.37
Conv. Total (cfs)	27355.5	Conv. (cfs)	7363.0	19992.5
Length Wtd. (ft)	63.32	Wetted Per. (ft)	22.00	52.69
Min Ch El (ft)	575.96	Shear (1b/sq ft)	0.94	1.88
Alpha 0.00	1.22	Stream Power (1b/ft 5)	300.00	0.00
Frctn Loss (ft) 2.91	0.44	Cum Volume (acre-ft)	1.64	11.26
C & E Loss (ft) 0.98	0.04	Cum SA (acres)	1.20	1.22

Manning's n values were composited to a single value in the main channel. CROSS SECTION

RIVER: LemonCreek

RS: 2502.39 REACH: Reach1

INPUT Description: Station Elevation Data 150 num= Elev Elev 638 635 631 637.57 634 638.01 636.45 632.78 Sta 6.59 16.78 24.09 29.11 Sta 0 Sta Elev Sta Sta 9.81 18.15 11.91 638 635.75 14.55 637 15.57 22.17 27.84 633.25 25.38 29.75 34.72 43.21 50.41 55.58 63.56 72.19 631.7 629 626.64 622.95 25.96 30.98 630.7 27.24 630 629.69 627 623.88 619.85 628.67 626 621.54 617.7 628 31.62 627.67 27.84 32.84 38.69 46.39 53.65 58.88 69.31 97.93 101.77 109.67 33.55 35.43 625.63 620.96 36.59 625 620 52.54 57.6 67.57 75.99 49.83 55.14 617 614.78 618 615.24 612.29 608 604 601.39 596.36 591.584 581.99 577.71 577.71 586.96 590.23 591.93 592.56 594 599.67 51.71 616.56 615 611 607 56.05 616 613.35 608.27 605.26 597 592.82 581.99 577 577 582.96 589 590.22 591.89 593.59 591.89 593.59 55.14 69.86 99.17 102.42 110.71 119.48 130.95 139.46 145.08 148.02 157.94 165.67 169.92 174.73 614 65.56 610 609 72.19 100.04 105.06 112.56 123.91 132.06 139.74 146.11 149.12 101.57 108.03 114.6 126.12 603.27 599.8 595.23 588.3 583.01 582 579 575.97 578.87 587 590 591.592 592.6 600.93 602.33 100.38 603 602.03 598.62 594 587.11 107 114.56 125.85 132.84 141.76 146.17 151.95 159.77 167.99 171.52 175.97 1216.35 234.22 245.98 261.53 278.08 582.88 127.67 582 582 142.07 578.93 575.87 579.18 585.99 588 590.01 591.06 146.8 155.77 578 576 143.38 147.43 147.43 157.06 164.42 168.5 173.06 183.68 214.26 217.68 240.91 155.// 161.54 168.43 172.18 179.55 201.28 217.38 239.47 247.41 580.6 166.82 588.4 170 174.92 193.99 216.23 230.94 244.47 254.05 259.89 277.98 290.28 590.12 183.97 214.89 228.19 242.13 591.06 592 592.67 595.43 597.46 600.55 602.34 592.07 593 595.89 598 601 248.31 256.01 266.18 287.06 252.26 259.17 271.42 288.85 255.63 263.1 598.16 601.32 602.79 602 280.77 602.45 602.9 300 603 603 Manning's n Values num= Sta n Val Sta n Val Sta n Val Sta n Va Sta n Val

Page 15

0 024 9.81 141.76 .07 147.43	.035 7	monCreekEX.rep 4.66 .024 97.93 7.06 .07 174.92	.07 137.04 .035	.024
Bank Sta: Left Right 141.76 174.92		eft Channel Right .56 175.2 183.4	Coeff Contr.	Expan.
CROSS SECTION OUTPUT Pro	file #50-YR			
E.G. Elev (ft)	587.80	Element	Left OB	Channe1
Right OB Vel Head (ft)	1.00	wt. n-val.	0.035	0.062
W.S. Elev (ft)	586.81	Reach Len. (ft)	170.56	175.20
183.40 Crit W.S. (ft)		Flow Area (sq ft)	54.18	201.57
E.G. Slope (ft/ft)	0.009196	Area (sq ft)	54.18	201.57
Q Total (cfs)	2021.00	Flow (cfs)	506.37	1514.63
Top width (ft)	43.34	Top width (ft)	15.41	27.93
vel Total (ft/s)	7.90	Avg. Vel. (ft/s)	9.35	7.51
Max Chl Dpth (ft)	10.94	Hydr. Depth (ft)	3.52	7.22
Conv. Total (cfs)	21074.8	Conv. (cfs)	5280.4	15794.4
Length Wtd. (ft)	174.65	Wetted Per. (ft)	16.68	34.41
Min Ch El (ft)	575.87	Shear (1b/sq ft)	1.87	3.36
Alpha	1.03	Stream Power (1b/ft s)	300.00	0.00
0.00 Frctn Loss (ft)	2.44	cum Volume (acre-ft)	1.56	10.90
2.91 C & E Loss (ft) 0.98	0.04	Cum SA (acres)	1.18	1.17

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek RS: 2327.19 REACH: Reach1

INPUT Description: Station Elevation Data 150 num= Sta Elev .27 629.83 7.84 626 15.46 622.15 25.55 617.1 31.74 614 38.02 610.65 E1ev Elev 629.96 626.85 5ta 1.91 9.51 17.76 25.74 31.77 39.22 5ta 3.56 11.79 19.79 28.08 35.49 40.2 628.17 Sta 0 5ta 3.88 12.11 21.75 Elev 629 Elev 628 623.85 6.16 625.15 621.04 624 620 623 618.12 614.8 619 615 23.46 617 615.9 29.8 36.59 613.98 612 611.43 609.5 37.29 611 610 42.1 608.49

149.62 583.9 150.08 155.85 583.72 160.04 164.44 583.56 166.16	607.46 604.99 509.35 599.35 595.49 589.24 588.213 576.35 576.35 576.35 578.21 583.61 583.61 583.61 583.62 585.19 585.19 585.19 587.99 589.20	74.62 603 86.3 599 86.3 595.05 12.07 592 19.64 588 18.99 584.08 18.99 584.08 18.17 575.9 18.17 583.73 16.39 577 10.49 580.47 16.39 583.48 174 583.19 162 583.48 174 585.19 183.17 587.9 110.2 597.00	46.77 63.29 74.74 81.43 86.52 92.84 101.47 109.23 116.58 125.73 116.58 125.73 148.46 151.06 166.76 177.19	606 604.29 602.91 598.26 594.94 591.59 587.04 580.05 573.29 573.29 583.77 583.77 583.77 585.73 585.73 585.73 587.55 588.98	76.78 83.24 88.28 94.99 103.4 109.36 118.62 127.54 133.23 137.84 142.57 149.48 152.67 163.84	605 604 601.48 597 594 590.46 583.93 578.93 574 574.574 5781.66 583.88 583.88 583.85 584.88 583.85 584.89 585.83 587.64 588.83	
Manning's n Values Sta n Val Sta 0 .07 48.62 127.54 .04 133.23	.024	9 Sta n Val 72.46 .07 19.62 .024	Sta 104.94 166.37	n Val .024 .035	Sta 108.99	n Val .07	
Bank Sta: Left Right 108.99 149.62			Right 66.43	Coeff	Contr.	Expan.	
CROSS SECTION OUTPUT Pro	file #50-YF	3					
E.G. Elev (ft)	585.32	Element		L	eft OB	Channel	
Right OB Vel Head (ft) 0.024	1.38	Wt. n-Val.				0.066	
W.S. Elev (ft) 66.43	583.94	Reach Len.	(ft)		55.09	56.19	
Crit W.S. (ft) 4.40	582.51					211.69	
E.G. Slope (ft/ft)	0.023801	Area (sq ft	:)			211.69	
Q Total (cfs)	2021.00	Area (sq ft Flow (cfs) Top Width (Avg. Vel. (Hydr. Depth Conv. (cfs)				2003.46	
Ton Width (ft)	56.97	Top width ((ft)			40.29	
16.68 Vel Total (ft/s) 3.98	9.35	Avg. Vel. ((ft/s)			9.46	
Max Chl Dpth (ft) 0.26	10.94	Hydr. Depth	(ft)			5.25	
Conv. Total (cfs)						12986.2	
Length Wtd. (ft)	58.92	Wetted Per.	(ft)			46.72	
Min Ch El (ft) 0.39	573.00	Shear (1b/s	q ft)			6.73	
Alpha 0 00		Stream Powe			00.00	0.00	
Frctn Loss (ft) 2.90	0.12	Cum Volume	(acre-ft)	1.45	10.07	
C & E Loss (ft) 0.94	0.30	Cum SA (acr	res)		1,15	1.03	
		Marco 47					

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LemonCreekEX.rep

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
CROSS SECTION

RIVER: LemonCreek
REACH: Reach1 RS: 2271.00

INPUT
Description:
Station Flevation Data Num= 150

	Data	mum-	150					
				Flow	C+n	Flore	Cto	Elev
								626
								617.84
								614.39
					20 75			610.59
								607
								605.36
			68 20					602.51
								600
								597.45
								594.57
							102 14	587
								583.73
								584.09
					124 20		128 55	580.27
								577.23
	141 0			575 77				574.66
			145 30	573				572.73
								572.97
								577.62
								577.32
						578 75		578.5
							214 73	585.02
								589.81
								592
								593
								594.86
	272 02		277 71		370 36		270.07	596.29
								601
								605.41
								610
000.30	303.77	000	304.70	000.31	300.77	609.36	307.39	010
n Value	c	num-	12					
				n val	Sta	n Val	Sto	n val
	73 78							.07
								.07
.024	277.71	. 07	1,2.0	.07	213	+024	200.31	.07
Left	Right	Lengths	: Left C	hanne1	Right	Coeff	Contr.	Expan.
			21.66	25	41.57		.1	.3
	Elev 629.96 629.96 627.65 617 614 609.07 6006 599.62 593.86 586.4 583.73 579.99 576.95 577.57 577.57 579.99 577.97 579.99 600.42 593.42	levation Data Elev 629.96	levation Data numer	levation Data num 150	levation Data			

CROSS SECTION OUTPUT Profile #50-YR

E.G. Elev (ft) 584.91 Element Left OB Channel Right OB

Le	monCreekEX.rep		
0.38	Wt. n-Val.	0.069	0.049
584.52	Reach Len. (ft)	21.66	25.00
	Flow Area (sq ft)	110.22	379.10
0.000933	Area (sq ft)	110.22	379.10
3182.00	Flow (cfs)	172.36	1622.37
108.09	Top Width (ft)	34.38	33.98
4.40	Avg. Vel. (ft/s)	1.56	4.28
11.79	Hydr. Depth (ft)	3.21	11.16
104167.8	Conv. (cfs)	5642.4	53110.8
34.40	wetted Per. (ft)	35.51	38.76
572.73	Shear (1b/sq ft)	0.18	0.57
1.28	Stream Power (1b/ft s)	307.59	0.00
0.05	Cum Volume (acre-ft)	1.38	9.69
0.04	Cum SA (acres)	1.13	0.99
	0.38 584.52 0.000933 3182.00 108.09 4.40 11.79 104167.8 34.40 572.73 1.28 0.05	0.38 wt. n-Val. 584.52 Reach Len. (ft) Flow Area (sq ft) 0.000933 Area (sq ft) 3182.00 Flow (cfs) 108.09 Top Width (ft) 4.40 Avg. Vel. (ft/s) 11.79 Hydr. Depth (ft) 104167.8 Conv. (cfs) 34.40 Wetted Per. (ft) 572.73 Shear (lb/sq ft) 1.28 Stream Power (lb/ft s) 0.05 Cum Volume (acre-ft)	0.38 wt. n-val. 0.069 584.52 Reach Len. (ft) 21.66 Flow Area (sq ft) 110.22 0.000933 Area (sq ft) 110.22 3182.00 Flow (cfs) 172.36 108.09 Top Width (ft) 34.38 4.40 Avg. Vel. (ft/s) 1.56 11.79 Hydr. Depth (ft) 3.21 104167.8 Conv. (cfs) 5642.4 34.40 Wetted Per. (ft) 35.51 572.73 Shear (lb/sq ft) 0.18 1.28 Stream Power (lb/ft s) 307.59 0.05 Cum Volume (acre-ft) 1.38

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1

RS: 2246.00

REACH: Reach1

INPUT
Description:
Station Elevation Data

0 629.97 2.49

13.56 623.24 16.19
24.47 618 27.15
35.48 613.87 37.7
44.89 610 45.94
50.23 608 56.2
64.69 605 68.19
72.51 602.05 75.21
84.93 599 87.26
89.95 596.84 92.83
99.18 591 100.75
108.07 585 108.79
113 583.65 114.35
119.87 582.49 123.98
130.06 580.54 135.94
143.56 578.59 143.89
145.85 575.02 146.88
149.67 571 154.52
156.53 574 156.97
158.87 577.73 159.02 149 num= Elev 628.83 621.92 617 613 609.52 607.05 604.14 600.46 598.66 595 584.5 583.77 581.38 578.57 575.57 575.57 Elev 624 618.97 614 610.52 608.12 605.41 603 599.63 599.63 8 ta 8 .06 17.96 29.74 39.73 47.18 57.57 68.74 75.96 87.76 93.54 101.35 114.79 125.45 114.79 125.45 139.02 144.29 146.95 155.35 El ev 626 621 612.19 609 606.78 600 598.46 598.46 583.28 583.78 577 579.38 577 577 572.35 Sta 10.58 19.86 32.51 40.95 49.1 60.68 69.09 76.18 88.5 95.5 103.42 115.49 126.82 143.21 144.93 155.92 Elev 624.76 620 620 6611.73 608.15 606 603.86 599.99 598.13 393.33 588.27 583.36 583.66 580.77 573.67 575.69 Sta 12.06 21.91 35.12 43.65 49.51 70.92 78.39 97.63 106.88 112.56 117.93 129.46 143.25 145.07 156.34 157.77 598.13 592 586.01 583.58 580.59 578.95 576 573 573.64 576 579

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184.1 578.25 184.19 206.47 578 210.72 217.01 583.06 220.92 228.04 589.17 229.49 235.9 589.82 238.02 241.55 592 242.47 250.15 593.3 252.18 259.86 594 266.92 276.5 598.29 277.79 292.44 607 294.24	578.18 18 580 21 585.32 22 589.34 23 590.1 23 592.31 24 593.32 25 594.78 26 599 28	monCr 66.46 2.87 3.84 1.81 88.39 3.62 4.12 9.03 10.98 5.91	seekEX.re 578.06 581 587 589.38 590.2 592.67 593.46 595 600.73 608.91	195.49 215.31 225.59 233.04 239.62 244.49 256.5 269.9 282.84 297.88	578.28 582.15 588 589.37 591 593.66 595.31 601.75 610	203.42 216.25 227.63 233.93 241.08 247.97 258.19 272.28 286.97	578.09 582.63 589.15 589.5 591.81 593.27 593.82 596 604
Manning's n Values Sta n Val Sta 0 .07 75.96 147.97 .04 155.35 238.02 .07 247.97	n Val .024 8 .07 15	13 5ta 7.26 9.92 9.03	n Val .07 .024 .07	5ta 110.82 206.47	n Val .024 .07	Sta 114.79 227.63	n Val .07 .024
Bank Sta: Left Right 143.25 159.92 Ineffective Flow num= Sta L Sta R Elev 0 148.54 583 154.54 297.88 583 CROSS SECTION OUTPUT Pro	Permanent F F	.12	hannel 29.64	Right 31.84	Coeff	Contr.	Expan.
E.G. Elev (ft)	584.83	Ele	ment		L	eft OB	Channel
Right OB Vel Head (ft)	0.74	Wt.	n-Val.			0.069	0.060
0.025 W.S. Elev (ft)	584.09	3,19	ch Len.	(ft)		33.12	29.64
31.84 Crit W.S. (ft)	583.01	7.5	w Area (30.35		92.69	172.63
295.10	0.002037		7 - 2 10 122			92.69	172.63
E.G. Slope (ft/ft) 295.10	7777		a (sq ft	.)		75.73	
Q Total (cfs) 2293.90	3182.00	FIG	w (cfs)		1	.87.82	700.27
Top Width (ft) 58.87	109.32	Тор	width (ft)		33.78	16.67
Vel Total (ft/s)	5.68	AVG	. vel. (ft/s)		2.03	4.06
Max Chl Dpth (ft)	13.09	нус	lr. Depth	(ft)		2.74	10.36
5.01 Conv. Total (cfs)	70494.1	Con	v. (cfs)		4	161.1	15513.8
50819.2 Length Wtd. (ft)	29.64	wet	ted Per.	(ft)		34.55	24.96
60.68 Min Ch El (ft)	571.00	She	ar (1b/s	o ft)		0.34	0.88
0.62 Alpha	1.47			r (1b/ft	s) 2	97.88	0.00
0.00	4.76						
Frctn Loss (ft) 2.47				(acre-ft	,	1.33	9.53
C & E Loss (ft) 0.85		Cun	SA (acr	es)		1.11	0.97

CULVERT

RIVER: LemonCreek REACH: Reach1

RS: 2230.01

		Le	monCr	reekEX.re	p			
INPUT Description: Culv Distance from Up: Deck/Roadway widt Weir Coefficient Upstream Deck/R	stream XS = th =	5 22 2.6 inates						
num= 5 Sta Hi Cord 143.25 578.95 154.54 583	14	Sta Hi 8.54 9.92	Cord 583 579	Lo Cord	Sta 151.54	Hi Cord 583	Lo Cord	
Upstream Bridge of Station Elevation Sta	n bata	m= 1	49 Sta 8.066 7.964 9.73 7.57 8.74 7.57 8.74 4.79 9.03 0.82 4.49 9.03 8.36 8.36 8.36 9.03 8.36 8.36 8.36 8.36 8.36 8.36 8.36 8.3	Elev 626 621 616.04 612.19 609 606.78 600 598.46 594.57 589.6 583.28 577 579 578.06 585 595 579 578.06 589.38 590.2 592.6 593.46 595 600.73 608.91	Sta 10.58 19.86 32.51 40.95 49.11 60.68 69.09 76.18 88.5 103.42 111.39 115.49 126.82 114.21 144.21 157.66 159.92 195.49 2256.5 269.9 224.49 233.04 233.04 239.62 244.49 256.5 269.9	Elev 624.76 615 601.73 608.15 606.63.86 603.86 599.99 598.13 598.33 588.27 583.66 580.77 575.69 573.1 573 575.69 582.15 588 582.15 588 582.15 583 665 582.15 583 665 583.66	Sta 12.06 21.91 35.12 43.65 49.51 63.07 70.92 78.39 97.63 106.88 112.56 117.93 129.46 114.97 144.97 156.34 157.77 156.34 157.77 156.34 157.77 158.34 203.42 216.25 227.63 233.93 241.08 247.97 258.19 272.28 286.97	Elev 624 618.97 691,41 610.52 608.12 605.41 599.63 598.13 598.58 583.58 573.64 578.95 573.64 578.95 573.64 579.58 573.64 579.58 573.64 579.62 582.63 589.15 589.15 589.15 589.15
Manning's n Value	Sta n 75.96 155.35 247.97	val .024 8 .07 15 .024 26	13 5ta 7.26 9.92 9.03	n Val .07 .024 .07 Expan.	Sta 110.82 206.47	n Val .024 .07	Sta 114.79 227.63	n Val .07 .024
Ineffective Flow Sta L Sta R 0 148.54 154.54 297.88	num=	rmanent F F		35				
num= 5 Sta Hi Cord 140.58 580.94 157.07 583	15 16	Sta Hi 1.07 2.25	Cord 583 580	Lo Cord	Sta 154.07	Hi Cord 583	Lo Cord	
Downstream Bridge Station Elevation			45					

LemonCreekEX ren

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LemonCreekEX.rep
                        Elev
                                                                                      Elev
                                                                                                                     Elev
                                                                                                                                  Sta
12.51
21.52
                                                                                                                                                    Elev
           Sta
                                                                        Sta
              0
                    629.09
                                        1.88
                                                    628.17
                                                                       5.09
                                                                                                                 625.55
                                                                                         627
                                                                                                                                                   624.3
                                                    623.18
                                                                                                    19.16
       13.35
                          624
                                                                      16.24
                                                                                  622.94
                                                                                                                                                      621
                                                                  16.24
30.46
41.21
52.22
64.85
76.66
86.31
94.9
       23.49
                    620.23
                                      24.63 39.63
                                                     619.8
                                                                                  617.37
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                                                                                                                 616.71
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                                                                                                    43.64
52.8
67.15
                    614.36
         37.7
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                                                                                                                 612.03
                                                                                                                                   43.93
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                                      51.67
64.59
72.77
85
94.78
104.7
                                                   610
                                                                                                                 609.83
606.32
                                                                                                                                   57,99
       47.79
                          611
                                                                                  609.99
                                                                                                                                                      609
       60.61
71.54
83.32
                     608.23
                                                                                         607
                                                                                                                                   68.39
                                                                                                                                                 605.94
                          605
                                                    604.64
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                                                                                                    78.19
88.25
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                                                                                                                       603
                     601.49
                                                         601
                                                                                   600.59
                                                                                                                 599.47
                                                                                                                                   88.99
                                                                                                  96.08
106.8
113.77
126.1
133.4
                                                                                                                                 96.46
        92.2
                                                  595.72
594.15
591.01
583.3
581.43
580.575.24
578.63
579.19
578.33
579.57
578.33
584.48
584.48
584.41
589.93
596
601.98
601.98
                    597.19
                                                                                   595.69
                                                                                                                 595.27
                                                                                                                                                 595.18
                   595 104.7

593 111.91

587.89 121.14

584 130.37

581.51 138.1

576.23 149.54

577.48 159.91

579.08 177.91

578.36 207.26

583.78 219.5

584.47 226.86

585.16 233.78

589 241.41

593 248.34

595.29 276.49

600.87 288.37

605.22 298.33
                                                                                   594.08
                          595
593
                                                                                                                 594.09
                                                                                                                                                      594
589
                                                                                                                594.09

590

585

582.08

581

578.43

571

580

579

578.74

578.28

581.53

584.3

584.74
                                                                                                                                107.02
116.24
126.72
133.63
140.58
146.75
157.27
171.35
185.22
193.51
202.97
                                                                  111.93
121.52
131.83
139.26
143.52
149.82
162.25
181.28
191.62
200.78
209.22
220.34
228.2
235.05
243.22
243.22
243.22
243.23
243.23
                                                                                   590.99
      108.69
     118.94
                                                                                 586.84
582.7
581.32
579
575.09
580
579.1
                                                                                                                                                 584.74
     128.62
137.03
                                                                                                                                                      582
                                                                                                 140.48
144.46
168.35
184.34
192.5
201.94
213.46
220.97
229.03
237.23
244.87
261.84
279.28
291.58
                                                                                                                                                 580.94
                                                                                                                                                      577
571
      140.88
      147.96
     157.96
173.85
185.93
199.04
                                                                                                                                                 579.17
                                                                                                                                                 578.99
                                                                                  579.1
578.81
578.32
579.82
584.18
584.62
587
591.67
                                                                                                                                                578.69
578.28
582
584.37
585
     204.07
219.08
226.59
231.14
                                                                                                                                 214.66
221.45
230.56
238.82
                                                                                                                588
592
594.91
597
603.73
                                                                                                                                                 588.74
      239.4
246.6
                                                                                                                                 245.93
263.51
                                                                                                                                                  592.6
                                                                                                                                                      595
     267.29
286.33
294.28
                                                                                   596.1
602.01
608
                                                                                                                                                 597.89
                                                                                                                                  280.88
                                                                                                                                292.06
302.6
                                                                                                                                                      604
                                                                                                                609.44
                                                                                                                                                 609.75
 Manning's n Values
                                                                       13
                                                    num=
                                                    n Val
.024
                          Val Sta
.07 97.8
.04 157.96
.07 248.34
                                                                                    n Val
.07
.024
                                                         Val Sta
.024 106.8
.07 162.25
          Sta n Val
                                                                                                        Sta
                                                                                                                   n Val
                                                                                                                                                  n val
                                                                                                                                       Sta
                                                                                                  133.63
                                                                                                                                 140.58
                                                                                                                      .024
                                                                                                                                                     .07
     149.82
                                                                                                                      .07
                                                                                                  204.07
                                                                                                                                 221.45
                                                                                         .07
     231.14
                                                       .024 276.49
 Bank Sta: Left Right
140.58 162.25
Ineffective Flow nu
                                                    coeff Contr.
                                                                                 Expan.
                                                               2
                                          num=
    Sta L Sta R
0 151.07
157.07 302.6
                                        Elev Permanent
                                         583
583
Descream Empankment side slope
Downstream Embankment side slope
Maximum allowable submergence for weir flow
Elevation at which weir flow begins
Energy head used in spillway design
Spillway height used in design
Weir crest shape
 Upstream Embankment side slope
                                                                                                     0 horiz. to 1.0 vertical 0 horiz. to 1.0 vertical
                                                                                                  .98
                                                                                      = Broad Crested
 Number of Culverts = 1
 Culvert Name
                                                       Rise
                                  Shape
                                                                       Span
 Culvert #1
                                Circular
  FHWA Chart # 2 - Corrugated Metal Pipe Culvert
  FHWA Scale # 1 - Headwall
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length
                                                             Top n Bottom n Depth Blocked Entrance Loss Coef
 Exit Loss Coef
                                                  22
                                                               .024
                                                                                 .024
                                                                                                        0
 Upstream Elevation = 571
Centerline Station = 151.54
 Downstream Elevation = 571
```

LemonCreekEX.rep Centerline Station = 154.07

CROSS SECTION

	LemonCreek Reach1		RS: 221	6.36						
INPUT Descrip Station S1 13. 23. 47. 60. 6 71. 83. 97. 108. 6 118. 6 128. 6 147. 5 173. 8 147. 5 173. 8 147. 5 173. 8 147. 5 173. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 147. 6 140. 8 140. 6 140	otion: 1 Elevation: 10 629.09 10 629.09 10 629.09 10 60.23 10 614.36 10 608.23 10 608.23 1	Sta 1.88 15.6 24.63 39.63 51.67 64.59 72.77 111.91 121.14 130.37 138.1 141.93 149.54 159.91 177.91	num= Elev 628.17 623.18 619.8 613.65 607.07 604.64 604.64 604.64 595.72 594.15 591.01 587 583.3 581.43 575.24 575.24	145 Sta 5.09 16.24 30.46 41.21 52.22 64.85 76.66 86.31 905.45 111.93 121.52 143.52 149.82 149.82 162.25 181.28	622.94 617.37 6013 609.99 607 600.59 595.69 594.08 590.99 586.84 582.7 581.32 579.1	19.16 32.03 43.64 52.8 67.15 78.19 88.25 96.08 106.8 113.77 126.1 133.4 140.48 144.46 152.36 168.35	616.71 612.03 609.83 506.32 603 599.47 595.27 594.09 585 582.08 581 578.43 571 580	21.52 36.15 43.93 57.99 68.39 96.46 107.02 116.24 126.72 133.63 140.58 146.75 157.27 171.35	621 615 611.95 609 605.94 602.67 599 595.18	
185.6 199.0 204.0 219.0 226.5 231.1 239.2 246.2 286.3 294.2	33 579 578.36 578.36 58 583.78 59 584.47 585.16 6 589 593 29 595.29 33 600.87 28 605.22	187.73 199.71 207.26 219.5 226.86 233.78 241.41 248.34 276.49 288.37 298.33	579 578.33 579 583.94 584.48 586.41 589.93 594 596 601.98 607.42	191.62 200.78 209.22 220.34 228.2 235.05 243.22 258.15 277.15 288.41 299.38	578.81 578.32 579.82 584.18 584.62 587 591 594.67 596.1 608	192.5 201.94 213.46 220.97 229.03 237.23 244.87 261.84 279.28 291.58 302.01	578.74 578.28 581.53 584.3 584.74 588 592 594.91 597 603.73 609.44	193.51 202.97 214.66 221.45 230.56 238.82 245.93 263.51 280.88 292.06 302.6	578.69 578.28 582 584.37 585 588.74 592.6 595 597.89 604 609.75	
149.8 231.1	14 .07	97.8 157.96 248.34	.024	276.49	.07	204.07	.01	221,43	.024	
157.0	0 151.07	583 583	Permane F F	nt	hannel 17.36	Right 12.78	Coeff	Contr.	Expan.	
	e1 (fax		F04 4	4 -1-	and a			. fe 60	eb1	
Right (Elev (ft) B Head (ft)		384.4	4 E1e	ment				Channel of ore	
0.026	Elev (ft)		1.4	4 Wt.	n-Val.	25.5		0.025		
16./0)							29.71		
198.69	w.s. (ft)		363.0	1 110	w Area (34 (1)		11.30	133.10	
				Pag	ge 23					

	Le	monCreekEX.rep		
E.G. Slope (ft/ft)	0.006525	Area (sq ft)	11.56	155.18
198.69 Q Total (cfs) 2162.82	3182.00	Flow (cfs)	67.20	951.97
Top Width (ft) 54.91	86.08	Top Width (ft)	9.50	21.67
vel Total (ft/s) 10.89	8.71	Avg. Vel. (ft/s)	5.81	6.13
Max Chl Dpth (ft)	12.01	Hydr. Depth (ft)	1.22	7.16
Conv. Total (cfs) 26774.7	39391.7	Conv. (cfs)	832.0	11785.0
Length Wtd. (ft) 55.90	14.85	Wetted Per. (ft)	9.79	32.16
Min Ch El (ft) 1.45	571.00	Shear (1b/sq ft)	0.48	1.97
Alpha 0.00	1.22	Stream Power (lb/ft s)	302.60	0.00
Frctn Loss (ft) 2.47	0.09	Cum Volume (acre-ft)	1.33	9.13
C & E Loss (ft) 0.81	0.10	Cum SA (acres)	1.09	0.96

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations. Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

	Lemoncreek								
REACH: F	Reach1		RS: 219	9.00					
INPUT									
Descript	tion:								
	Elevation	Data	num=	150					
Sta		Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
- (1.59	629.41	2.76	629	4.04	628.57	5.58	628
7.		8.6	627	13.45	625.36	16.54	624.31	17.43	624
19.		20.4	623	22.88	622.16	23.37	622	29.17	620.04
30.89		34.81	618	39.5	616.33	40.47	615.96	41.36	615.64
43.08		46.08	614.01	48.76	613.37	50.22	613	55.03	611.8
56.2		57.71	611.74	63.68	611.43	66.22	611.31	70.8	611.18
72.68		75.74	611	75.81	610.98	78.22	610.02	83.99	608
		89.81	606	90.91	605.64	92.79		93.99	604.66
86.88							605		
95.04		95.44	604.34	96.68	604.16	99.06	603.83	99.51	603.72
100.17		100.63	603.49	103.1	602	104.73	601	108.02	599
109.86		113.3	595.83	114.72	595	115.92	594.26	116.9	593.67
118.6		119.78	592	121.45	591	122.23	590.97	129.78	590.24
131.66		132.16	590	132.97	590	137.52	589.72	140.82	589.53
142.13	3 589.39	144.68	589.08	145.28	589	145.51	588.92	146,98	587.41
147.7		148.29	586	148.68	585.57	149.83	584.42	150.63	583.56
151.76		153.8	580.36	155.17	579	156.77	577.38	158.17	576
160.8		161.17	573	163.16	571	165.22	570.95	168.28	570.92
170.43		173.35	571	174.61	571.99	174.64	572	176.09	573.47
177.65		180.41	577.73	180.69	578	181.58	579	182.54	580
183.17		183.73	580	185.5	579	189.81	579.09	190.46	579.11
192.29	9 579.14	197.01	579.03	199.91	579.08	207.41	579.11	214.44	579.14
					00				

	Lor	nonCreekEX. re	an			
219.8 579.01 220.67 225.92 580.95 226.06 233.84 582.72 235.23 243.61 584 243.82 254.2 588.93 256.49 264.65 594 269.09 294.26 596.9 294.69 305.45 603 305.54 310.94 606 312.73	579.1 22: 581 22: 582.73 23: 584.09 24: 590 25: 594.3 27: 597.1 2: 603.04 30:	1.54 579.25 9.71 582.02 6.25 582.8 5.74 585 8.67 591 5.28 598 96.3 598 7.28 604 4.59 608	222.1 232.49 238.04 249.99 260.83 286.51 300.3	579.37 582.66 583 587 592 595.87 600.18 604.15 609.17	223.64 233.08 242.17 252.01 262.77 288.16 302.15 309.11 318.26	580 582.7 583.55 587.92 592.89 596 601.2 605 610.02
Manning's n Values Sta n Val Sta 0 .07 55.03 161.17 .04 174.61 242.17 .07 264.65	n val .024 7 .07 18	13 Sta n Val 5.81 .07 3.12 .024 4.26 .07		n val .024 .07	Sta 145.51 233.08	n Val .07 .024
Bank Sta: Left Right 145.51 183.12	Lengths: Le	eft Channel	Right 122.27	coeff	Contr.	Expan.
CROSS SECTION OUTPUT Pro	file #50-YR					
E.G. Elev (ft)	583.69	Element		L	eft OB	Channel
Right OB	100					
Vel Head (ft) 0.025	1.11	wt. n-val.				0.060
W.S. Elev (ft)	582.58	Reach Len.	(ft)	1	07.55	114.90
122.27 Crit W.S. (ft)		Flow Area	(so ft)			253.72
148.95	20000000		3.0			200
E.G. Slope (ft/ft) 148.95	0.006052	Area (sq f	t)			253.72
Q Total (cfs)	3182.00	Flow (cfs)				1676.05
1505.96 Top Width (ft)	80.56	Top Width	(ft)			31.51
49.04	7.90		2: 25			6.61
Vel Total (ft/s) 10.11		Avg. Vel.	(11/5)			
Max Chl Dpth (ft) 3.04	11.66	Hydr. Dept	h (ft)			8.05
Conv. Total (cfs)	40903.9	Conv. (cfs)			21545.2
19358.7 Length Wtd. (ft)	117.18	Wetted Per	(ft)			40.01
49.87						
Min Ch El (ft) 1.13	570.92	Shear (1b/	sq ft)			2.40
Alpha	1.14	Stream Pow	er (1b/ft	5) 3	18.26	0.00
0.00 Frctn Loss (ft)	0.86	Cum Volume	(acre-ft)		1.33	9.05
2.42 C & E Loss (ft) 0.80	0.01	Cum SA (ac	res)		1.09	0.95

Note: Manning's n values were composited to a single value in the main channel. CROSS SECTION

RIVER: LemonCreek REACH: Reach1

RS: 2084.10

INPUT Description: Station Elevation Data

num= 150

				LemonCr	eekEX.re	p			
15.56 30.06 34.44 40.89 47.19 53.34 58.11 74.84 101.34 121.46 124.55 129.26 135.5 141.19 148.55 129.26 135.5 141.19 148.55 129.26 135.4 190.22 194.96 200.73 207.33 221.26 229.47 237.45 237.45 244.65	599 596.31 593.3 590.13 586.83 585.72 587.5 577 579.5 576.71 579.12 583.41 586.33 594.2 594.2 595.93 598.53 603.607	18. 92 31. 26 34. 58 42. 67 48. 67 48. 67 59. 93 69. 35 76. 26 104. 03 121. 55 125. 2 130. 17 133. 02 135. 71 145. 13 150. 16 155. 86 159. 62 184. 09 191. 05 196. 04 201. 28 208. 91 218. 31 224. 31 239. 26 245. 68	610.83 609.87 609.57 605 598.61 595.28 595.28 585.68 581.33 576 572.84 569.66 569.67 571 574.555 577 580 584 589.35 599.595 609.66	Sta 13.36 22.67 31.31 35.55 44.21 60.39 65.76 70.43 79.27 106.2 121.57 125.51 130.24 133.78 151.76 156.55 161.12 191.86 197.03 204.93 211.97 221.69 221.69 221.69 221.69 221.69 221.69 221.69	Elev 610.15 610.15 610.03 609.88 600.598 595 592 589.39 586 585.63 585.55 581 575.93 586.64 587.6 587.6 587.6 587.6 587.6 587.7 575.5 581.6 582.73 599.77 605.34 608	5ta 13.61 25.45 33.73 39.11 45.16 50.28 55.98 60.99 66.73 72.8 84.31 109.22 122.62 6131.16 134.62 136.11 148.08 131.16 134.62 136.13 192.78 197.63 205.34 212.69 226.74 233.9 242.85 242.85 249.03	607,607,607,607,607,607,607,607,607,607,	40.4 46.25 51.57 56.86 63.42 67.56 74.53 91.78 120.47 123.95 126.47 132.11 134.79 137.29 148.42 153.42 153.42 158.11 162.61 189.46 193.51 199.49 206.83 218.33 227.07 235.75 243.58	606.28 603 609 597 593.31 587 585.76 585.06 582.63 573.86 570.77 569.66 569.98 573.03 576 579.36 579.58 579.76 583 585.44 589.19 594.77 597.18 602.04 606.41 609.97
Sta 0	n val	Sta	n val	76.26	n val	5ta 121.55	n va1	134.79	n Val
150.16									
Bank Sta:	21.55 1	Right 62.61	Lengths	202.44	208.44	211.8	Coeff	Contr.	Expan.
CROSS SEC	TION OUT	PUT Pro	file #50	-YR					
E.G. El	ev (ft)		582.8	3 E1e	ement		L	eft OB	Channe1
vel Hea	d (ft)		1.1	.6 Wt.	n-val.				0.060
W.S. E1	ev (ft)		581.6	7 Rea	ich Len.	(ft)	2	02.44	208.44
Right OB Vel Hea 0.024 W.S. El 211.80 Crit W.	s. (ft)			Flo	w Area (sq ft)			318.75
E.G. S1		ft)		9 Are	a (sq ft	:)			318.75
49.32 Q Total 463.61			3182.0	0 F1c	ow Area (ea (sq ft ow (cfs) o Width (2718.39
			65.	0 Top	width (ft)			37.74
24.66 Vel Tot	al (ft/s	(3)	8.6	5 Ave	. vel. (ft/s)			8.53
9.40 Max Chl	Doth (f	;) ft) fs)	12.0	14 HVC	r. Depth	(ft)			8.45
2.00 Conv. T	otal (cf	·s)	33561.	0 Cor	v. (cfs)				28671.2
4889.8 Length	wtd. (ft	:)	208.6	9 Wet	ted Per.				45.75
25.09 Min Ch	El (ft)								3.91
					ge 26	4,10			

1.10	Le	monCreekEX.rep		
Alpha	1.00	Stream Power (1b/ft s)	250.00	0.00
0.00 Freth Loss (ft)	1.87	Cum Volume (acre-ft)	1.33	8.30
2.14 C & E Loss (ft) 0.69	0.02	Cum SA (acres)	1.09	0.86
5.415				

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek RS: 1875.66 REACH: Reach1

Station Elevation Data State Elev State	INPUT Description	on-								
Sta Elev Sta Elev O 592.1 .92 592.5 591.67 6.14 591.66 7.2 591.68 7.67 591.67 10.27 591.56 16.72 591.31 17.3 591.29 18.84 591.33 20.57 591.42 25.08 592 33.29 592.98 33.47 593 34.09 593.02 349.86 592.89 51.26 592.89 52.94 592.84 54.45 592.87 593.18 47.02 593 49.86 592.89 51.26 592.89 52.94 592.84 54.45 592.8 55.74 592.8 56.26 592.79 59.36 592.86 60.06 592.81 60.58 592.82 61.07 592.81 66.92 589.23 70.51 589 72.18 588.14 72.5 588 74.3 587.05 88.4 585 89.33 584.98 91.08 584.86 74.24 585.87 79.56 585.69 97.43 584.51 100.65 584.3 105.04 584 113.95 583.31 112.99 583.22 119.26 583 119.29 583 120.86 582 211.96 581.33 122.99 583.23 77.40 581.33 122.99 583.33 574 135.2 572.82 136.42 572 137.25 571.48 137.96 571 139.26 570.18 140.38 569.46 141.05 569 141.31 568.85 142.58 574.91 139.26 570.18 140.38 569.46 141.05 569 141.31 568.85 142.58 568 143.93 567.13 144.31 566.87 146.25 565.58 147.09 565 156.76 565 158.66 567 158.45 577.59 158.68 568 159.29 579.66 168.40 577.60 158.94 579.81 168.45 579.81 168.45 579.81 168.45 579.81 168.45 579.81 168.45 579.89 170.33 579.98 171.55 580.46 141.05 569 141.31 568.85 142.58 569.31 144.31 566.87 159.94 570 160.34 570.63 160.54 571 160.8 571 160.8 579.99 579.99 170.33 579.98 171.55 580 171.69 580.08 173.98 581 175.79 581.79 591.70 173.3 589.00 579.28 170.03 589.49 570.63 160.54 579.81 168.43 579.82 169.03 579.99 170.33 579.98 171.55 580 171.69 580.08 173.98 581 175.79 581.75 579.59 160.34 579.63 168.40 579.83 188.85 584.88 175.79 581.75 579.69 160.34 579.83 168.43 579.83 168.43 579.83 168.43 579.83 168.43 579.83 168.43 579.83 168.43 579.83 169.47 588.33 129.94 570 160.34 570.63 160.54 579.83 168.43 579.83 160.83 579.99 579.99 579.83 170.28 589.83 170.98 581.75 580.75 580.75 588.48 189.96 588.49 170.85 588.48 189.96 588.49 170.			Data	num-	150					
0 592.1						Flow	C+n	Flow	Cta	Flow
7.67 591.67 10.27 591.56 16.72 591.31 17.3 591.29 18.84 591.33 20.57 591.42 25.08 592 33.29 592.98 33.47 593.34.09 593.02 34.88 593.02 36.99 593.05 39.52 593.22 40.35 593.18 47.02 593 49.86 592.89 51.26 592.89 52.94 592.84 54.45 592.8 55.74 592.8 61.44 592.75 63.13 592.86 60.06 592.81 60.58 592.85 592.86 61.44 592.75 63.13 592.87 60.58 592.86 60.06 592.81 60.58 592.82 61.07 592.81 61.44 592.75 63.13 592.84 72.18 588.14 72.5 588 74.3 587.05 75.52 586.47 62.44 586 76.61 585.86 77.17 585.87 79.56 585.69 89.33 584.98 91.08 584.86 94.24 584.7 96.13 584.59 97.43 584.51 100.65 584.98 91.08 584.86 94.24 584.7 96.13 584.59 112.26 583 119.29 583 120.86 582 121.96 581.33 122.99 580.65 124.02 580 125.41 579.13 125.88 578.83 127.13 578 127.77 577.6 128.67 577 129.53 576.46 130.24 576 131.85 575.02 131.91 574.97 133.33 574 135.2 572.82 136.42 572 137.25 571.44 137.96 571 139.26 570.18 140.38 569.46 141.05 569 141.31 568.85 142.58 143.93 567.13 144.31 566.87 146.25 565.58 147.09 565 156.76 565 156.76 565 158.06 567 158.45 567.59 158.68 568 159.29 569 159.47 569.24 161.72 573 162.14 573.69 162.3 574.81 189.94 570 160.34 570.63 160.54 571 160.8 571.41 161.46 572.49 161.72 573 162.14 573.69 162.3 574.81 188.96 579.81 178.55 580 171.69 580.08 173.98 581.33 19.99 588.63 194.94 587.24 197.93 588 168.24 579.81 168.83 579.82 169.03 579.99 170.33 579.98 171.55 580 171.69 580.08 173.98 581.32 199.97 588.63 199.49 588.32 125.59 588.48 199.47 588.32 199.97 588.53 200.82 588.78 201.73 593.49 233.19 594.52 226.95 592.43 228.09 592.81 228.64 593.23 199.94 587.24 197.93 588 199.47 588.32 199.97 588.53 200.82 588.78 201.73 593.49 233.19 594.52 226.95 592.43 228.09 592.81 228.64 593.23 199.94 587.24 197.93 588 199.47 588.32 199.97 588.53 200.82 588.78 201.73 593.49 233.19 594.52 226.95 592.43 228.09 592.81 228.64 593.23 250.60 600 600 600 600 600 600 600 600 600										
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124.02 580 125.41 579.13 125.88 578.83 127.13 578 127.77 577.6 128.67 577 129.53 576.46 130.24 576 131.85 575.02 131.91 574.97 133.33 574 135.2 572.82 136.42 572 137.25 571.48 137.96 571 139.26 570.18 140.38 569.46 141.05 569 141.31 568.85 142.58 568 143.93 567.13 144.31 566.87 146.25 565.58 147.09 565 156.76 565 158.06 567 158.45 567.59 158.68 568 159.29 569 159.47 569.24 159.94 570 160.34 570.63 160.54 571 160.8 571.41 161.46 572.49 161.72 573 162.14 573.69 162.3 574 162.9 575 163.45 576.63 164.04 577 164.58 578 165.85 579 166.32 579.23 167.12 579.52 167.65 579.68 168.24 579.81 168.43 579.82 169.03 579.93 170.33 579.98 171.55 580 171.69 580.08 173.98 581 175.79 581.75 176.36 582 178.1 582.73 179.66 583.32 181.85 584 183.67 584.48 185.08 584.82 185.79 585 187.92 585.49 189.96 586 191.28 586.32 194.94 587.24 197.93 588 199.47 588.32 199.97 588.53 200.82 588.78 201.73 589 202.84 589 217.02 589.83 219.94 580 221.55 590.57 230.1 593.49 233.19 594.52 234.65 595 237.23 595.84 237.74 596 239.92 596.71 242.63 597.6 245.14 598.42 247.64 599.23 250 600 Manning's n values num= 8	97.43	584.51	100.65	584.3	105.04	584	113.95	583.36	115.96	583.22
124.02 580 125.41 579.13 125.88 578.83 127.13 578 127.77 577.6 128.67 577 129.53 576.46 130.24 576 131.85 575.02 131.91 574.97 133.33 574 135.2 572.82 136.42 572 137.25 571.48 137.96 571 139.26 570.18 140.38 569.46 141.05 569 141.31 568.85 142.58 568 143.93 567.13 144.31 566.87 146.25 565.58 147.09 565 156.76 565 158.06 567 158.45 567.59 158.68 568 159.29 569 159.47 569.24 159.94 570 160.34 570.63 160.54 571 160.8 571.41 161.46 572.49 161.72 573 162.14 573.69 162.3 574 162.9 575 163.45 576.63 164.04 577 164.58 578 165.85 579 166.32 579.23 167.12 579.52 167.65 579.68 168.24 579.81 168.43 579.82 169.03 579.93 170.33 579.98 171.55 580 171.69 580.08 173.98 581 175.79 581.75 176.36 582 178.1 582.73 179.66 583.32 181.85 584 183.67 584.48 185.08 584.82 185.79 585 187.92 585.49 189.96 586 191.28 586.32 194.94 587.24 197.93 588 199.47 588.32 199.97 588.53 200.82 588.78 201.73 589 202.84 589 217.02 589.83 219.94 580 221.55 590.57 230.1 593.49 233.19 594.52 234.65 595 237.23 595.84 237.74 596 239.92 596.71 242.63 597.6 245.14 598.42 247.64 599.23 250 600 Manning's n values num= 8	119.26	583	119.29	583	120.86	582	121.96	581.33	122.99	580.65
128.67 577 129.53 576.46 130.24 576 131.85 575.02 131.91 574.97 133.33 574 135.2 572.82 136.42 572 137.25 571.48 137.96 571 139.26 570.18 140.38 569.46 141.05 569 141.31 568.85 142.58 568 143.93 567.13 144.31 566.87 146.25 565.58 147.09 565 156.76 565 158.06 567 158.45 567.59 158.68 568 159.29 569 159.47 569.24 161.72 573 162.14 573.69 162.3 574 162.9 575 163.45 576.63 164.04 573.69 162.3 574 162.9 575 163.45 576.63 164.04 577 164.58 578 165.85 579 166.32 579.23 167.12 579.52 167.65 579.68 168.24 579.81 168.43 579.82 169.03 579.99 170.33 579.99 171.55 580 171.69 580.08 173.98 581 175.79 581.75 176.36 582 178.1 582.73 179.66 583.32 181.85 584 183.67 584.48 185.08 584.82 185.79 585 187.92 585.49 189.96 586 191.28 586.32 194.94 587.24 197.93 588 199.47 588.32 199.97 588.53 200.82 588.78 201.73 589 202.84 589 217.02 589.83 199.97 588.53 200.82 588.78 217.05 589.83 199.97 588.53 200.82 588.78 217.05 589.83 199.95 590.21 593.49 233.19 594.52 236.95 592.43 228.09 592.81 228.64 593 239.92 596.71 242.63 597.6 245.14 598.42 247.64 599.23 250 600		580								
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163.85 576.63 164.04 577 164.58 578 165.85 579 166.32 579.23 167.12 579.52 167.65 579.68 168.24 579.81 168.43 579.81 169.03 579.99 170.33 579.98 171.55 580 171.69 580.08 173.98 581 175.79 581.75 176.36 582 178.1 582.73 179.66 583.32 181.85 584 183.67 584.48 185.08 584.82 185.79 585 187.92 585.49 189.96 586 191.28 586.32 194.94 587.24 197.93 588 199.47 588.32 199.97 588.53 200.82 588.78 201.73 589 202.84 589 217.02 589.83 219.94 590 221.55 590.57 222.79 591 224.31 591.52 226.95 592.43 229.99 592.81 228.64 593 239.92 596.71 242.63 597.62 234.65 595 237.23 595.84 237.74 596 230.1 593.49 233.19 594.52 234.65 595 237.23 595.84 237.74 596 600 Manning's n Values num= 8 5ta n Val 158.06 0.07 169.03 .024 171.69 .07 201.73 .024 219.94 .07				573 69						
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Sta n Val Sta n Val <th< td=""><td>239.92</td><td>596.71</td><td>242.63</td><td>597.6</td><td>245.14</td><td>598.42</td><td>247.64</td><td>599.23</td><td>250</td><td>600</td></th<>	239.92	596.71	242.63	597.6	245.14	598.42	247.64	599.23	250	600
Sta n Val Sta n Val <th< td=""><td>Manning's</td><td>n value</td><td>5</td><td>num=</td><td>8</td><td></td><td></td><td></td><td></td><td></td></th<>	Manning's	n value	5	num=	8					
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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 119.26 165.85 106.62 105.37 108.86 .1 .3	171.69	.07		.024	219.94	. 07		100	265165	3334
119.26 165.85 106.62 105.37 108.86 .1 .3	Bank Sta:	Left	Right	Lengths	: Left c	hannel	Right	coeff	Contr	Expan.
								2421		.3

CROSS SECTION OUTPUT Profile #50-YR

LemonCreekEX, rep

E.G. Elev (ft)	580.94	Element	Left OB	Channel
Right OB Vel Head (ft) 0.070	1.09	wt. n-Val.		0.062
W.S. Elev (ft) 108.86	579.85	Reach Len. (ft)	106.62	105.37
Crit W.S. (ft) 0.94		Flow Area (sq ft)		380.50
E.G. Slope (ft/ft) 0.94	0.008925	Area (sq ft)		380.50
Q Total (cfs)	3182.00	Flow (cfs)		3181.10
0.90 Top Width (ft)	44.30	Top Width (ft)		41.60
2.70 Vel Total (ft/s)	8.34	Avg. Vel. (ft/s)		8.36
0.96 Max Chl Dpth (ft) 0.35	14.85	Hydr. Depth (ft)		9.15
Conv. Total (cfs)	33681.3	Conv. (cfs)		33671.8
Length Wtd. (ft) 2.85	105.66	wetted Per. (ft)		53.71
Min Ch El (ft) 0.18	565.00	Shear (1b/sq ft)		3.95
Alpha	1.00	Stream Power (1b/ft s)	250.00	0.00
0.00 Frctn Loss (ft) 2.02	0.61	Cum Volume (acre-ft)	1.33	6.62
C & E Loss (ft) 0.63	0.05	Cum SA (acres)	1.09	0.67

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek RS: 1770.29 REACH: Reach1

INPUT Description:
Station Elevation Data

Sta Elev Sta
0 587.96 1.24
10.32 587.84 19.03
35.01 587.78 39.77
44.49 588.02 48.07
66.25 587.74 66.55
79.03 581.37 79.99
96.62 583.58 98.21
99.63 581.7 100.41
102.43 577 100.41
110.18 572 110.41
110.18 572 110.41
113.15 569.37 113.56
116.93 566 118.38
125.68 566 125.79
127.13 567.03 128.66
133.42 571 133.94 INPUT Elev Sta Elev 587.9 6.94 587.87 587.7 26.7 587.7 587.6 43.81 587.97 588 58.66 587.94 584.71 94.89 584 582.98 98.95 582.31 580.28 101.38 580 578 103.87 577.69 574 108.7 573.35 571 111.6 570.73 568.4 114.69 568 565.96 123.94 565.98 566.24 126.24 566.45 568.11 130.23 569 572 135.64 572.43 574 138.42 574.15 150 num= Elev 587.93 587.76 588.02 587.73 583 581 578.71 574.28 571.84 566.11 568 571.34 Sta 8.57 27.67 43.96 60.28 77.02 96.12 Elev 5ta 4.22 26.31 43.35 54.87 74.06 84.35 98.23 101.07 103.53 107.96 111.31 114.24 121.34 125.94 128.82 135 138.28 587.86 587.69 588 587.86 586.67 582 579.72 577 573 570 567.16 565.99 566.63 570 573 96.12 99.3 101.7 104.65 109.09 112.43 115.62 124.68 126.52 131.82 136.55 138.45 574.17

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Selection Services County			eekEX.re		real t	Vie 20	- del 1920	
139.59 574.21 141.45 145.88 574.67 146.08 151.26 576 155.28 160.68 578.23 162.92 168.92 581.05 171.61 177.22 582.9 177.68	574.69 14 576.93 1 579 16 582 1	43.16 46.29 55.57 64.24 73.64 79.43	574.51 574.73 577 579.44 582.77 582.94	144.24 147.29 157.74 165.88 174.27 180.82	574.6 574.99 577.51 580 583 583	145.58 147.34 159.77 168.54 175.96 186.75	574.66 575 578 580.92 583 583.74	
187.02 583.79 187.98	584 1	88.81	584.15	192.9	585	194.77	585	
200.79 585.21 207.03 213.74 586 215.12		08.75	585.41 587	211.97 217.91	585.44 587.58	212.28	585.45 588	
220.77 588.64 221.75	589 2	24.44	590	226.64	590.82	227.13	591	
229.56 591.9 229.82 236.69 594.64 237.6	592 2 595 2	32.51	595.74	232.52 240.12	593 596	235.06 242.26	594 596.86	
242.64 597.01 245.01		46.86	598.75		599.19	250	600.02	
Manning's n Values	num=	8	n val		n 1/27	544	n Vn1	
5ta n Val Sta 0 .035 79.99		Sta 94.89	n Val	107.96	n Va	5ta 138,42	n Val	
146.08 .07 174.27	.024 2	12.28	.07					
Bank Sta: Left Right 98.23 138.42	Lengths: 1		hannel 176.46	Right 170.99	Coeff	Contr.	Expan.	
CROSS SECTION OUTPUT Pro			170.40	1.0.55				
CROSS SECTION DOTPOT PTO)1116 #30-11							
E.G. Elev (ft)	580.28	Ele	ment		L	eft OB	Channe1	ı
Right OB Vel Head (ft)	0.92	Wt.	n-val.				0.046	
0.033 W.S. Elev (ft)	579.36	Rea	ch Len.	(ft)	1	80.61	176.46	
170.99 Crit W.S. (ft)	34.5.18.5		w Area (7115.5	-	.,	334.33	
81.72 E.G. Slope (ft/ft)	0.004033		a (sq ft				334.33	
81.72				-)				
Q Total (cfs) 534.66	3182.00		w (cfs)	200			2647.34	
Top width (ft) 25.58	61.93	Тор	width ((ft)			36.35	
Vel Total (ft/s) 6.54	7.65	Avg	. vel. ((ft/s)			7.92	
Max Chl Dpth (ft)	13.40	Hyd	lr. Depth	(ft)			9.20	
Conv. Total (cfs) 8419.5	50108.1	Con	v. (cfs)				41688.6	
Length Wtd. (ft)	175.07	Wet	ted Per.	(ft)			43.89	
26.21 Min Ch El (ft)	565.96	She	ar (1b/s	q ft)			1.92	
0.78 Alpha	1.01	Str	eam Powe	er (1b/ft	5) 2	50.00	0.00	
0.00 Freth Loss (ft)	0.51	Cum	volume	(acre-ft)		1.33	5.76	
1.91 C & E Loss (ft)	0.07		SA (acr	A TONING		1.09	0.57	
0.59							0.726	

Note: Manning's n values were composited to a single value in the main channel. CROSS SECTION

RIVER: LemonCreek REACH: Reach1

ACH: Reach1 RS: 1593.83

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LemonCreekEX.rep

			LemonCr	eekEX.re	ep			
INPUT Description: Station Elevat Sta El	ion Data lev Sta	num= Elev	48 5ta	Elev	Sta	Elev	Sta	Elev
42.65 581. 68.11 581.	2.3 14.19 26 45.07 05 74.02	582.25 581.03 580.89	18.36 47.59 82.51	582.15 580.81 580.69	30.74 53.38 84.18	581.77 581.04 580.68	38.83 59.12 90.23	581.53 581.16 580.89
91.02 580 102.88 579, 122.33 564, 134.85 570, 181.51 580, 211.46 581, 235.29 592	26 126.98 91 135.83 45 197.91 67 211.76	564.28 570.93 582.13 581.83	95.24 114.77 127.2 143.73 199.26 211.9 250	580.74 569.5 564.29 571.03 581.62 581.83 599.97	100.58 120.75 127.64 160.54 205.79 219.98	580.29 564.25 564.66 576.19 581.59 585.54	102.15 120.8 133.94 172.63 210.25 231.41	580 564.26 570.51 579.54 581.58 590.76
Manning's n Va		num≔ n Val	8 Sta	n val	Sta	n Val	Sta	n Val
0 .0	24 47.59	.035	95.24	.07	102.15		134.85	.024
Bank Sta: Left	Right 134.85	Lengths:	Left C	hannel 127.96	Right 126.93	coeff	Contr.	Expan.
CROSS SECTION	OUTPUT Pr	ofile #50-	-YR					
E.G. Elev (f	ft)	579.70) Ele	ment		E	eft ob	Channe1
Right OB Vel Head (ft 0.035	:)	0.68	Wt.	n-val.				0.040
W.S. Elev (f 126.93	ft)	579.02	2 Rea	ch Len.	(ft)	1	30.55	127.96
Crit W.S. (1	ft)		F1o	w Area	(sq ft)			305.32
E.G. Slope ((ft/ft)	0.002200) Are	a (sq f	t)			305.32
Q Total (cfs	5)	3182.00) F10	w (cfs)				2097.10
1084.90 Top Width (f	ft)	66.82	2 Тор	Width	(ft)			30.93
35.89 Vel Total (f	t/s)	6.60) Avg	. vel.	(ft/s)			6.87
6.14 Max Chl Dpth	(ft)	14.77	7 Hyd	r. Dept	h (ft)			9.87
4.92 Conv. Total	(cfs)	67845.6	5 Con	v. (cfs))			44713.8
23131.8 Length Wtd.	(ft)	127.64	wet	ted Per	. (ft)			39.01
37.05 Min Ch El (f	t)	564.25	5 She	ar (1b/	sq ft)			1.07
0.65 Alpha		1.01	1 str	eam Powe	er (1b/ft	s) 2	50.00	0.00
0.00 Frctn Loss ((ft)	0.19) Cum	Volume	(acre-ft)		1.33	4.46
1.41 C & E Loss (0.47	(ft)	0.10) Cum	SA (acı	res)		1.09	0.44

CROSS SECTION

RIVER: LemonCreek REACH: Reach1

RS: 1465.87

INPUT

TWO IS THE TAX TO SEE			LemonCr	eekEX.re	p				
Description: Station Elevation Sta Elev 0 581.05 30.68 580.17 75.57 578.53 112.13 578.01 128.32 578.09 161.22 577.84 171.84 577.09 197.7 563.25 210.04 568.95 248.91 577.48 274.27 580.16 325 599.18	Data	num= Elev 581.03 580.17 578.53 578.51 578.27 577.54 571.44 563.87 572.96 578.75	56 Sta 8.21 75.96 119.66 142.4 170.37 188.44 199.94 237.14 263.98 304.35	Elev 580.78 580.06 578.53 578.55 578.5 577.57 566.17 564.31 576.15 579.64 589.17	Sta 30.05 64.49 95.91 120.98 144.72 171.03 189.75 204.04 239.45 265.4 316.82	Elev 580.19 579.31 578.32 578.35 577.91 577.49 563.7 565.41 576.66 579.7	Sta 30.44 775 97.12 122.02 152.12 171.78 193.87 205.5 242.76 270.89 323.27	Elev 578.56 578.25 578.44 578.01 577.11 563.11 568.71 577.37 580.07 598.38	
Manning's n Value Sta n Val 0 .024 228.15 .07	Sta 161.22 270.89	num= n val .07 .024	8 5ta 171.78 304.35	n Val .04 .07	Sta 205.5	n va1 .024	Sta 210.04	n Val .04	
Bank Sta: Left 171.78	Right 205.5	Lengths	: Left C	hanne1 39.95	Right 45.44	Coeff	Contr.	Expan.	
CROSS SECTION OUT		file #50	-YR						
E.G. Elev (ft)		579.4	I Ele	ment		i	eft OB	Channe1	
Right OB Vel Head (ft)		0.3	6 Wt.	n-val.			0.028	0.040	
0.036 W.S. Elev (ft)		579.0	5 Rea	ch Len.	(ft)		40.45	39.95	
45.44 Crit W.S. (ft)			F1o	w Area (sq ft)		88.52	353.49	
263.49 E.G. Slope (ft/	ft)	0.00108	6 Are	a (sq ft)		88.52	353.49	
263.49 Q Total (cfs)	16	3182.0		w (cfs)			41.63	1799.07	
1241.30 Top Width (ft)		190.7		Width (ft)		.03.61	33.72	
53.44 Vel Total (ft/s	1	4.5		. vel. (1.60	5.09	
4.71 Max Chl Dpth (f		15.9	2 000	r. Depth			0.85	10.48	
4.93		96551.					297.6	54589.2	
Conv. Total (cf 37664.6	13			v. (cfs)					
Length Wtd. (ft 54.69)	41.1		ted Per.		1	.03.79	41.71	
Min Ch El (ft) 0.33		563.1		ar (1b/s			0.06	0.57	
Alpha 0.00		1.1		eam Powe	r (1b/ft	5) 3	25.00	0.00	
Frctn Loss (ft) 0.76		0.0	6 Cum	Volume	(acre-ft))	1.20	3.50	
C & E Loss (ft) 0.34		0.0	0 Cum	SA (acr	es)		0.93	0.34	
CROSS SECTION									

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RS: 1425.92

RIVER: LemonCreek

REACH: Reach1

Station Elevation Data Sta Elev Sta 0 580.97 4.35 14.41 87.2 118.41 138.08 193.13 223.33 242.37 248.26 262.76 281.87 298.95 321.7 340.46 580.79 Sta 35 93.27 580.43 578.22 577.45 580.86 578.53 577.47 577.24 577.22 577.18 574.56 563.51 573.13 577.35 577.89 578.7 579.93 582.59 593.49 26.58 580.79 578.37 577.46 577.05 577.22 577.13 574.57 563.51 573.38 577.82 578.11 578.72 580.29 0 580.97 58.81 577.22 104.21 577.68 120.61 577.44 155.21 577.27 177.25 577.2 221.48 574.97 80.96 578.09 577.45 89, 25 578, 22 120, 16 577, 45 140, 46 576, 81 163, 65 577, 22 206, 94 576, 86 224, 21 573, 34 244, 65 563, 51 248, 36 573, 95 266, 54 577, 85 284, 14 578, 16 306, 05 579, 28 321, 86 580, 3 352, 04 589, 82 365 595, 4 120.35 151.84 164.44 217.76 224.89 115 135.45 160.03 181.74 223.31 230.99 247.69 261.95 275.02 296.34 317.68 335.36 359.43 577.16 577.22 577 563.51 563.51 221.48 574.97 228.69 563.51 244.89 563.51 253.19 573.81 274.65 577.86 291.46 578.43 315.91 579.8 331.61 581.12 358.39 593.02 224.89 563.51 244.83 563.51 248.54 573.83 273.43 577.88 286.65 578.29 309.83 579.54 329.53 580.8 357.12 592.41 584.89 594.15 365 595.4 Manning's n Values Sta n values num 6 Sta n val Sta n val Sta 0 .024 217.76 .07 223.31 9.53 .07 n Val .04 n val n Val val sta .024 281.87 Sta 248.36 .035 329.53 Bank Sta: Left Right 217.76 262.76 Ineffective Flow nu Lengths: Left Channel Right 28.7 coeff contr. Expan. 26.56 26.5 .3 2 neffective Flow num= 2 Sta L Sta R Elev Permanent 0 224.89 577.34 F 244.89 365 577.34 F CROSS SECTION OUTPUT Profile #50-YR E.G. Elev (ft) Right OB Vel Head (ft) 579.35 Left OB channel Element 0.40 wt. n-val. 0.024 0.040 0.026 W.S. Elev (ft) 28.70 578.96 Reach Len. (ft) 26.56 26.50 Crit W.S. (ft) 572.75 Flow Area (sq ft) 223.19 428.32 29.49 E.G. Slope (ft/ft) 29.49 0.001749 Area (sq ft) 223.19 428.32 0 Total (cfs) 63.65 3182.00 751.47 2366.88 Flow (cfs) Top width (ft) 234.65 Top Width (ft) 150.47 45.00 Vel Total (ft/s) 2.16 Max Chl Dpth (ft) 4.67 Avg. Vel. (ft/s) 3.37 5.53 15.45 1.48 9.52 Hydr. Depth (ft) 0.75 Conv. Total (cfs) 1521.9 76085.4 17968.6 56594.9 Conv. (cfs) Length Wtd. (ft) 39.21 Min Ch El (ft) 0.08 26.50 wetted Per. (ft) 150.53 63.97 563.51 0.16 0.73 Shear (1b/sq ft) 1.17 365.00 0.00 Alpha. Stream Power (1b/ft s) 0.00 Freth Loss (ft)

LemonCreekEX.rep

Sta

Elev

Elev

580.11

num= Elev

INPUT Description:

> 0.61 C & E Loss (ft)

0.29

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Cum Volume (acre-ft)

Cum SA (acres)

1.05

0.82

3.14

0.30

LemonCreekEX.rep

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

```
RIVER: LemonCreek
  REACH: Reach1
                                                                   RS: 1412.68
  TNPUT
 Description: Culvert #2
Distance from Upstream XS =
Deck/Roadway width =
                                                               #
                                                                             16.5
  Weir Coefficient
                                                                                  2.6
 Upstream Deck/Roadway Coordinates
            Sta Hi Cord Lo Cord
224.89 577.34
227.13 577.34
231.95 577.34
239 577.34
243.99 577.34
262.76 577.82
                                                                                                                              Sta Hi Cord Lo Cord
224.89 577.34
229.18 577.34
234.89 577.34
240.6 577.34
244.89 577.34
      217.76
225.79
230.78
237.83
242.65
244.89
Upstream Bridge Cross Section Data Station Elevation Data num= Elev Sta Elev 0 580.97 4.35 580.86 58.81 579.22 80.96 578.53 104.21 577.68 115 577.47 1 120.61 577.44 135.45 577.24 1 155.21 577.27 160.03 577.22 177.25 577.2
                                                                                            74
     num=
Elev
580.86
578.53
577.47
577.24
577.22
577.18
574.56
563.51
573.13
577.35
577.89
578.7
579.93
582.59
                                                                                     74

Sta Elev

14.41 580.79

87.2 578.37

118.41 577.46

138.08 577.05

163 577.22

193.13 577.23

223.33 574.57

242.37 563.51

248.26 573.38

262.76 577.82

281.87 578.21

298.95 578.72

321.7 580.29

340.46 584.89

361.11 594.15
                                                                                                                                                                       5ta
35
93.27
120.35
151.84
164.44
217.76
                                                                                                                                  5ta
26.58
89.25
                                                                                                                                                        Elev
                                                                                                                                                                                                Elev
                                                                                                                                                   580.43
578.22
577.45
576.81
577.22
576.86
                                                                                                                                                                                           580.11
578.09
577.45
577.16
577.22
                                                                                                                               120.16
140.46
163.65
206.94
                                                                                                                               224.21
244.65
248.36
266.54
                                                                                                                                                    573.34
                                                                                                                                                                       224.89 244.83
                                                                                                                                                    573.95
                                                                                                                                                                       248.54 273.43
                                                                                                                                                   578.16
579.28
580.3
                                                                                                                                                                       286.65 578.29
309.83 579.54
329.53 580.8
                                                                                                                               284.14
                                                                                                                               321.86
352.04
365
                                                                                                                                                   589.82
                                                                                                                                                                       357.12
                                                                                                                                                                                           592.41
Manning's n Values num= 6
Sta n Val Sta n Val Sta
0 .024 217.76 .07 223.31
                                                                                                          n Val Sta
.04 248.36
                                                                                                                                                   n Val
                                                                                                                                                                                             n Val
                                                                                                                                                                              Sta
                                                                                                                                                         .024 281.87
                                                                                                                                                                                                  .035
 Coeff Contr.
                                                                                                        Expan.
                                                                                         .1
 Downstream Deck/Roadway Coordinates
      num= 17
Sta Hi Cord Lo Cord
179.99 573.89
186.02 577.34
191.01 577.34
198.06 577.34
202.88 577.34
205.12 577.34
                                                                  Sta Hi Cord Lo Cord
185.12 577.34
187.36 577.34
192.18 577.34
199.23 577.34
204.22 577.34
212.17 576.66
                                                                                                                              Sta Hi Cord Lo Cord
185.12 577.34
189.41 577.34
195.12 577.34
200.83 577.34
205.12 577.34
```

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LemonCreekEX, rep

				LemonCr	eekex.re	P				
Downstreat Station E 50.63 109.48 136.92 153.01 179.54 187.62 205.12 220.38 230.61 242.59 269.22			ection D num= Elev 578.74 577.19 576.33 576.46 576.25 575.68 573.89 563.39 574.42 577.68 578.01 583.1 586.94	68 5ta 28.4 71.18 92.04 120.05 138.71 163.01 180.08 195.87 212.17 220.78 235.99 249.1 286.2 330	Elev 578.17 576.72 576.52 576.44 576.18 575.37 573.34 563.39 576.66 577.21 577.67 578.63	Sta 43.55 77.96 97.17 124.76 144.25 168.11 185.12 199.62 219.47 224.87 238.24 265.61 289.3	Elev 577.66 576.35 576.55 576.35 575.71 573.62 563.39 567.14 577.36 577.85 580.49 583.37	Sta 48.32 79.87 106.43 135.21 145.95 173.95 186.91 200.25 219.84 228.09 241.83 267.13 302.9	Elev 577.48 576.57 576.57 576.22 575.7 563.39 563.39 577.15 577.35 577.86 580.62	
Manning's Sta 0 241.83	n Value n Val .024 .035	s Sta 163.01 289.3	num= n Val .07	7 Sta 173.95	n Val .04	Sta 208.93	n val	5ta 220.73	n Val .024	
Bank Sta: 1: Ineffective Sta L 0 205.12	79.99 2	Right 12.17 num= Elev 577.34 577.34	Permane	.1	Expan,					
Upstream Downstream Maximum a Elevation Energy he Spillway I Weir crest	m Embank llowable at whic ad used height u t shape	ment sid submerg h weir f in spill sed in d	e slope ence for low begi way desi	weir fl ns	=	0 hor 0 hor .98	iz. to 1	.0 verti .0 verti	cal cal	
Culvert Na Culvert #2 FHWA Char FHWA Scal Solution (Culvert Up Exit Loss	ame 1 t # 41- e # 1 - Criteria pstrm Di	Shape Arch Arch; Co 90 Degre = Highe	e headwa st U.S. th To	EG .	tom n D	epth Blo	ocked En	itrance L	oss Coef	
Upstream Downstream	Center m Elevat	line Sta	63.39	234.89 195.12						
CROSS SEC	TION									
RIVER: Ler REACH: Rea			RS: 139	9.42						
Description E Station E Sta 0		Data Sta 10.22	num= Elev 578.74	68 Sta 28.4		Sta 43.55	Elev 577.66	Sta 48.32	Elev 577.48	
				Pa	ge 34					

50.63 577.44 57.08 80 576.31 81.47	577.19 7	emonCreekEX.re 71.18 576.72 92.04 576.52	77.96 97.17	576.39 576.55	79.87 106.43	576.31 576.57
109.48 576.51 112.08 136.92 576.21 138.11 153.01 575.63 157.4	576.46 12 576.25 13 575.68 16	20.05 576.44 38.71 576.18 53.01 575.37	124.76 144.25 168.11	576.35 575.71 573.62	135.21 145.95 173.95	576.22 575.7 574.5
179.54 573.92 179.99 187.62 563.39 189.25	563.39 19	30.08 573.34 95.87 563.39	185.12 199.62	563.39	186.91 200.25	563.39 563.39
205.12 563.39 208.93 220.38 577.17 220.73	577.2 22	12.17 576.66 20.78 577.21	219.47 224.87	577.14 577.36	219.84	577.15 577.35
230.61 577.41 234.87 242.59 577.89 244.09 269.22 580.84 285.42	578.01 2	35.99 577.67 249.1 578.63 286.2 583.17	238.24 265.61 289.3	577.85 580.49 583.37	241.83 267.13 302.9	577.86 580.62 583
307.74 584.91 312.07	586.94	330 593.68	209.3	303.37	302.9	303
Manning's n Values Sta n Val Sta	num= n Val	7 Sta n val	Sta	n Val	Sta	n Val
0 .024 163.01 241.83 .035 289.3		73.95 .04	208.93	. 07	220.73	.024
Bank Sta: Left Right 179.99 212.17	34	eft Channel	Right 35.82	Coeff	Contr.	Expan.
Ineffective Flow num= Sta L Sta R Elev	Permanent					
0 185.12 577.34 205.12 330 577.34	F					
CROSS SECTION OUTPUT Pro	file #50-YF					
E.G. Elev (ft)	577.23	Element		L	eft OB	Channe1
Right OB Vel Head (ft)	4.60	wt. n-val.				0.040
W.S. Elev (ft)	572.63	Reach Len.	(ft)		34.16	31.45
35.82 Crit W.S. (ft)	572.63	Flow Area	(sq ft)			184.89
E.G. Slope (ft/ft)	0.011063	Area (sq ft	t)			221.29
Q Total (cfs)	3182.00	Flow (cfs)				3182.00
Top Width (ft)	27.88	Top Width	(ft)			27.88
vel Total (ft/s)	17.21	Avg. vel.	(ft/s)			17.21
Max Chl Dpth (ft)	9.24	Hydr. Depth	n (ft)			9.24
Conv. Total (cfs)	30252.5	Conv. (cfs))			30252.5
Length Wtd. (ft)	31.46	Wetted Per	(ft)			20.00
Min Ch El (ft)	563.39	Shear (1b/s	sq ft)			6.38
Alpha	1.00	Stream Powe	er (1b/ft	5) 3	30.00	0.00
0.00 Frctn Loss (ft)	0.28	Cum Volume	(acre-ft)		1.05	2.80
0.61 C & E Loss (ft) 0.28	0.90	Cum SA (acı	res)		0.77	0.28

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations. Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may

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LemonCreekEX.rep

LemonCreekEX.rep
indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest [smallest] user entered n value. The value has been set to the largest [smallest] entered value. The user may wish to examine this cross section and enter a single n value for the entire channel.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1	RS: 1367.97	7.0					
INPUT Description: Station Elevation Data Sta Elev Sta 0 578.03 11.26 46.64 576.09 47.94 67.13 576.21 87.05 117.61 575.38 123.94 138.23 574.36 140.98 155.29 571.84 157.62 173.83 568.75 183.44 194.61 562.65 196.69 223.47 576.85 226.34 280.65 584.57 287.86 309.88 584.66 310.89	Elev 577.67 11 576.07 575.29 12 574.05 145 1571.66 158 563.33 184 564.51 208 576.92 236 584.61 290	54 Elev .56 577.66 .57 576.14 .7.5 575.87 .7.5 575.87 .7.5 575.98 .29 571.41 .24 562.82 .63 576.44 .92 578.88 .92 578.48 .92 578.48 .92 578.48	Sta 12.18 61.16 102.08 134.74 141.92 171.55 185.4 213.77 263.1 297.75 315	Elev 577.65 576.18 575.86 574.73 573.83 569.51 562.66 576.23 582.94 584.71 585.8	Sta 33.49 65 107.16 135.28 149.49 172.34 194.1 214.74 273.65 308.35	Elev 577.11 576.2 575.66 574.63 572.48 569.01 562.66 576.32 584.48 584.7	
Manning's n Values Sta n Val Sta 0 .024 125.7 273.65 .024 308.35	num= n Val .07 157 .07	7 Sta n Val 7.62 .04	Sta 208.63	n Val .035	Sta 226.34	n Val .07	
Bank Sta: Left Right 157.62 208.63	Lengths: Le	ft Channel	Right 108.69	Coeff	Contr.	Expan.	
CROSS SECTION OUTPUT Pro	file #50-YR						
E.G. Elev (ft) Right OB Vel Head (ft)	575.17 1.60	Element Wt. n-Val.			eft OB 0.070	Channel 0.040	
W.S. Elev (ft)	573.57	Reach Len.	(ft)	1	11.51	110.10	
108.69 Crit W.S. (ft)		Flow Area ((sq ft)	1 6	15.78	308.77	
E.G. Slope (ft/ft)	0.007479	Area (sq ft	:)	15	15.78	308.77	
Q Total (cfs)	3182.00	Flow (cfs)		1	30.81	3151.19	
Top Width (ft)	62.39	Top Width (ft)	1	14.25	48.14	

Vel Total (ft/s)	9.80	emonCreekEX.rep Avg. Vel. (ft/s)	1.95	10.21
Max Chl Dpth (ft)	10.92	Hydr. Depth (ft)	1,11	6.41
Conv. Total (cfs)	36793.5	Conv. (cfs)	356.2	36437.3
Length Wtd. (ft)	110.14	Wetted Per. (ft)	14.39	54.53
Min Ch El (ft)	562.65	Shear (1b/sq ft)	0.51	2.64
Alpha	1.07	Stream Power (1b/ft s)	315.00	0.00
0.00 Fretn Loss (ft)	0.67	Cum Volume (acre-ft)	1.05	2.61
0.61 C & E Loss (ft) 0.28	0.09	Cum SA (acres)	0.76	0.26
POSS SECTION				

CROSS SECTION

RIVER: LemonCreek REACH: Reach1

RS: 1257.87

INPUT									
Descripti									
Station E			num=	47	200		1-5.00		
5ta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	575.12	5.82	575.1	11.09	574.72	22.9	574.59	28.81	574.57
49.87	574.6	53.32	574.51	55	574.48	72.29	573.87	72.51	573.87
85.74	573.85	87.33	573.76	90.3	573.54	104.8	572.5	115.05	571.05
125.13	569.65	133.71	568.83	135.42	568.73	137.08	567.62	143.38	562.84
144.24	562.55	144.35	562.57	145.18	562.02	150.35	561.79	154.11	562
154.38	562.04	158.03	565.21	163.85	569.43	174.47	570.56	179.86	571.07
193.84	573.59	198.71	574.33	205.91	574.58	211.56	574.75	213.44	574.9
214.98	577.17	216.92	578.01	227.71	582.3	233.96	582.73	234.78	582.81
240.05	582.87	255.36	583.2	268.25	583.61	276.38	583.82	282.17	583.97
296.29	584.31	305	585.14						
Manning's	n value	5	num=	5					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.024	125.13	.07	135.42	.04	163.85	.035	227.71	.035
Bank Sta:	Left	Right	Lengths	: Left C	hanne1	Right	coeff	Contr.	Expan.
		63.85			106.66	107.08		.1	.3
CROSS SEC	TTON OUT	DIT DEC	file #50	-VP					
FILE 22 255	LEGIT OUT	TOI TIO	1116 750	7.17					

E.G. Elev (ft)	574.42	Element	Left OB	Channe T
Right OB Vel Head (ft)	1.31	Wt. n-Val.	0.041	0.040
0.035 W.S. Elev (ft)	573.11	Reach Len. (ft)	106.69	106.66
107.08 Crit W.S. (ft) 56.89		Flow Area (sq ft)	84.55	248.23
E.G. Slope (ft/ft) 56.89	0.005013	Area (sq ft)	84.55	248.23
Q Total (cfs)	3182.00	Flow (cfs)	406.28	2498.58
277.14 Top Width (ft)	94.80	Top Width (ft)	39.07	28.43
27.30 vel Total (ft/s)	8.17	Avg. vel. (ft/s)	4.81	10.07

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	Le	monCreekEX.rep		
Max Chl Dpth (ft) 2.08	11.32	Hydr. Depth (ft)	2.16	8.73
Conv. Total (cfs)	44940.5	Conv. (cfs)	5738.1	35288.3
Length Wtd. (ft) 27.57	106.75	Wetted Per. (ft)	39.33	33.16
Min Ch El (ft) 0.65	561.79	Shear (1b/sq ft)	0.67	2.34
Alpha 0.00	1.27	Stream Power (1b/ft s)	305,00	0.00
Frctn Loss (ft) 0.54	0.36	Cum Volume (acre-ft)	0.92	1.90
C & E Loss (ft) 0.24	0.19	Cum 5A (acres)	0.70	0.16

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections. Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1		RS: 115	1.21					
INPUT Description: State Elevation Sta Elev 0 574.05 48.47 573.28 78.29 572.7 151.31 569.21 168.49 561.02 181.91 567.76 220.44 573.27 241.95 574.07 278.39 575.01	5ta .61 56.23 110.55 152.9 169.83 187.87 221.32	num= E1ev 574.05 573.12 571.92 568.02 560.85 567.66 573.74 574.09	41 5ta 3.41 65 130.46 155.43 175.07 201.88 221.89 252.13	Elev 574 572.88 570.51 567.03 565.16 570.09 574.07 574.21	Sta 23.95 72.67 136.44 160.05 177.24 211.02 234.15 258.87	Elev 573.69 572.78 570.2 563.27 567.55 571.85 574.05 574.38	Sta 30.55 75.81 141.14 161.98 178.87 220.25 236.31 270.45	Elev 573.57 572.77 570.04 561.53 567.75 573.24 574.08 574.77
Manning's n Value Sta n Val 0 .024 221.89 .035	s Sta 141.14	num= n Val .07	6 Sta 151.31	n Val .04	Sta 178.87	n Val .024	Sta 201.88	n Val .07
	Right 78.87	Lengths	Left C 21.5	hanne1 20	Right 21.56	Coeff	Contr.	Expan.
CROSS SECTION OUT	PUT Prof	ile #50-	-YR					
E.G. Elev (ft)		573.87	7 Ele	ment			eft OB	Channe1
Right OB Vel Head (ft)		0.69	9 Wt.	n-val.			0.033	0.040
0.026 W.S. Elev (ft)		573.18	8 Rea	ch Len.	(ft)		21.50	20.00
21.56 Crit W.S. (ft)			Flo	w Area (sq ft)	1	41.68	250.61
135.62 E.G. Slope (ft/	ft)	0.002394	4 Are	a (sq ft)	1	41.68	250.61
135.62 Q Total (cfs) 966.99	300	3182.00		w (cfs)			47.83	1767.18

Top Width (ft)	166.7		reekEX.re p Width (98.16	27.56	
41.00 Vel Total (ft/s	6.0)3 Av	g. vel. ((ft/s)		3.16	7.05	
7.13 Max Chl Dpth (f	t) 12.3	33 Hy	dr. Depth	(ft)		1.44	9.09	
3.31 Conv. Total (cf	s) 65038.	4 Co	nv. (cfs)		9	153.4	36120.1	
19764.9 Length Wtd. (ft	20.9	90 We	tted Per.	(ft)		98.26	32.79	
41.48 Min Ch El (ft)	560.8	35 Sh	ear (1b/s	a ft)		0.22	1.14	
0.49 Alpha	1.2		ream Powe				0.00	
0.00 Freth Loss (ft)			m volume			0.64	1.29	
0.30 C & E Loss (ft)			m SA (acr			0.53	0.09	
0.16	0.0	75 Cui	III SA (acr	es)		0.33	0.09	
CROSS SECTION								
RIVER: LemonCreek REACH: Reach1	RS: 11	31.21						
INPUT Description: Station Elevation Sta Elev 0 574.01 49.5 573.22 90.54 572.53 128.11 571.63 157.89 569.9 180.16 567.24 184.91 559.97 190.6 567.36 227.94 571.03 241.2 573.95 267.8 573.99 307.64 575 Manning's n Value Sta n Val 0 0.24 241.2 .035	Sta Elev 4.97 573.99 71.6 572.76 93.26 572.54 132.99 571.29 174.95 568.87 180.31 567.16 187.35 559.97 194.01 567.28 230.94 571.54 243.53 573.67 274.32 574.2	6	573.76 572.76 572.5 570.13 568.67 564.32 565.14 567.3 571.71 573.68 574.61	Sta 72.28 72.21 103.44 156.56 179.44 182.55 190.54 198.27 239.24 258.63 303.41	572.75 572.28 570.04 567.5 559.97 567.31 567.39 572.82 573.85 574.91	Sta 46.09 85 120.2 157.08 180.02 184.47 190.56 204.22 239.47 264.59 306.35	Elev 573.28 572.53 571.82 570.01 567.29 559.97 567.36 567.39 572.9 573.9 574.96	
Bank Sta: Left 179.44 Ineffective Flow Sta L Sta R 0 182.29	190.6 num= 2 Elev Permane 567 F	29.92	Channel 29.5	Right 29.66	Coeff	Contr.	Expan.	
188.29 307.64	567 F							
CROSS SECTION OUT	PUT Profile #50)-YR						
E.G. Elev (ft) Right OB	573.7	79 E1	ement		L	eft OB	Channe1	
vel Head (ft) 0.036	0.6	51 Wt	. n-val.			0.026	0.040	
W.S. Elev (ft)	573.1	L8 Re	ach Len.	(ft)		29.92	29.50	
29.66 Crit W.S. (ft)	572.0		ow Area (age 39	(sq ft)	2	13.80	121.40	

		maneavalles and		
187.70	Le	monCreekEX.rep		
E.G. Slope (ft/ft) 187.70	0.003521	Area (sq ft)	213.80	121.40
Q Total (cfs)	3182.00	Flow (cfs)	1098.32	851.97
1231.72 Top Width (ft) 49.34	188.62	Top Width (ft)	128.13	11.16
Vel Total (ft/s) 6.56	6.09	Avg. Vel. (ft/s)	5.14	7.02
Max Chl Dpth (ft)	13.21	Hydr. Depth (ft)	1.67	10.88
Conv. Total (cfs) 20757.1	53623.7	Conv. (cfs)	18509.1	14357.5
Length Wtd. (ft) 49.85	29.50	Wetted Per. (ft)	128.46	21.37
Min Ch El (ft) 0.83	559.97	Shear (1b/sq ft)	0.37	1.25
Alpha 0.00	1.05	Stream Power (1b/ft s)	307.64	0.00
Frctn Loss (ft) 0.22		Cum Volume (acre-ft)	0.55	1.21
C & E Loss (ft) 0.14		Cum SA (acres)	0.47	0.08

CULVERT

Bank Sta: Left Right 179.44 190.6

RIVER: LE			RS: 111	16.46					
INPUT									
Descripti				-					
Distance	from Ups	tream XS		5					
Deck/Road		n		9.5					
Weir Coef		Salar Carlo		2.6					
Upstream num=	5	adway Co			1.1572		14 3		
	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta		Lo Cord	
179.44	567.5		182.29	567		185.29	567		
188.29	567		190.6	567.36					
Upstream Station E 90.54 128.11 157.89 180.16 184.91 190.6 227.94 241.2 267.8 307.64			num= Elev 573.99 572.76 572.54 571.29 568.87 567.16 559.97 567.28 571.54 573.67	56 Sta 18.52 71.83 95.45 154.97 176.31 181.02 189.58 195.03 231.97 244.1 292.99	Elev 573.76 572.76 572.5 570.13 568.67 564.32 565.14 567.3 571.71 573.68 574.61	Sta 22.88 72.21 103.44 156.56 179.44 182.55 190.54 198.27 239.24 258.63 303.41	Elev 573.69 572.75 572.28 570.04 567.3 567.31 567.39 572.82 573.85 574.91	Sta 46.09 85 120.2 157.08 180.02 184.47 190.56 204.22 239.47 264.59 306.35	E1ev 573.28 572.53 571.82 570.01 567.29 559.97 567.39 572.9 573.9 574.96
Manning's Sta 0 241.2	n Value n Val .024 .035	s Sta 174.95	num= n Val .035	6 Sta 179.44	n Val .04	5ta 190.6	n Val .035	Sta 227.94	n Val

Coeff Contr. Expan. .3
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LemonCreekEX, rep
Ineffective Flow
                              num=
                            Elev Permanent
567 F
567 F
    Sta L Sta R
0 182.29
   188.29 307.64
Downstream Deck/Roadway Coordinates
      num=
   Sta Hi Cord Le Cord
226.16 566.13
233.57 566
                                    234.94 566.56
Downstream Bridge Cross Section Data
Station Elevation Data
                                    num=
    Sta Elev
0 574.02
44.19 573.56
85.07 572.68
                                   Elev Sta Elev

573.94 19.18 573.92

573.2 62.71 573.91

572.52 110.31 572.24

571.98 133.58 571.73

567.31 225.47 566.09

559.8 231.96 559.8

566.56 235.13 566.57

567.27 268.02 569.4

573.6 284.64 573.59

573.64 334.73 573.77

575.01
                                       Elev
                                                                                     Elev
                                                                                                             Elev
                             Sta
                                                     Sta
                                                               Elev
                         9.15
57.75
92.85
130
172.48
217.82
228.43
                                                                                              33.87
75.18
112.16
                                                                                  573.89
573.26
572.23
                                                                         27.18
75.17
                                                                       110.94
             572.02
571.59
568.53
563.93
                                                                       140.76
191.32
226.14
233.64
   128.15
159.87
                                                                                  571.96
                                                                                              151.15
202.32
                                                                                                          571.79
                                                                                    569.9
                                                                                  566.03
559.8
566.79
571.66
573.42
   209.06
                                                                                              226.16
    226.2
  234.91 566.51
243.22 567.22
283.99 573.41
314.49 573.39
366.2 574.89
                                                                                             242.93
282
302.16
                                                                                                           567.2
                         234.94
                                                                       241.94
                         243.64
284.29
328.11
369.09
                                                                       279.43
288.92
                                                                                                          572.16
573.35
                                                                       342.32
                                                                                  573.96
                                                                                              354.44
Manning's n Values
                                     num=
      Sta n Val Sta
0 .024 217.82
4.29 .035
                                    n Val Sta
.035 226.16
                                                            n Val
                                                                           Sta n Val
                                                                                                           n Val
                                                                                                   Sta
                                                                .04 234.94
                                                                                      .035 268.02
                                                                                                              .07
   284.29
Bank Sta: Left Right 226.16 234.94
                                     coeff contr.
                                                          Expan.
                                       2 .1
Ineffective Flow
                             num=
    Sta L Sta R
0 227.57
                            Elev Permanent
                              566
                                           F
   233.57 369.09
                             566
Upstream Embankment side slope
Downstream Embankment side slope
                                                                          0 horiz. to 1.0 vertical
                                                                          0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design
Weir crest shape
                                                               = Broad Crested
Number of Culverts = 1
Culvert Name
                        Shape
                                        Rise Span
                      Circular
Culvert #1
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef
Exit Loss Coef
                         5 19.5
                                              .024
                                                           .024
                                                                                                         .5
Upstream Elevation = 559.97
               Centerline Station = 185.29
Downstream Elevation = 559.8
                Centerline Station = 230.57
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CROSS SECTION

LemonCreekEX.rep RIVER: LemonCreek REACH: Reach1 RS: 1101.71 INPUT Description: Station Elevation Data 57 num= Sta 0 Elev Elev Sta 19.18 62.71 Elev Sta 27.18 75.17 Elev Elev Sta Sta 573.94 573.2 573.2 572.52 571.98 571.05 567.31 559.8 566.56 567.27 574.02 9.15 573.92 573.11 573.89 573.26 33.87 44.19 573.56 85.07 572.68 128.15 572.02 75.18 92.85 572.24 571.98 570.73 110.94 572.23 140.76 571.96 110.31 112.16 110.31 572.24 110.94 133.58 571.98 140.76 179.53 570.73 191.32 225.47 566.09 226.14 231.96 559.8 233.64 235.13 566.57 241.94 268.02 569.4 279.43 284.64 573.59 288.92 334.73 573.77 342.32 151.15 172.48 217.82 228.43 234.94 571.59 202.32 569.33 159 87 569 9 202.32 226.16 233.66 242.93 282 302.16 209.06 568.53 226.2 563.93 234.91 566.51 243.22 567.22 566.03 566.13 559.8 566.79 571.66 573.42 573.96 567.2 243.64 572.16 573.35 283.99 573.41 314.49 573.39 366.2 574.89 284.29 328.11 369.09 573.6 573.64 575.01 Manning's n Values num= Sta n Val Sta 0 .024 217.82 34.29 .035 n Val n val Sta n Val Sta 7.82 .035 226.16 n Val Sta Sta Sta .04 234.94 .035 268.02 .07 284.29 Bank Sta: Left Right Lengths: Left Channel Right coeff contr. Expan. 226.16 234.94 Ineffective Flow 2 22.46 20.19 28.45 .3 num= Elev Permanent Sta L Sta R 0 227.57 566 566 F 233.57 369.09 CROSS SECTION OUTPUT Profile #50-YR E.G. Elev (ft) 573.32 Left OB Element channel Right OB Vel Head (ft) 0.51 wt. n-val. 0.027 0.040 0.037 W.S. Elev (ft) 572.82 Reach Len. (ft) 22.46 20.19 28.45 crit W.S. (ft) 571.33 269.49 101.81 Flow Area (sq ft) 190.67 E.G. Slope (ft/ft) 0.003017 Area (sq ft) 269.49 101.81 190.67 Q Total (cfs) 1135.28 3182.00 1417.26 629.46 Flow (cfs) Top Width (ft) 200.28 Top Width (ft) 143.40 8.78 48 10 Vel Total (ft/s) 5.66 Avg. Vel. (ft/s) 5.26 6.18 5.95 Max Chl Dpth (ft) 13.02 1.88 Hydr. Depth (ft) 11.60 3.96 Conv. Total (cfs) 20668.1 57929.3 25801.7 11459.5 conv. (cfs) Length Wtd. (ft) 22.84 Wetted Per. (ft) 143.79 19.30 48.74 Min Ch El (ft) 559.80 0.35 Shear (1b/sq ft) 0.99 0.74 369.09 1.01 Stream Power (1b/ft s) 0.00 Alpha 0.00

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Cum Volume (acre-ft)

Cum SA (acres)

0.55

0.38

0.80

0.07

0.05

0.03

Frctn Loss (ft)

0.22 C & E Loss (ft)

0.11

LemonCreekEX.rep

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1	RS: 1081.52	2				
INPUT Description: Station Elevation Data Sta Elev Sta 0 574.01 7.48 39.16 573.45 39.33 71.87 572.98 81.77 116.01 571.93 123.74 140.46 571.53 143.48 184.28 570.88 188.83 226.17 568.16 227.13 232.41 558.84 243.37 252.24 564.39 254.13 273.75 568.38 286.99 297.03 572.87 302.42 342.26 573.31 356.16 385.14 574.84 387.34	573.93 14 573.44 5 572.53 8 571.84 13 571.68 19 567.85 22 559.95 22 565.49 25 565.49 25 571.84 29 572.84 35 573.54 35	Sta Elev 1.13 573.85		Elev 573.81 572.96 571.53 571.47 569.2 559.4 560.86 567.3 572.85 572.95	Sta 38.86 71.87 105 140 172.26 221 232.32 250.28 268.95 292.55 335.5 380.23	Elev 573.45 573.02 572.19 571.52 571.33 568.49 559.3 564.08 567.76 572.97 573.18 574.58
Manning's n Values Sta n Val Sta 0 .024 226.17	num= n Val .04 268	4 Sta n Val 3.95 .07	Sta 292.55	n val .035		
Bank Sta: Left Right 226.17 260.6	Lengths: Le	eft Channel .48 81.52	Right 87.79	Coeff	Contr.	Expan.
CROSS SECTION OUTPUT Pro	file #50-YR					
E.G. Elev (ft)	573.24	Element		L	eft OB	Channel
Vel Head (ft) 0.050	0.39	Wt. n-val.			0.024	0.040
W.S. Elev (ft)	572.85	Reach Len.	(ft)		78.48	81.52
87.79 Crit W.S. (ft)		Flow Area ((sq ft)	2	54.93	355.22
106.41 E.G. Slope (ft/ft)	0.001423	Area (sq ft	:)	2	54.93	355.22
106.41 Q Total (cfs)	3182.00	Flow (cfs)		8	41.99	2056.32
Z83.69 Top Width (ft)	231.31	Top Width ((ft)	1	51.43	34.43
45.45 Vel Total (ft/s)	4.44	Avg. Vel. ((ft/s)		3.30	5.79
2.67 Max Chl Dpth (ft)	14.01	Hydr. Depth	(ft)		1.68	10.32
	84366.6	conv. (cfs)		22	324.3	54520.8
7521.5 Length Wtd. (ft)	81.12	Wetted Per.	(ft)	1	51.55	42.30
46.05 Min Ch El (ft)	558.84	Shear (1b/s	q ft)		0.15	0.75
0.21 Alpha 0.00	1.28	Stream Powe	er (1b/ft	5) 3	88.33	0.00
7.7						

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Frctn Loss (ft)	0.14	emonCr.	eekEX.re Volume	p (acre-ft	:)	0.42	0.69
0.13 C & E Loss (ft) 0.07	0.02	Cum	SA (acr	es)		0.30	0.06
Warning: Divided flow co	mputed for	this c	ross-sec	tion.			
CROSS SECTION							
RIVER: LemonCreek REACH: Reach1	RS: 1000.	00					
INPUT Description: Station Elevation Data Sta Elev Sta 0 573.05 2.18 36.51 572.28 46.38 72.89 571.5 89.91 135 570.77 138.28 159.59 570.57 210.91 222.33 558.73 222.38 242.92 558.89 243.04 249 570.43 251.06 294.37 573.08 294.46 308.73 572.96 327.86	E1ev 573 572.08 571.54 570.68 1 571.74 2 558.72 2 571.05 2 573.09 2	49 55.78 55.78 98.49 41.28 11.68 130.04 43.09 57.59 97.07 32.19	Elev 572.68 571.89 570.9 570.64 558.61 559.13 571.89 573.16 572.97	Sta 18.87 69.2 114 146.02 212 236.21 245.22 283.06 302.35 335	Elev 572.64 571.54 571.05 570.57 558.6 572.07 572.85 573.2 572.97	Sta 19.93 70.65 128.58 151.48 222.25 242.58 245.25 290.81 308.43	Elev 572.61 571.5 570.9 570.84 558.79 558.89 572.09 572.99 572.99
Manning's n Values Sta n Val Sta 0 .024 210.91	num= n Val .04 2	4 5ta 45.22	n val .035	Sta 283.06	n Val .024		
Bank Sta: Left Right 210.91 245.22	Lengths:	Left C 9.02	hanne1 0	Right 4.06	Coeff	Contr.	Expan.
CROSS SECTION OUTPUT Pr	ofile #50-y	'R					
E.G. Elev (ft) Right OB Vel Head (ft)	573.08 0.58		ment n-Val.			eft OB 0.024	Channel
0.035 W.S. Elev (ft)	572.50		ch Len.	(ft)		24021	0.00
Crit W.S. (ft)	567.17	Flo	w Area (sq ft)	2	07.97	384.50
	0.002213	Are	a (sq ft)	2	07.97	384.50
19.95 Q Total (cfs)	3255.00	Flo	w (cfs)		6	53.71	2570.28
31.00 Top Width (ft)	248.32	Тор	Width (ft)	1	.85.45	34.31
28.55 Vel Total (ft/s) 1.55	5.31	Avg	. vel. (ft/s)		3.14	6.68
Max Chl Dpth (ft)	13.90	Hyd	r. Depth	(ft)		1.12	11.21
0.70 Conv. Total (cfs)	69188.7	Con	v. (cfs)		1.3	895.4	54634.3
659.0 Length Wtd. (ft)		Wet	ted Per.	(ft)	1	.85.51	51.40
29.07 Min Ch El (ft)	558.60	She	ar (1b/s	q ft)		0.15	1.03
0.09 Alpha 0.00	1.32	Str	eam Powe	r (1b/ft	(5)	35.00	0.00
		-					

Frctn Loss (ft)

LemonCreekEX.rep
Cum Volume (acre-ft)

C & E Loss (ft)

Cum SA (acres)

SUMMARY OF MANNING'S N VALUES

River:LemonCreek

Reach n6	n7	River Sta. n8	n9 ni	L n:	10 n	2 n1	n3	3 n1	n2	n1	3 ns	5
Reach1		3105.06		.035		.024		. 07		.04		.07
.035 Reach1 .024	.035	3034.83		.035		.024		. 07		.04		.07
Reach1	.031	2901.87		.035		.024		.07		.035		
Reach1		2778.59		.035		.024		. 07		.04		.07
Reach1	. 07	2685.90		.07		.024		.07		.024		.07
Reach1	.07	2660.90		.07		.024		.07		.024		.07
Reach1		2625.92	culve	ert								
Reach1	. 07	2590.90		.07		.024		.07		.024		.07
Reach1	. 07	2565.90		.07		.024		. 07		.024		.07
Reach1 .07	. 04	2502.39	.035	.024		.035		.024		.07		.024
Reach1	.07	.024	.035	.07		.024		. 07		.024		.07
Reach1	.04	2271.00	.024	.07	.07	.024	.024	.07	.07	.024		.07
Reach1 .04 Reach1	. 07	2246.00 .024 2230.01	.07 Culve	.07	.024	.024	.07	.07	.024	.024	.07	.07
Reach1		2216.36	Cuive			024		.07		024		.07
.04 Reach1	.07	.024 2199.00	.07	.07	.024	.024	.07	. 07	.024	.024	.07	.07
.04 Reach1	. 07	.024	.07	.035	.024	0.7	.07	.024	.024	.07	.07	.04
.07 Reach1	.024	.07 1875.66	.024	.035	.07	- 07		.04		.07		.024
.07 Reach1	.024	1770.29		.035		.024		.07		.04		.024
.07 Reach1	.024	1593.83		.024		.035		. 07		.04		.024
.07 Reach1	.024	.07 1465.87		.024		.07		. 04		.024		.04
.07 Reach1	.024	.07 1425.92		.024		. 07		.04		.024		.035
.07 Reach1		1412.68	culve	ert								
Reach1 .035	. 07	1399.42		.024		.07		. 04		.07		.024

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0.7	1367.97	LemonCreekEX. .024	.07	. 04	.035	.07
.07	1257.87	.024	. 07	.04	.035	.035
	1151.21	.024	.07	.04	.024	.07
	1131.21	.024	.035	.04	.035	.07
	1116.46	culvert				
	1101.71	.024	.035	.04	.035	.07
	1081.52	.024	.04	.07	.035	
	1000.00	.024	.04	.035	.024	
	.07	1257.87 1151.21 1131.21 1116.46 1101.71 1081.52	.07 1367.97 .024 1257.87 .024 1151.21 .024 1131.21 .024 1116.46 culvert 1101.71 .024 1081.52 .024	.07	.07	.07

SUMMARY OF REACH LENGTHS

River: LemonCreek

Reach	River Sta.	Left	Channe1	Right
Reach1	3105.06	73.02	70.23	61.56
Reach1	3034.83	141.38	132.96	132.46
Reach1	2901.87	123.39	123.28	123.54
Reach1	2778.59	80.84	92.69	98.27
Reach1	2685.90	32.36	25	27.91
Reach1	2660.90	72.46	70	72.44
Reach1	2625.92	Culvert		
Reach1	2590.90	24.97	25	32.13
Reach1	2565.90	62.79	63.51	72.59
Reach1	2502.39	170.56	175.2	183.4
Reach1	2327.19	55.09	56.19	66.43
Reach1	2271.00	21.66	25	41.57
Reach1	2246.00	33.12	29.64	31.84
Reach1	2230.01	Culvert		
Reach1	2216.36	29.71	17.36	12.78
Reach1	2199.00	107.55	114.9	122.27
Reach1	2084.10	202.44	208.44	211.8
Reach1	1875.66	106.62	105.37	108.86
Reach1	1770.29	180.61	176.46	170.99
Reach1	1593.83	130.55	127.96	126.93
Reach1	1465.87	40.45	39.95	45.44
Reach1	1425.92	26.56	26.5	28.7
Reach1	1412.68	Culvert		
Reach1	1399.42	34.16	31.45	35.82
Reach1	1367.97	111.51	110.1	108.69
Reach1	1257.87	106.69	106.66	107.08
Reach1	1151.21	21.5	20	21.56
Reach1	1131.21	29.92	29.5	29.66
Reach1	1116.46	Culvert		
Reach1	1101.71	22.46	20.19	28.45
Reach1	1081.52	78.48	81.52	87.79
Reach1	1000.00	9.02	0	4.06

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: LemonCreek

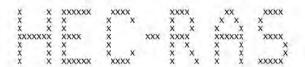
LemonCreekEX.rep

Reach	River Sta.	Contr.	Expan.
Reach1	3105.06	.1	.3
Reach1	3034.83	.1	. 3
Reach1	2901.87	.1	. 3
Reach1	2778.59	.1	. 3
Reach1	2685.90	.1	. 3
Reach1	2660.90	1	.3
Reach1		lvert	
Reach1	2590.90	1	. 3
Reach1	2565.90	1	. 3
Reach1	2502.39	1	. 3
Reach1	2327.19	1	. 3
Reach1	2271.00	1	- 3
Reach1	2246.00	1	. 3
Reach1		lvert	
Reach1	2216.36	TVELL	3
Reach1	2199.00	1	. 3
Reach1	2084.10	1	. 3
Reach1	1875.66	1	. 3
Reach1	1770.29	. 1	. 3
Reach1	1593.83	1	. 3
Reach1	1465.87	1	. 3
Reach1	1425.92	1	. 3
Reach1		lvert	. 3
Reach1	1399.42	ivert	2
Reach1	1367.97	1	+ 3
Reach1	1257.87	.1	. 5
	1151 31	.1	. 3
Reach1	1131.21	1	.3
Reach1		Torrest	. 3
Reach1		lvert	2
Reach1	1101.71	.1	.3
Reach1	1081,52	.1	. 3
Reach1	1000.00	.1	. 3

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LemonCreekPR.rep

HEC-RAS Version 4.1.0 Jan 2010 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California



PROJECT DATA
Project Title: Lemon Creek
Project File: LemonCreek.prj
Run Date and Time: 5/8/2014 8:13:57 AM

Project in English units

PLAN DATA

Plan Title: Lemon Creek_PR_No DS Culvert Plan File :

h:\pdata\137644\Calcs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.p07

Geometry Title: Lemon Creek_Pr_7x14_box_no_DS_culvert
Geometry File:
h:\pdata\137644\Calcs\Strmwater\Hydraulics\HEC-RAS\LemonCrek\LemonCreek.g18

Flow Title : Flow 01 PR
Flow File :
h:\pdata\137644\Calcs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.f02

Plan Summary Information:
Number of: Cross Sections = 27
Culverts = 3
Culverts = 0 Multiple Openings = Inline Structures = Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.01

Critical depth calculation tolerance = 0.01

Maximum number of iterations = 20

Maximum difference tolerance = 0.3

Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Flow 01 PR

LemonCreekPR.rep

Flow File : h:\pdata\137644\Ca\cs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.f02

Flow Data (cfs)

River	Reach	RS	50-YR
LemonCreek	Reach1	3105.07	2021
LemonCreek	Reach1	2271.00	3182
LemonCreek	Reach1	1000.00	3255

Boundary Conditions

River Downstream	Reach	Profile	Upstream
LemonCreek	Reach1	50-YR	

Known WS = 572.75

GEOMETRY DATA

Geometry Title: Lemon Creek_Pr_7x14_box_no_DS_culvert Geometry File : h:\pdata\137644\calcs\Strmwater\Hydraulics\HEC-RAS\LemonCrk\LemonCreek.g18 CROSS SECTION

RIVER: LemonCreek

RS: 3105.07 REACH: Reach1

INPUT Description: Station Elevation Data 150 num= Elev Elev Elev Sta 0 Elev 655 Sta Sta Sta 652.28 649 646 .96 654.44 653 4.64 6.56 651.14 3.41 650.48 648 644.46 641 638.58 654.44 650 647.67 644 640.22 638 635 8.85 14.77 20.17 25.01 29.75 33.64 39 50.73 56.74 7.68 11.91 17.83 23.39 27.3 648.18 12.47 18.57 24.65 28.25 33.25 37.77 15.34 21.78 26.44 29.91 646.33 643 640 637.1 16.98 21.96 642 639.11 637 634 26.63 31.57 36.11 42.32 636.01 31.58 36.59 43.46 54.72 60.96 68.47 73.42 79.65 638.58 636 633 629 626.65 622.76 618.08 615.11 607.32 607.604 634.77 34.92 632.31 628 626 630.5 631.58 628 625.39 621.49 616.98 613 610.17 627.45 625 620.37 45.17 52.66 54.17 60.25 626 622 617.02 614.46 611 607.55 607.35 606.57 603 599.62 596.72 70.25 64.8 71.81 77.98 83.04 62.19 70.17 74.28 79.83 85.77 88.03 100.74 109.61 117.54 124.28 131.53 141.39 141.98 65.4 616 70.25 76.63 81.16 86.19 88.26 102.23 110.07 118.98 125.95 612.15 78.23 84.4 612 610.17 607.56 607.3 606 602.8 599 596 593 590.76 588 589.79 607.37 607.32 605.44 601.07 598.64 595.03 84.85 87.57 99.63 107.22 86.77 87.22 88.62 103.63 114.14 119.81 128.17 93.16 104.75 114.69 121.31 128.38 134.56 141.61 600.83 600 597 594 591 116.65 123.64 130.49 135.59 592 590 588.47 589.97 593.06 593.4 591 588 589.27 591.13 132.3 141.47 143.2 148.23 152 133.8 141.57 144.53 148.72 153.15 591.61 588.44 589 591 588.76 141.8 146.02 145.33 590.05 150.55 592

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				LemonCr	eekPR.re	ep.			
154.99 159.53 164.89 168.3 172.11	594.71 598.54 602.97 605.78 608.79	155.31 160.08 164.92 168.58 172.28	595 599 603 606 609	156.22 160.7 166.14 169.53 172.75	595.79 599.51 604 606.77 609.56		596.81 600.55 604.34 607 609.33	158.87 162.92 167.36 171.01 250	598 601.35 605 607.98 609.29
Manning's Sta 0 135.59	n Value n Val .035 .04	Sta 45.17 150.55	num= n Val .024 .07	8 51a 50.73 172.75	n Val .035 .024	Sta 93.16	n Val .024	Sta 99.63	n Val
Bank Sta:		Right 72.28	Lengths: Left Channel Right 73.02 70.23 65.15				Coeff	Contr.	Expan.
CROSS SEC	TION OUT	PUT Pro	ofile #50	-YR					
E.G. Elev (ft) Right OB			599.4	599.43 Element				eft OB	Channel
vel Hea	d (ft)		2.3	9 Wt.	wt. n-val.				0.058
	ev (ft)		597.0	4 Rea	ich Len.	(ft)		73.02	70.23
65.15 Crit W.	s. (ft)		597.0	4 F1c	w Area ((sq ft)			162.87
E.G. S1	ope (ft/	ft)	0.03690	0 Are	Area (sq ft)				162.87
Q Total	(cfs)		2021.0	0 F1c	w (cfs)				2021.00
Top Wid	th (ft)		34.1	6 тор	width ((ft)			34.16
vel Tot	al (ft/s	()	12.4	1 Avg	. Vel. ((ft/s)			12.41
Max Ch1	opth (f	t)	9.0	4 нус	ir. pepti	(ft)			4.77
Conv. T	otal (cf	s)	10520.	9 cor	v. (cfs)				10520.9
Length	wtd. (ft	:)	70.2	3 Wet	ted Per.	(ft)			40.95
Min Ch	El (ft)		588.0	0 She	ar (1b/s	q ft)			9.16
Alpha			1.0	0 Str	eam Powe	er (1b/ft	5) 2	50.00	0.00
0.00 Frctn Loss (ft)			1.2	6 Cun	Cum Volume (acre-ft)			1.91	14.18
2.67 C & E L 0.91	oss (ft)	Ŭ.	0.4	7 Cun	SA (acr	es)		0.84	1.75

Lemontroek DD ren

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

	Manning's n				
Note:					

CROSS SECTION

E.G. Slope (ft/ft)

Q Total (cfs)

RIVER:	LemonCreek		
REACH:	Reach1	RS:	3034.84

INPUT									
Descripti Station E		nata	mum-	150					
Station	Elev	Sta	Flev	Sta	Elev	Sta	Flev	Sta	Elev
0	654.54	.99	654	5ta 1.79	653.59	2.92		4.27	652.26
5.05	651.81	6.44	651	7.69	650.28	8.2	650	9	649.6
9.95	649.22	11.49 16.76	648.58	11.96 16.99	648.37 645.93	12.98 19.77	647.89	14.24	647.27
22.97	647	25.5	641.66	28.48	640.15	28.83	644.55	30.76	643.07 639
32.17	638.29	33.24	637.74	34.71	637	36.68	636	37.01	635.84
32.17 38.66	635	40.42	634.11	41.06	633.79	42.61	633	42.97	632.82
45.98	631.29	48.54	630	49.72	629.34	50.32		51.93	628
52.33	627.76	55.16	626	55.19	625.99	56.79	625	57.35	624.65
58.41 64.89	624	60.03	623 619.99	60.54	622.68 618.47	61.65	622 618	63.27 69.86	621 617
70.45		71.52	616	74.37	614.28	77.78	612.23	78.61	611.74
79.83	611	81.49	610	84.35	609.56	87.26	609.15	88.3	609
90.21	608.66	92.77	608.21	93.18	608.14	94.03	608	94.57	607.71
95.87	607 603	96.73 104.72	606.54 602.23	97.72 106.09	606	100.56	604.47 600.73	101.44	604 599.55
103.3	598	113.4	597.59	114.52	597	116.89	595.74	119.77	594.23
120.2	598 594	121.97	593.07	124.04		124.14	592	124.8	591.69
125.48	591.48	125.68	591.43	126.52	591.18	127.58	590.85	127.74	590.79
128.68	590.49	129.4	590.27	129.72	590.16	130.95 135.25	589.78	131.98	589.38
133.03 136.34	589 587.98	134.05 138.56	588.72 587.32	134.55 138.94	588.56 587.21	135.25	588.36 587	136.26	588 586.67
144.31	585.61	145.41	585.28	146.36	585	147.54	584.73	147.93	584.68
150.79	585	151.01	585	151.99	585.99	151.99	586	153.32	584.68 587.34
155.3	589.35	155.93	590	156.92	591	157.38	591.48	157.89	592
160.1 165.12	594.23	160.9 165.9	595 599.74	161.63	595.71 600.11	162.31 169.35	596.35	162.99 169.63	597 603.27
171.43	604.98	172.49	606	172.67	606.11	174.46	607.91	174.51	608.33
174.6	609	283.56	609	283.8	608.79	285.95	606.88	289.6	606.91
291.8	606.92	292.33	606.42	292.55	604.92	298.07	605.4	300	605.59
Manning's	n Value	5	num=	6					
Sta	n Val	Sta	n Val	Sta	n Val	Sta		Sta	n Val
174 0	.035	81.49	.024	93.18	. 07	144.31	. 04	151.99	.07
174.6									
Bank Sta:	Left	Right	Lengths	: Left C	hanne1	Right	Coeff	Contr.	Expan.
	93.18 1	.74.51		141.38	132.96	131./		.1	.3
CROSS SEC	TION OUT	PUT Pro	file #50	-YR					
E.G. El	ev (ft)		596.4	3 Ele	ment		L	eft OB	Channe
Right OB Vel Hea	d (ft)		0.8	2 Wt.	n-val.				0.066
			595.6			(ft)	1	41.38	132.96
131.70	5. (ft)		2.4			sq ft)			278.62
Citt W.	3. (11)			P10	m Mied (34 11)			270.02

Page 4

0.010624

2021.00

Area (sq ft)

Flow (cfs)

278.62

2021.00

Top Width (ft)	44.39 Le	monCreekPR.rep Top Width (ft)		44.39
Vel Total (ft/s)	7.25	Avg. Vel. (ft/s)		7.25
Max Chl Dpth (ft)	10.93	Hydr. Depth (ft)		6.28
Conv. Total (cfs)	19607.1	Conv. (cfs)		19607.1
Length Wtd. (ft)	132.96	wetted Per. (ft)		50.84
Min Ch El (ft)	584.68	Shear (1b/sq ft)		3.63
Alpha	1.00	Stream Power (1b/ft s)	300.00	0.00
0.00 Frctn Loss (ft)	0.87	Cum Volume (acre-ft)	1.91	13.82
2.67 C & E Loss (ft)	0.10	Cum SA (acres)	0.84	1.69

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1 2901.88

REACH:	Reachl	R5: 290
INPUT		

ij	Descripti	on:								
ì	Station E			num=	150	277		620		0.500
	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	
	0	655.87	3.61		4.88	653.34	5.55	653	7.49	652
	8.88	651.28	10	650.71	12.59	649.38	13.84	648.73	15.27	648
	17.08	647.07	17.3	646.96	19.17	646	19.61	645.77	24.87	643.07
	25.02		26.96	642	27.57	641.68	28.91	641	30.43	640.22
	30.85	640	32.55	639.13	33.18	638.8		638	35.78	637.47
	38.01	636.33	38.65	636	42.55		43.42		44.5	633
	45.46	632.5	47.71	631.35	48.38		50.18	630		629.41
	52.44	628.59	53.38	628	56.58	626	58.6	624.73	59.77	624
	60.42	623.58	61.33	623	62.87	622	64.89	620.81		
	69.63	618	70.46	617.51		616.25	73.48	615.68		614.58
	78.88	612.25	79.53	611.83	80.84		92.21	610	93.76	609.27
	96.11	608.17	98.92	606.84	100.56	606	101.42	605.5		605
	103.24	604.44	103.99	604		603.49	105.66	603	106.36	602.49
	107.02	602	109.79	600.4		599.75	111.37	599.5		599
	112.95		113.98	598	114.92		116.15		116.74	596.4
	118.55	595.36	119.99	594.51	120.4	594.28	121.27	593.77	121.6	593.57
	122.11		123.97		125.04		126.18			590.69
	127.33		128.86	589.33	130.1	588.59	131.1	588	131.31	587.87
	131.93		132.78			586.4	134.45		135.07	585.62
	136.51	584.77	137.79	584	138.03	583.85	139.81		140.9	582.11
	141.09	582	142.25	581.82	143.74	581.82	144.38	581.82	146.89	581.82
	148.14	581.82	149.21	581.82	150.82	581.82	151.3		151.6	581.82
	152.16	581.82	152.82	581.82	153.28	581.82	154.15	582	154.5	582.52
	154.81	583	155.46	583.97	156.13		156.8			587
	158.12	588.04	158.73	589	158.87	589.21	160	591	160.59	592
	161.17	593	161.74	594	162.32	595	162.89		164.05	
	164.62	599	165.4	599.16	165.54		165.95		166.92	600.15
	167.06	600.24	167.78	600.76	167.87		174.6	605	174.61	605
	178.9		180.63	607	284.78	607	285.78	606.26		605.27
	288.85	605.27	292.32	605.26	292.83	604.76	293.03	603.26	300	603.24

	emon	 	- DO	1.1.	
- 14	emon	ee	KMH		CL

0 .035 80.84 .024 92.21 .07 142.25 .04 153.28 165.54 .035 180.63 .024	
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. 92.21 165.54 123.39 123.28 123.92 .1	Expan.
CROSS SECTION OUTPUT Profile #50-YR	
E.G. Elev (ft) 595.46 Element Left OB Right OB	Channe1
vel Head (ft) 0.47 Wt. n-Val.	0.064
	123.28
123.92 Crit W.S. (ft) Flow Area (sq ft)	367.50
E.G. Slope (ft/ft) 0.004403 Area (sq ft)	367.50
Q Total (cfs) 2021.00 Flow (cfs) 2	021.00
Top width (ft) 43.13 Top width (ft)	43.13
Vel Total (ft/s) 5.50 Avg. Vel. (ft/s)	5.50
Max Chl Dpth (ft) 13.17 Hydr. Depth (ft)	8.52
Conv. Total (cfs) 30457.4 Conv. (cfs) 3	0457.4
Length Wtd. (ft) 123.28 Wetted Per. (ft)	53.90
Min Ch El (ft) 581.82 Shear (lb/sq ft)	1.87
Alpha 1.00 Stream Power (1b/ft 5) 300.00	0.00
0.00 Frcth Loss (ft) 0.83 Cum Volume (acre-ft) 1.91	12.83
2.67 C & E Loss (ft) 0.03 Cum SA (acres) 0.84 0.91	1.55

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1 RS: 2778.60

INPUT Descripti Station E		Data	num=	139					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	650.53	2.2	649.47	5.2	648	6.52	647.35	8.22	646.52
9.26	646	11.24	645	13.18	644	14.54	643.26	15.45	642.76
16.8	642	17,65	641.53	18.66	641	18.98	640.9	20.06	640.59
21.73	640.15	21.9	640.1	23.12	639.79	24.33	639.46	25.23	639.21
26.81	638.75	27.78	638.45	28.56	638.22	29.28	638	31.48	637.55
33.68	637.06	33.94	637	35.57	636	35.67	635,93	37.16	635

		omonCr	nakan ra	n			
49.25 628.76 49 54.86 625.78 56 59.85 623 66 65.22 620 65 68.65 618 68 75.15 614.46 75 81.07 610.22 8	71 634 5.2 631 5.99 628.38 628.38 629 622.63 99 619.53 74 618 614 2.4 609.22 6.3 606 6.1 604 25 601.86 14 597.38 14 597.38 16 593.26 17 598.42 18 598.42 19 598.42 19 598.42 10 598.42 10 598.42 11 598.42 12 598.42 13 598.42 14 598.42 15 598.42 16 598.42 17 598.42 18 598	39.96 46.77 51.73 61.7 66.64 69.28 77.29 83.1 105.4 121.48 121.48 121.48 133.9 669.54 669.25 67.25 68.25 69.26 77.29	eekPR. re 633.38 630.15 627.52 622 619.18 617.71 613 608.69 600.53 7603.29 8600.53 796.22 592.86 605.89 86 603.60 608 608 608 608 608 608 608 608 608 6	40.72 47.07 52.74 58.23 63.22 67.57 74.24	633 630 627 624 621.15 618.64 615.26 608 605.26 600 595.59 592.58 592.66 595.59 592.66 605	42.33 48.04 53.46 58.55 64.92 67.87 79.17 85.34 101.08 108.31 115.09 123.84 130.77 139.07 158.21 162.47 167.85 169.87 180.81 193.75	632.3 629.44 626.59 623.8 620.17 618.52 614.8 611.63 607 605.02 602.49 599.41 591.47 587.17 587.17 587.17 589.06 593.94 595.07 600 606
Manning's n Values	num≔	5				47.5	0.10
Sta n Val 0 .035 85	34 .024	99.83	n val .07	5ta 169.87	n Val .035	193.75	n Val .024
Bank Sta: Left Right 99.83 169.8	Lengths:	Left C	hannel 92.69	Right 99.08	Coeff	Contr.	Expan.
CROSS SECTION OUTPUT		'R	200				
E.G. Elev (ft)	594.60	Fle	ment		L	eft on	Channe1
Right OB Vel Head (ft)	0.78		n-Val.			-1.2.42	0.070
W.S. Elev (ft)			ch Len.	(ft)		80.84	92.69
99.08 Crit W.S. (ft)		Flo	w Area (sq ft)			284.35
E.G. Slope (ft/ft)	0.011443	Are	a (sq ft)			284.35 2021.00 41.50 7.11 6.85 18892.6 51.35
Q Total (cfs)	2021.00	Flo	w (cfs)				2021.00
Top Width (ft)	41.50	Тор	width (ft)			41.50
Vel Total (ft/s)	7.11	Avg	. ve1. (ft/s)			7.11
Max Chl Dpth (ft)	14.46	Hyd	r. Depth	(ft)			6.85
Conv. Total (cfs)	18892.6	Con	v. (cfs)				18892.6
Length Wtd. (ft)	92.69	Wet	ted Per.	(ft)			51.35
Min Ch El (ft)	92.69 579.35 1.00	She	ar (1b/s	q ft)			3.96
Alpha	1.00	Str	eam Powe	r (1b/ft	s) 3	00.00	0.00
Frctn Loss (ft)	1.44					1,91	11.91
2.67 C & E Loss (ft) 0.91	0.04		SA (acr			0.84	1.43

LemonCreekPR.rep Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Lemon REACH: Reach	Creek 1		RS: 268	5.91						
0 6 5.01 10.41 17.67 61 27.23 61 32.58 61 38.86 61 50.01 58.76 60 69.87 60 64.94 60 69.87 60 74.88 60 81.74 92.1 60 98.25 103.27 59 110.3 59 115.49 59 120.13 126.01 132.91 59 120.13 126.01 132.91 59 176.08 59 177.13 176.08 196	ation 29.1 626 9.988 5.93 0.518 7.31 6.64 6.62 6.62 6.62 6.62 6.62 6.62 6.62	5 ta . 499 6.18 10.82 20.03 27.52 34.44 39.88 51.73 59.64 65.07 71.06 76.55 84.17 94.25 99.38 104.08 110.37 116.72 121.4 127.92 133.41 140.55.33 166.43 173.89 182.07 300	628.79 628.79 625.29 625.29 615.81 610.71 607.85 607.24 606.55 606.51 604.22 606.55 599.81 599.82 598.21 596.59 598.95 598.95 598.95 598.95 598.95 598.95	5 ta 1.76 6.65 12.77 22.41 29.36 35.9 40.04 54.41 62.41 67 72.23 77.7 84.85 96.47 99.47 104.97 113.11 117.56 122.12 129.8 134.97 143.07 156.51 162.31 162.31 162.31 174.65 185.82	607.1 606.82 606.45 606.65 606 607.38 599.79 598.71 598.596 592 585.77 585 587.94 591.74 594.35 600	117.74 123.99 130.8 137.13 144.94 157.21 162.58 170.26 175.4 189.1	507.08 506.78 606.78 606.60 600.14 599.69 599.23 598.69 598.69 598.69 598.69 598.69 598.69 588.08 588.08 584.69 594.69 601.65	64.02 69.05 74.48 78.52 90.45 98.02 102.02 102.02 114.57 119.47 124.3 131.6 137.43 150.58.27 165.71 171.93 175.58	607 606.69 606.28 605.86 602.19 599.56 599.59 598.56 597.27 594.89 577.5 587.9 587.9 587.9 589.67 592.89 594.76 602.39	
Manning's n Sta n 0 191.67	value: val .035 .024	s Sta 42.27	num= n Val .024	6 Sta 77.82	n Va1 .035	Sta 116.72	n Val .07	Sta 173.89	n Val .035	
Bank Sta: Le 116.	ft 1	Right 73.89	Lengths	: Left C	hanne1 25	Right 27.33	Coeff	Contr.	Expan.	
CROSS SECTIO	N OUT	PUT Pro	file #50	-YR						
E.G. Elev Right OB Vel Head ((ft)		593.1	1 Ele	ment		L	eft OB	Channe'	l
Vel Head (ft)		1.1	9 Wt.	n-val.				0.070	
w.s. Elev 27.33	(ft)		591.9	2 Rea	ch Len.	(ft)		32.36	25.00	
Crit W.S.				Flo	w Area (sq ft)			230.78 230.78 2021.00	
E.G. Slope	(ft/	ft)	0.02242	8 Are	a (sq ft)			230.78	
Q Total (c	fs)		2021.0	0 Flo	w (cfs)				2021.00	

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Top Width (ft)	40.17 Le	monCreekPR.rep Top Width (ft)		40.17
Vel Total (ft/s)	8.76	Avg. Vel. (ft/s)		8.76
Max Chl Dpth (ft)	14.42	Hydr. Depth (ft)		5.75
Conv. Total (cfs)	13495.0	Conv. (cfs)		13495.0
Length Wtd. (ft)	25.00	wetted Per. (ft)		50.47
Min Ch El (ft)	577.50	Shear (1b/sq ft)		6.40
Alpha	1.00	Stream Power (1b/ft s)	300.00	0.00
0.00 Freth Loss (ft)	0.28	Cum Volume (acre-ft)	1.91	11.36
2.67 C & E Loss (ft)	0.04	Cum SA (acres)	0.84	1.35

warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Le			** 255	0.01					
REACH: Re	acnı		RS: 266	0.91					
INPUT									
Descripti	on:								
Station E	levation	Data	num=	149					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	630.3	.5	630	1.23	629.55	2.14	629	3.24	628.32
3.77	628	5.39	627	6.54	626.3	7.02	626	8.69	625
10.42	624	11.74	623.31	12.26	623	13.94	622.18	14.28	622
15.99	621.18	16.35	621	18.44	620	19.2	619.64	20.53	619
22.56	618	24.21	617.16	24.54	617	25.29	616.67	27.75	615.64
29.24	615	24.21 30.65	614.38	32.5	613.54	33.71	613	35.84	612.04
38.13	611	40.35	610	40.67	609.85	42.56	609	46.2	608
46.65	608	56.87	607.62	64.61	607.35	74.14	607.01	74.56	607
76.89	606.01	76.97	605.97	79.32	605	79.79	604.8	81.72	604
82.16	603.82	83.21	603.38	83.86	603.1	86.07	602.2	86.55	602
88.85	601.13	89.18	601	90.26	600.68	92.5	600	94.22	599.4
95.41	599	96.87	598.4	97.87	598	100.42	596.99	103.13	596
105.91	595	106.01	595	108.21	594.49	108.84	594.38	109.88	594.21
110.11	594.16	111.07	594	113.04	593.63	113.35	593.58	114.34	593.39
115.67	593.14	116.47	593.01	116.49	593	117.08	593	117.92	592.87
117.98	592.85	118.71	592.76	120.5	592.46	122.85	592.06	123.22	592
125.25	591.61	127.02	591.28	128.3	591.05	128.38	591.03	129.6	590.82
130.73	590.61	132.33	590.12	132.72	590	132.95	590	134.81	589
135.4	588.54	136.04	588	136.86	590 587.27	137.46	586.76	138.33	586
139	585.43	143	577	143.04	577	144	577	144.21	577
144.87	577	145.42	577	146.65	577	147.46	577	149.07	577
149.12	577	150.2	577	150.62	577	151.35	577	151.45	577
152.58	577	153.57	577	154.33	577	154.63	577	155.38	577
155.63	577	156	577	156.22	577	156.95	577	157	577
157.92	585.34	158.51	586	159.05	586.35	159.67	586.73	159.86	586.82
161.07	587.26	162.59	587.79	163.22	588	164.36	588.39	166.41	589.1
167.73	589.56	169.55	590.21	171.7	591	172.22	591.21	174.13	592.01
176.11	592.7	176.42	592.82	178.02	593.48	179.41	594.08	181.5	595
184.82	596.56	187.35	597.76	191.29	599.66	192.49	600,26	198.01	603
291.83	603	298.05	600.01	298.09	600.02	300	601.61		

Manniagle a Values		monCreekPR.rep		
Manning's n Values Sta n Val Sta 0 .035 46.2 198.01 .024		Sta n Val Sta 4.56 .035 132.33	n val Sta .07 174.13	n val .035
Bank Sta: Left Right 132.33 174.13 Ineffective Flow num Sta L Sta R Elev 0 143 603 157 300 603	= 2 Permanent F	eft Channel Right .68 158.51 172.97	Coeff Contr.	Expan.
CROSS SECTION OUTPUT Pr	ofile #50-YR			
E.G. Elev (ft)	592.79	Element	Left OB	Channe1
Right OB Vel Head (ft)	1.61	Wt. n-val.		0.070
w.s. Elev (ft)	591.18	Reach Len. (ft)	168.68	158.51
172.97 Crit W.S. (ft)	585.66	Flow Area (sq ft)		198.52
E.G. Slope (ft/ft)	0.006701	Area (sq ft)	2.20	304.73
Q Total (cfs)	2021.00	Flow (cfs)		2021.00
Top width (ft)	44.57	Top Width (ft)	4.75	39.82
vel Total (ft/s)	10.18	Avg. Vel. (ft/s)		10.18
Max chl opth (ft)	14.18	Hydr. Depth (ft)		14.18
Conv. Total (cfs)	24688.5	Conv. (cfs)		24688.5
Length Wtd. (ft)	158.51	Wetted Per. (ft)		14.00
Min Ch El (ft)	577.00	Shear (1b/sq ft)		5.93
Alpha 0.00	1.00	Stream Power (1b/ft	300.00	0.00
Frctn Loss (ft) 2.67		Cum Volume (acre-ft)	1.91	11.21
C & E Loss (ft) 0.91		Cum SA (acres)	0.84	1.32

CULVERT

RIVER: LemonCreek REACH: Reach1

RS: 2577.93

INPUT
Description: Culvert #4
Distance from Upstream XS = 21.18
Deck/Roadway width = 123.36
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num=
2
Sta Hi Cord Lo Cord
74.56 607 Sta Hi Cord Lo Cord
198.01 603

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LemonCreekPR ren

				LemonC	reekPR.re	p			
Upstream Station E Sta 0 0 3.77 10.42 15.99 22.56 29.24 38.13 46.65 76.89 82.16 88.85 95.41 105.91 110.11 115.67 117.98 125.25 130.73 135.4 139.12 152.58 155.63 157.92 161.07 167.73 176.11 184.82 291.83	Elevation Elev 630.3 628 624 621.18 615 611 608 666.01 603.8 595.5 594.16 593.4 592.8 591.61 588.54 585.43 587.7 577.7 585.34 587.26 589.56 592.6 592.6 592.6 592.6 592.6 592.6 592.6 603	Data	nume 630 627 623.31 621.161.16 614.38 607.62 605.97 603.88 601 598.4 599.5 594.7 591.28 590.12 588 577 577 577 577 577 577 577 577 577	149	ETTev 629.55 626.3 6220 617.35 609.85 607.35 609.85 598.49 593.68 591.05 587.27 577 577 577 577 577 577 577 577 577 5	Sta 2.14 7.02 13.94 19.2 25.29 33.71 42.56 74.14 79.79 92.5 100.42 108.84 113.35 117.08 122.85 128.38 132.95 144 147.46 151.35 154.69 159.67 164.36 172.22 179.41 192.49	Elev 626 626 619.64 616.67 613.60 607.01 604.8 602.2 6000 596.99 594.38 593.58 594.58	Sta 3.24 8.69 14.28 20.53 27.75 35.84 46.25 94.22 103.13 109.88 114.34 117.92 123.22 123.22 123.22 134.81 149.07 151.45 155.86 179.86 1	Elev 628.2622 619 615.64 612.04 608 607 604 599.4 599.8 599.8 599.8 590.82 599.8 590.82 595.87 577 577 577 577 577 577 577 577 577 5
Manning's Sta 0 198.01	n value n val ,035 .024	s Sta 46.2	num= n Val .024	6 5ta 74.56	n Val .035	Sta 132.33	n Val	Sta 174.13	n Val .035
Bank Sta: Ineffecti Sta L 0 157	132.33 1 ive Flow Sta R 143 300	Right 74.13 num= Elev 603 603	Permane F F	.1 nt	Expan.				
Downstrea num= Sta 98.04	m Deck/ 2 Hi Cord 605	Roadway Lo Cord			Lo Cord				
Downstrea Station E Sta 0 56.63 61.57 65.81 72.17 80.2 98.04 101.76 105.01 108 111.62			ection D num= Elev 615 614 611.79 609 606.41 605.56 604.82 602 599.84 597 594.33	147 55.21 58.28 63.57 69.49 74.66 85.3 99.45 103.42 106.34 109.66 112.94	Elev 615.15 613.65 611 608.09 606 605.37 604 601.17 599 596.48 594	Sta 55.54 59.57 65.27 69.68 80.04 95.13 100.09 103.66 107.4 110.3 113.48	Elev 615.03 613 610.15 608 605.57 605.05 603.55 601 598.19 596 593.59	Sta 55.61 60.06 65.57 70.11 80.12 97.62 100.87 104.28 107.66 110.83 114.26	Elev 615 612.76 610 607.83 605.57 605.01 603 600.54 598 595.6 593

		LemonCr	eekPR.re	n				
127.09 583 134.26 142.62 581.58 143.14 146.11 576 146.31 147.43 576 147.91 157.06 576 157.31 162.03 581 162.8 164.63 583.13 165.67 168.01 586 168.54 171.5 588 172.81 174.51 589.89 174.91 178.78 591.95 179.47 203.37 594.13 204.05 221.53 597.56 222.27 251.07 598 268.78	592 589.14 584.77 582.35 581.18 576 576 576 581.62 584.62 584.86 590.08 592.28 594.26 597.71 598 600.13	115, 77 119, 55 123, 13 126, 17 138, 38 146, 33 148, 02 158, 31 163, 26 166, 81 173, 03 176, 04 179, 55 223, 58 270, 31	591.86 589 586.3 584 582.03 581 576 576 582 584.99 586.09 589 590.63 592.5 594.51	116.9 119.64 123.52 126.43 138.85 143.64 146.8 155.77 159.18 164.36 166.82 170.01 173.36 177.93 181.03 238.68 274.51	591 588.93 586 583.7 582 580.84 576 576 582.9 585 587 589.2 591.55 593 595.14 598.35	117.54 120.87 124.24 127.06 142.07 145.31 147.3 155.88 159.31 164.48 166.85 170.84 173.65 178.65 195.65 241.07 281.72	590.52 588.582 576 576 576 576 576 583 585.02 587.56 589.37 591.89 596.33 598.71	
	num= n Val .035 .035	11 Sta 74.66 181.03	n Val .024 .024	Sta 97.62 195.69	n val .035 .035	Sta 127.06 223.58	n Val .024 .024	
127.06 174.91 Ineffective Flow num=	Permane F F Tope slope nce for ow begi	.1 nt weir fl	OW = = = =		iz. to 1	.0 verti .0 verti		
Number of Culverts = 1	0.500	40.70		00.000				
FHWA Chart # 8 - flared wi FHWA Scale # 1 - Wingwall Solution Criteria = Highes Culvert Upstrm Dist Lengt Exit Loss Coef 21.18 123.3	flared t U.S. h To	30 to 75 EG		epth Blo	cked En	trance L	oss Coef	
Upstream Elevation = 57 Centerline Stat Downstream Elevation = 57 Centerline Stat	ion =	150 152.31						
CROSS SECTION								
RIVER: LemonCreek REACH: Reach1	RS: 250	2.40						
INPUT Description: Station Elevation Data	num=	147						

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	1.00		120	LemonCr	eekPR.re				
Sta 0	Elev 615	55.11 57.59	Elev 615	55.21 58.28	615.15	55.54	615.03	55.61	Elev 615
56.63	614.48	57.59 62	614	58.28 63.57	615.15	59.57 65.27	613 610.15	60.06	612.76
61.57 65.81	609.88	67.55	609	69.49	608.09	69.68	608	65.57 70.11	607.83
72.17 80.2	607	73.64 80.24 98.3	606.41	74.66 85.3	606	80.04 95.13	605.57	80.12 97.62	605.57 605.01
98.04	605 602.37	98.3	605.56 604.82 602	99.45	604	100.09	603.55	100.87 104.28	603
101.76 105.01	600	102.27 105.22	599.84	106.34	599	107.4	598.19	107.66	598
108	597.74	108.98	597 594.33	109.66	596.48 594	110.3	596 593.59	110.83 114.26	595.6 593
115.44 118.23	592.1 590	112.5 115.58 119.37	592 589.14	112.94 115.77 119.55	591.86 589	116.9	591 588.93	114.26 117.54 120.87	590.52 588
121.3	587.68	122.2	5.87	123.13	586.3	119.64 123.52	586	124.24	585.46
124.85	585 583	125.15 134.26	584.77 582.35	126.17 138.38	582.03	126.43 138.85	583.7 582	127.06	583.03 582
127.09 142.62 146.11	581.58 576	134.26 143.14 146.31	581.18 576	138.38 143.38 146.33	581 576	143.64	580.84 576	142.07 145.31 147.3	576 576
147.43	576	147.91	576	148.02	576	155.77	576	155.88	576
157.06 162.03	576 581	157.31	576	158.31 163.26 166.81	576 582	159.18 164.36 166.82	576 582.9	159.31 164.48	576 583
162.03 164.63 168.01	583.13 586	162.8 165.67 168.54	584 586	166.81 168.67	584.99 586.09	166.82 170.01	585 587	166.85 170.84	583 585.02 587.56
171.5	588	1/2.81	588.86	173.03	589	173.36 177.93	589.2	173.65	389.37
174.51 178.78	589.89 591.95	174.91 179.47 204.05	590.08 592.28	176.04 179.95	590.63 592.5 594.51	181.03	591.55 593 595.14	178.65 195.69	591.89 593 596.33
178.78 203.37 221.53	594.13 597.56	204.05	592.28 594.26 597.71	179.95 205.55 223.58	594.51 598	208.99	595.14	215.45	596.33
251.07 287.7	598 599.2	268.78 300	598 600.13	270.31	598	274.51	598.35	281.72	598.71
Manning's		s	num=	11 Sta		-			
Sta 0	.024	55.21	n val .035	74.66	.024	97.62	n Val		.024
142.07 270.31	.035	174.91	.035	181.03	.024	195.69	.035	223.58	.024
Bank Sta:	Left 27.06 1	Right 74.91 num=	Lengths	: Left 0	hannel 30.97	Right 31.13	coeff	Contr.	Expan.
Ineffecti Sta L		num= Elev							
0	Sta R 145.31	593	F	nic.					
159.31	300	593							
CROSS SEC	TION OUT	PUT Pro	file #50	-YR					
E.G. El	ev (ft)		588.9	7 E16	ement		1	eft OB	Channe'
Right OB Vel Hea	d (ft)		4.3		n-Val.				0.070
W.S. ET 31.13	ev (ft)		584.6	5 Rea	ich Len.	(ft)		35.00	30.97
Crit W.	s. (ft)		584.6	5 F1c	w Area (sq ft)			121.10
E.G. 51	ope (ft/	ft)			a (sq ft	:)		1.30	195.56
Q Total	(cfs)		2021.0	0 F1c	w (cfs)				2021.00
Top Wid	th (ft)		41.1	1 Top	width ((ft)		1.75	39.36
Vel Tot	al (ft/s	(3)	16.6	9 Avg	. vel. (ft/s)			16.69
Max Chl	Dpth (f	t)	8.6	5 нус	lr. Depth	(ft)			8.65

	Le	monCreekPR.rep		
Conv. Total (cfs)	10832.3	Conv. (cfs)		10832.3
Length Wtd. (ft)	31.50	Wetted Per. (ft)		14.00
Min Ch El (ft)	576.00	Shear (1b/sq ft)		18.80
Alpha 0.00	1.00	Stream Power (1b/ft s)	300.00	0.00
Frctn Loss (ft) 2.67	0.42	Cum Volume (acre-ft)	1.91	10.62
C & E Loss (ft) 0.91	1.05	Cum SA (acres)	0.82	1.18

BC . 3477 43

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations. Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Manning's n values were composited to a single value in the main channel.

Manning's n values were composited to a single value in the main channel. Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: LemonCreek

REACH: Re	ach1		RS: 247	1.43					
INPUT									
Descripti	on:								
Station E	levation	Data	num=	150					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	615	51.68	615	52.06	614.78	52.23	614.7	53.82	613.86
55.35	613.06	56.84	612.35	57.57	612	59.27	611.17	59.65	611
61.38	610.25	61.72	610.1	61.97	610	63.17	609.49	64.3	609
65.12	608.65	66.62	608	67.76	607.5	68.88	607	70.06	606.48
71.14	606	72.75	605.29	73.4	605	74.17	604.96	78.31	604.74
82.14	604.7	83.31	604.68	86.06	604.54	86.62	604.5	87.39	604.46
89.15	604.35	95.02	604	96.73	603	98.22	602.12	98.43	602
100.14	601	101.13	600.42	101.85	600	102.37	599.7	103.55	599
104.73	598.31	105.25	598	106.57	597.23	106.95	597	108.61	596.02
108.67	595.99	110.56	594.87	111.48	594.32	112.34	593.81	113.68	593
114.66	592.4	115.31	592	115.69	591.76	116.92	591	118.54	590
119.93	589.14	120.37	588.86	121.76	588	122.52	587.31	122.85	587
123.33	586.49	123.78	586	124.21	585.55	124.71	585	125.59	584.19
125.8	584	125.94	583.89	126.84	583.42	126.93	583.39	127.17	583.36
127.38	583.32	128.1	583.24	128.96	583.15	129.12	583.14	130.3	583.01
130.42	583	131.55	582.87	131.76	582.85	132.8	582.71	133.31	582.63
134.04	582.51	134.36	582.43	135.24	582.3	135.38	582.26	136.59	582.05
136.83	582	137.85	581.87	138.59	581.64	139.33	581.47	139.64	581.34
139.86	581.28	140.12	581.17	140.46	581.04	140.58	581		581
140.93	580.96	141.55	580.1	141.7	579.9	142.29		142.83	578.2
143.46	577.24	143.61	577	144.1	576.27	144.27	576	144.91	575.01

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144.92 575 146 156.06 577 156.66 160.15 580.49 160.71 163.06 583.14 163.99 166.38 586.24 167.17 169.73 588.6 169.76 171.39 589.36 171.64 246.39 593 247.25 275.25 598.25 291.51	575 148 577.49 158 581 16 584 165 588.61 16 589.52 17 593.22 254	monCreekPR. re 8.86 575.32 8.42 578.96 61.2 581.45 61.06 585 7.94 587.8 99.8 588.63 72.5 590 1.82 596.4 8.81 600.83	154.82 158.49 161.81 165.72 168.13 170.34 173.25 260.38 294.58	576 579.02 582 585.62 588.82 590.37 596.49 603	155.78 159.6 162.91 166.12 168.68 171.04 178.5 265.68 300	576.78 580 583 586 588.16 589.23 593 596.59 603
Manning's n Values Sta n Val Sta 0 .024 51.68 144.27 .04 154.82	n val .035	10 Sta n val 73.4 .024 9.76 .035	Sta 95.02 178.5	n Val .035 .024	Sta 140.93 246.39	n Val .07 .035
Bank Sta: Left Right 140.93 169.76	Lengths: Le	eft Channel	Right	coeff	Contr.	Expan.
CROSS SECTION OUTPUT Pro		33 111.21	132.43		, .	
E.G. Elev (ft) Right OB	587.47	Element		L	eft OB	Channel
Vel Head (ft)	0.84	Wt. n-Val.		- 3	0.035	0.061
W.S. Elev (ft)	586.64	Reach Len.	(ft)	1	39.55	144.24
152.45 Crit W.S. (ft)		Flow Area	(sq ft)		66.06	210.68
E.G. Slope (ft/ft)	0.007062	Area (sq ft	t)		66.06	210.68
Q Total (cfs)	2021.00	Flow (cfs)		5	35.78	1485.22
Top width (ft)	43.60	Top width	(ft)		17.74	25.86
vel Total (ft/s)	7.30	Avg. vel.	(ft/s)		8.11	7.05
Max Chl Dpth (ft)	11.64	Hydr. Depth	(ft)		3.72	8.15
Conv. Total (cfs)	24050.1	Conv. (cfs))	6	375.9	17674.3
Length Wtd. (ft)	143.62	Wetted Per	(ft)		19.27	33.15
Min Ch El (ft)	575.00	Shear (1b/s	sq ft)		1.51	2.80
Alpha	1.01	Stream Powe	er (1b/ft	s) 3	00.00	0.00
0.00 Frctn Loss (ft)	2.10	Cum Volume			1.89	10.47
2.67 C & E Loss (ft) 0.91	0.17	Cum 5A (acr			0.81	1.16

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

LemonCreekPR.rep

RIVER: LemonCreek REACH: Reach1	RS: 2327.19		
93.92 590 94.72 102.29 586.32 103.01 109.28 584 110.98 115.54 580.95 118.4 126.32 575 127.18 133.21 573.99 134.25 139.89 580 140.92 144.8 583.87 150.07 152.97 583.86 153.92 159.54 583.64 161.13 163.51 583.51 164.03 166.97 583.77 167.16 172.83 585.7 178.21 185.81 587.42 186.59 177.08 585.7 178.21 185.81 587.42 186.59 177.08 585.7 178.21 185.81 587.42 186.59 189.69 591 204.87 241.54 589.33 246.22 250.63 591.56 258.83 256.55 592.36 258.83 256.55 592.36 258.88 289.28 594.42 297.1	622 31.77 620.49 33.19 604.52 64.23 604.07 65.49 603.49 70.35 603.41 70.57 602.62 76.13 602 77.6 598 83.42 597 86.28 593 90.55 592 92.06 589.64 96.17 589 98.04 586 104.89 585 107.67 583.35 111.84 583 112.08 579.38 120.52 578.21 120.91 574.51 128.04 574 129.44 575 135.3 581 141.03 581.06 142.55 583.29 146.41 583.36 147.66 583.93 150.69 583.98 151.19 583.82 154.71 583.8 156.39 583.84 165.03 583.98 1551.19 583.85 168.15 584 162.95 585.21 174.97 585.35 175.58 585.93 179.84 586.32 182.57 585.21 174.97 585.35 175.58 585.93 179.84 586.32 182.57 587.52 187.62 587.75 187.99 588.21 191.25 588.37 194.12 590.85 246.7 591 248.11 591.71 253.52 591.86 254.24 592.95 259.03 593.01 260.22 593.72 273.9 593.88 276.33 594.73 298.7 594.8 299.79	588.19 100.37 587.16 584.38 108.99 584.07 582.86 113.65 582 578 123.98 576.3 577 138.79 579 582 143.25 582.3 583.55 148.68 583.75 583.97 151.78 583.94 583.49 163.28 583.52 583.49 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52 583.40 163.28 583.52	
Manning's n Values Sta n Val Sta 0 .024 27.36 128.04 .04 133.21	num= 9 n val Sta n val Sta .035 64.23 .024 74.68 .07 149.62 .035 199.69	n Val Sta n Val .035 108.99 .07 .024	
Bank Sta: Left Right 108.99 149.62	Lengths: Left Channel Right 55.09 56.19 66.43	Coeff Contr. Expan.	
CROSS SECTION OUTPUT Pro		Left OB Channel	
E.G. Elev (ft) Right OB			
Vel Head (ft)	2.50 Wt. n-Val.	0.066	
W.S. Elev (ft) 66.43	582.70 Reach Len. (ft)	55.09 56.19	
	582.70 Flow Area (sq ft)	159.21	
E.G. Slope (ft/ft)	0.046655 Area (sq ft)	159.21	
Q Total (cfs)	582.70 Flow Area (sq ft) 0.046655 Area (sq ft) 2021.00 Flow (cfs) 31.77 Top Width (ft)	2021.00	
Top Width (ft)	31.77 Top Width (ft)	31.77	
vel Total (ft/s)	12.69 Avg. Vel. (ft/s)	12.69	
	Page 16		

Pa		

Max Chl Dpth (ft)	9.70 Le	monCreekPR.rep Hydr. Depth (ft)		5.01
Conv. Total (cfs)	9356.6	Conv. (cfs)		9356.6
Length Wtd. (ft)	58.89	Wetted Per. (ft)		37.93
Min Ch El (ft)	573.00	Shear (1b/sq ft)		12.23
Alpha 0.00	1.00	Stream Power (1b/ft s)	300.00	0.00
Frctn Loss (ft) 2.67	0.11	Cum Volume (acre-ft)	1.78	9.86
C & E Loss (ft)	0.64	Cum SA (acres)	0.79	1.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations. Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

ach1		RS: 227	1.00					
on:								
	Data	num-	149					
				rTou	Cto	Flour	Cto	Elev
								617.38
								601.9
								599.63
		600.93						
								597
								594.64
								592.52
								589
								585.64
								582
	124.95							579.99
				5/8	140.02			576.94
				5/5				573.56
								572
		5/2.76		572.87	1/2.25		173.19	575.61
								576.01
								576.46
		576.48				576.99		577
		577.34						577.98
								582.36
								589.79
								592.24
								593.22
								593.62
507 61	241.54	502 75	242.88	593.76	244.86	593.84	245.25	593.82
	ach1 on:	on: levation Data Elev Sta 622 31.58 612.44 58.39 601.47 74.36 599.3 86.36 599.3 86.36 599.3 94.8 599.102.17 588 109.16 588 109.16 588 124.95 578 132.67 576 141.6 573 144.96 572.56 168.15 576 173.69 575.91 175.58 576.45 188.27 577.1 199.96 578.22 203.23 584.4 216.32 590 226.08 592.29 229.58 593.29 229.58	ach1 RS: 227 on: levation Data Elev 622 31.58 622 612.44 58.39 610 601.47 74.36 599.3 86.36 599 599.3 86.36 599 594.39 94.8 594 592 102.17 591 588 109.62 587.8 585 581.48 124.95 581 581.48 124.95 581 579 132.67 579 576 141.6 575.74 573 144.96 577.56 168.15 577.1 175.58 572.76 573 144.96 577.59 576.45 188.27 576.48 577.1 199.96 577.59 576.45 188.27 576.48 577.1 199.96 577.34 578.22 203.23 579.594.4 578.22 203.23 585.81 590 226.08 590.74 592.29 229.58 592.61 593.29 229.58 592.61	ach1 Rs: 2271.00 on: levation Data Flew Sta 622 31.58 622 35.36 601.47 74.36 600.93 74.45 599.3 86.36 599 86.68 594.39 94.8 594 95.48 594 39 94.8 594 95.48 592 102.17 591 103.01 581.48 109.62 587.8 111.44 585 116.85 584.6 121 581.48 124.95 579 132.67 579 136.81 573 144.96 575.56 141.6 575.74 142.34 572.56 168.15 572.76 170.64 575.91 175.58 576.45 188.27 576.47 142.34 575.57 174.575.91 175.58 576.47 142.34 577.591 175.58 576 173.69 577.34 142.34 572.36 168.15 572.76 170.64 575.91 175.58 575.91 175.96 576.45 188.27 576.48 194.67 575.91 175.58 575.91 175.96 576.48 194.67 577.19 19.96 577.34 201.02 578.22 203.23 584.4 216.32 585.81 219.55 590.24 226.08 590.74 226.41 592.29 229.58 590.74 226.51 239.21	ach1 Rs: 2271.00 on: levation Data Flev Sta 622 35.3 620.78 37.67 620 43.09 612.44 58.39 610 62.6 608.04 72.52 603.5 73.52 601.47 74.36 6599 86.68 599.8 87.25 597.84 87.87 599.3 86.36 599 86.68 598.58 87.22 597.84 87.87 594.39 94.8 594 95.48 595.9 91.2 594.58 92.54 581.68 109.62 587.8 111.44 587 112.7 586.41 114.44 585 116.85 584.6 121 582.8 121.69 582.51 122.83 581.48 124.95 581 126.04 580.69 127.2 580.37 129.06 570 141.6 575.74 142.34 578 143.87 573 144.96 572 146.64 572 148.3 571.99 148.62 572.56 168.15 572.76 170.64 572.87 172.55 573 173.19 576 173.69 577 174 577.01 174.17 577 175.01 576.45 188.27 576.48 194.67 576.99 194.81 576.99 195.59 577.1 199.96 577.34 201.02 577.47 986.57 199.55 577.1 199.96 577.34 201.02 577.47 986.57 199.55 578.42 203.23 579 203.29 579 204.65 579.75 209.52 584.4 216.32 585.81 21.9.55 587.88 221.09 588.12 224.64 590.226.08 590.74 226.41 591.27.1 592.27.91 593.29 229.58 592.61 231.97 593.23.57 593.23 253.55			

	1	emonCreekPR, re	en			
245.51 593.87 246.07 258.96 595 260.44 280.04 596 281.39 284.08 599 285.33 293.2 602.78 293.73 299.89 605.92 301.93	594.02 2 594.88 2 596.77 2 599.66 2 603 2	46.78 594.29 76.74 594.96 81.75 597 86.05 600 96.06 604 04.43 608.33	247.79 277.1 282.86 288.2	594.75 594.96 598 600.83 604.14 610	249.04 278.03 283.15 290.98 298.11	595 595 598.25 601.88 605
Manning's n Values Sta n Val Sta 0 .024 31.58 144.42 .04 172.25 278.03 .07	num= n Val .035 .07	11 74.36 n Val 74.36 .024 174 .024	Sta 85.46 199.46	n Val .035 .07	Sta 140.02 249.04	n Val .07 .024
Bank Sta: Left Right 140.02 174		Left Channel 1.66 25	Right 41.57	Coeff	Contr.	Expan.
CROSS SECTION OUTPUT Pro	ofile #50-Y	'R				
E.G. Elev (ft)	584.41	Element		L	eft OB	Channe1
Right OB Vel Head (ft)	0.36	Wt. n-Val.			0.035	0.049
0.026 W.S. Elev (ft)	584.05	Reach Len.	(ft)		21.66	25.00
41.57 Crit W.S. (ft)		Flow Area	(sq ft)		85.18	379.10
240.76 E.G. Slope (ft/ft)	0.000860	Area (sq f	t)		85.18	379.10
240.76 Q Total (cfs)	3182.00	Flow (cfs)		2	53.68	1530.53
1397.80 Top Width (ft)	94.69	Top Width	(ft)		21.91	33.98
38.80 vel_Total (ft/s)	4.51	Avg. Vel.	(ft/s)		2.98	4.04
5.81 Max Chl Dpth (ft)	12.06	Hydr. Depti	n (ft)		3.89	11.16
6.20 Conv. Total (cfs)	108490.4	Conv. (cfs))	8	649.1	52183.4
47657.9 Length Wtd. (ft)	33.83	wetted Per	(ft)		23.03	39.12
41.45 Min Ch El (ft)	571.99	Shear (1b/s	sq ft)		0.20	0.52
0.31 Alpha	1.15	Stream Powe	er (1b/ft	5) 3	07.59	0.00
0.00 Frctn Loss (ft)	0.04	Cum Volume	(acre-ft)		1.73	9.51
2.48 C & E Loss (ft) 0.88	0.03	Cum SA (ac			0.77	1.02

Note: Manning's n values were composited to a single value in the main channel. CROSS SECTION

RIVER: LemonCreek REACH: Reach1

RS: 2246.00

INPUT Description: Station Elevation Data Sta Elev Sta 0 622 33.13 44.96 617.25 60.03 num= Elev 622 610 150 Sta Elev 36.85 620.78 73.07 603.96 Sta Elev 39.24 620 74.97 603.09 Sta Elev 41.25 619.04 75.31 602.61

				LemonCr	eekPR.re	n			
76.07 84.93 89.79 93.34 107.07 112.32 117.51 141.25.81 141.77 145.52 156.12 157.36 159.00 179.99 186.29 200.61 208.6 216.93 227.33 234.42 239.62 251.51 264.44 273.63 281.49	597 596 590 587.53 585 578.15 578.32 571.05 572.79 577.71 576.95 579.579 579.589 589.54	86.46 90.53 94.37 109.23 113.47 118.56 128.29 141.43 143.95 146.94 156.18 157.87 159.11 181.51 191.48	\$99.85 \$98.72 \$97.58 \$89.587 \$80.73 \$79.12 \$77.51 \$77.57 \$77.57 \$77.57 \$77.57 \$78.99 \$77.50 \$111 \$89.82 \$99.82	79.62 88.38 90.91 97.71 109.57 115.12 119.22 130.44 142.83 149.07 155.14 155.7 157.92 183.48 192.9 202.74 212.84 230.78 237.21 241.55 268.98 275.62 285.17	599. 52 598. 18 594. 18 588. 18 588. 18 580. 15 576. 576. 576. 571. 03 571. 09 573. 78. 47 576. 82 577. 78 576. 82 577. 581 584. 55 589. 36 590 593. 590 593. 595 595. 598	82.75 88.81 91.41 100.35 110.55 115.55 120.94 142.88 144.77 149.99 155.45 156.77 158.45 160.39 184.54 160.39 222.53 231.6 224.99 222.53 231.6 238.68 244.4 258.19 269.09 279.57 285.55	\$96.75 \$93 \$88.41 \$88 \$580 \$588.85 \$78.83 \$75.33 \$71.02 \$76.77 \$78.74 \$578.03 \$76.95 \$78.95 \$78.93 \$79.047 \$99.47 \$99.47	103.27 111.37 116.62 122.32 139.89 143.25 145.21 151.59 155.6 157.29 158.53 160.56 185.51	598. 596.4 591.71 585.46 582.43 579.29 578.49 571.03 572.57 574.78 577.82 576.88 579.57 582.3 579.58 589.54 590.58 593.594 596.59
Sta 0 143.25 227.33	n Val .024 .07	Sta 33.13 146.94 268.49	n Val .035 .04 .07	76.96 155.6	.024 .07	86.46 160.56	n Val .035 .024	125.81 208.58	n Val .024 .07
Bank Sta: 1 Ineffecti	Left	Right	Lengths	: Left C	hannel	Right	Coeff	Contr.	Expan.
Ineffecti Sta L 0 154.54 CROSS SEC	Sta R 148.54 297.88	579.69 579.69	Permaner F F	nt.	29.64	31.84		.1	.3
E.G. El	ov (ft)		504 2	c e1a	mont		4	oft on	Channel
Right OB Vel Hea					n-val.			0.024	0.059
0.025 W.S. El			583.70					33.12	29.64
31.84 Crit W.			581.2		w Area (72.86	176.15
292.70		ft)			a (sq ft			72.86	176.15
0 Total								99.39	657.23
			98.4		width (23.51	16.67
Top Wid 58.26 Vel Tot	al (ft/s)			, vel. (5.48	3.73
		t)						3.10	10.57
Conv. T		s)						779.1	16092.6
52041.0 Length			29.6	4 Wet	ted Per. ge 19			24.46	25.19

- A	LemonCreekPR.rep		LemonCreekPR.rep
60.37 Min Ch El (ft)	571.02 Shear (1b/sq ft)	0.31 0.73	143.25 .07 146.94 .04 155.6 .07 160.56 .024 208.58 .07 227.33 .024 268.49 .07
0.50 Alpha	1.21 Stream Power (lb/ft s)	297.88 0.00	Bank Sta: Left Right Coeff Contr. Expan. 143.25 159.92 .1 .3
0.00 Frctn Loss (ft)	Cum Volume (acre-ft)	1.69 9.35	Ineffective Flow num= 2
2.23 C & E Loss (ft) 0.83	Cum SA (acres)	0.76 1.00	Sta L Sta R Elev Permanent 0 148.54 579.69 F 154.54 297.88 579.69 F
			Downstream Deck/Roadway Coordinates num= 5
CULVERT			Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord 140.58 581 151.07 579.69 154.07 579.69 162.25 580
RIVER: LemonCreek REACH: Reach1 R	RS: 2230.01		Downstream Bridge Cross Section Data Station Elevation Data num= 150
Upstream Deck/Roadway Coor num= 5 Sta Hi Cord Lo Cord	= 5 = 22 = 2.6 rdinates Sta Hi Cord Lo Cord Sta Hi Co 148.54 579.69 151.54 579.	rd Lo Cord 59	Sta Elev Sta Sta Ele
84.93 599 86.46 5 89.79 597 90.53 93.34 596 94.37 5 107.07 590 109.23 112.32 587.53 113.47 117.51 585 118.56 125.81 581 128.29 5 141.23 579.15 141.43 5 145.52 573.32 146.94 152.52 571.05 154.42 5 156.12 572.79 156.18 157.36 572.79 156.18 157.36 577.76 159.11 179.99 579 181.51 5	num= 150 Sta Elev Sta El. 622 36.85 620.78 39.24 6 699.85 79.62 599.52 82.75 599. 599.87 88.38 598.17 88.81 598. 597.90 91 596.83 91.41 596. 598.58 197.71 594.16 100.35 588. 588 109.57 588.83 110.5 588. 587.115.12 586.19 115.55 586.19 115.55 584. 580.73 130.44 580.5 135.82 578. 579.12 142.81 579 142.88 578. 577.51 144.53 576 144.77 575. 577.1 571.03 149.99 571. 577.107 155.14 571.09 155.45 571. 575.77 573.78 156.77 575.77 575.77 576.75 576.74 160.39 578. 575.77 157.95 576 158.45	20 41.25 619.04 21 75.31 602.61 22 83.33 599.15 22 88.94 598 23 103.27 591.71 24 111.37 588 25 116.62 585.46 25 122.32 582.43 25 132.32 582.43 25 132.32 578.49 26 136.55 578.49 27 158.53 574.78 27 158.53 574.78 27 158.53 577 28 160.56 579 29 185.51 577.82	148.5 575.89 149.74 575.14 149.94 575.07 150.79 575.05 150.56 575.07 151.53 571 151.39 571 152.36 571 152.76 571 153.29 571 157.27 571 157.96 577.48 158.78 577.95 160.18 578.79 161.56 579.6 162.25 580 168.35 580 169.16 579.77 170.7 579.35 179.32 579 184.49 579 184.82 578.98 185.32 578.99 185.79 578.37 170.7 579.35 179.32 579 187.9 579 188.9 578.96 189.02 578.99 185.79 578.99 186.17 579 194.11 578.66 194.47 578.62 195.49 578.95 190.83 578.84 192.59 578.74 194.11 578.66 194.47 578.36 201.54 578.52 207.29 578.32 203.2
216.95 583 218.71 227.33 589 227.61 234.42 589.54 235.9 5 239.62 591 241.2 5 251.51 593.28 253.1 5 264.44 594.5 268.49 5 273.63 596.96 273.89 5	580.11 212.88 581 214.99 5.585 584 219.64 584.55 222.53 586 589 230.78 589.82 237.21 590 238.68 590.591.83 241.55 592 244.4 5.593.39 255.35 593.56 258.19 593.594.95 268.98 595 269.09 595.6597.11 275.62 598 279.57 603 285.55 603	78 208.58 579 215.6 582.3 24 225.56 588 37 233.72 589.54 47 238.96 590.58 39 246.33 593 32 259.89 594 272.08 596 00 280.72 600.59	Manning's n Values
	num= 12 n val Sta n val Sta n v .035 76.96 .024 86.46 .0	al Sta n Val 35 125.81 .024	Upstream Embankment side slope = 0 horiz. to 1.0 vertical Downstream Embankment side slope = 0 horiz. to 1.0 vertical Maximum allowable submergence for weir flow = .98

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LemonCreekPR, rep
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Elevation at which weir flow begins Energy head used in spillway design Spillway height used in design Weir crest shape

= Broad Crested

Number of Culverts = 1

Shape Culvert Name Rise Span Culvert #1 Circular FHWA Chart # 2 - Corrugated Metal Pipe Culvert FHWA Scale # 1 - Headwall

Solution Criteria = Highest U.S. EG Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef

.024 22 .024 .5

Elevation = 571.02 Upstream Centerline Station = 151.54 Downstream Elevation = 571 Centerline Station = 154.07

CROSS SECTION

RIVER: LemonCreek

RS: 2216.36 REACH: Reach1

INPUT Description: 150 Station Elevation Data num= Elev Sta Elev 622 Elev Sta Sta Sta 48.98 93.74 95.81 104.03 108.94 121.37 46.96 76.74 95.53 103.43 622 608.73 596.47 594.26 593.15 587.33 617.39 598.05 621.35 53.15 620 58.6 95.19 73.98 610 95.21 597.87 97.8 595 107.04 594 600.62 595.29 594.21 94.34 95.84 104.5 111.92 123.52 133.6 146.73 595.2 96.16 595.17 594.16 105.25 594.21 592.85 586.88 582.07 577.82 594 588 108.44 591 586 590 113.76 118.64 132.83 141.81 149.74 151.95 582.3 580 575.14 571 577.48 580 578.98 131.05 140.58 583 581 575.89 571 571 580 579 579 578.66 578.41 578.37 580 583.7 584.4 584.71 586 589.3 582 577 139.09 133.4 145.39 150.19 152.76 155.75 160.18 575.05 571 571 148.5 149.94 152.36 575.07 571. 571. 571. 577. 95 578.99 578.99 578.52 578.52 578.52 584.07 584.47 584.86 587.13 590.55 593.09 595.09 600.29 600.29 150.56 153.29 153.67 157.27 154.34 157.96 168.35 184.82 188.9 194.47 199.37 205.08 211.57 219.71 225.65 229.64 234.72 241.54 154.98 158.78 169.16 185.32 189.02 195.49 201.54 205.52 212.01 219.96 226.47 235.34 246.78 246.78 246.78 277.1 285.29 293.48 293.48 156.68 161.56 571 578.79 579.35 578.99 578.84 578.5 579.6 170.7 185.79 579 579 162.25 184.49 187.9 194.11 198.48 203.97 209.64 218.88 223.33 228.81 232.94 240.05 244.9 257.35 276.35 281.09 290.41 578.96 578.62 578.36 578.47 580.82 584.45 584.45 584.85 593 593 593 595 600 190.83 192.59 197.1 578.5 578.32 578.99 582.61 584.39 202.57 207.29 216.07 222.55 226.69 230.57 237.25 243.02 583 584.49 228.2 585 588 239.44 243.28 589 591 590.86 594 595.53 596.87 601.79 241.54 246.62 263.53 276.56 284.75 292.08 248.3 270.43 278.87 288.02 293.91 298.48 243.28 248.73 272.59 279.28 289.76 294.52 302.6 592 594.59 595.7 597 602.73 595.98 603.09 604 605 296.82 606.59 607 11 Sta 95.81 222.55 Manning's n Values num= val Sta .024 46.96 .024 209.64 n Val .035 .07 n val .024 .024 n Val Sta n Val 5ta 107.04 n Val Sta 140.58 .024 .035 .04 162.25 226.42 .024

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248.3

LemonCreekPR, rep

5. 56	. 07

Bank Sta: Left 140.58 Ineffective Flow	162.25	Lengths: Left 29.71	Right 12.78	Coeff Contr.	Expan.
Sta L Sta R	Elev	Permanent			
0 151.07 157.07 302.6	579.69 579.69	F			

CROSS SECTION OUTPUT Profile #50-YR

584.11	Element	Left OB	Channel
1.97	wt. n-val.	0.035	0.040
582.14	Reach Len. (ft)	29.71	17.36
582.14	Flow Area (sq ft)	4.48	136.75
0.009609	Area (sq ft)	4.48	136.75
3182.00	Flow (cfs)	13.31	1281.17
81.64	Top Width (ft)	7.35	21.67
10.85	Avg. Vel. (ft/s)	2.97	9.37
11.14	Hydr. Depth (ft)	0.61	6.31
32461.7	Conv. (cfs)	135.7	13070.0
14.99	Wetted Per. (ft)	7.44	33.14
571.00	Shear (1b/sq ft)	0.36	2.48
1.08	Stream Power (1b/ft s)	302.60	0.00
0.12	Cum Volume (acre-ft)	1.69	8.96
0.20	Cum SA (acres)	0.75	0.99
	1.97 582.14 582.14 0.009609 3182.00 81.64 10.85 11.14 32461.7 14.99 571.00 1.08 0.12	1.97 Wt. n-Val. 582.14 Reach Len. (ft) 582.14 Flow Area (sq ft) 0.009609 Area (sq ft) 3182.00 Flow (cfs) 81.64 Top Width (ft) 10.85 Avg. Vel. (ft/s) 11.14 Hydr. Depth (ft) 32461.7 Conv. (cfs) 14.99 Wetted Per. (ft) 571.00 Shear (lb/sq ft) 1.08 Stream Power (lb/ft s) 0.12 Cum Volume (acre-ft)	1.97 wt. n-val. 0.035 582.14 Reach Len. (ft) 29.71 582.14 Flow Area (sq ft) 4.48 0.009609 Area (sq ft) 4.48 3182.00 Flow (cfs) 13.31 81.64 Top width (ft) 7.35 10.85 Avg. Vel. (ft/s) 2.97 11.14 Hydr. Depth (ft) 0.61 32461.7 Conv. (cfs) 135.7 14.99 wetted Per. (ft) 7.44 571.00 Shear (lb/sq ft) 0.36 1.08 Stream Power (lb/ft s) 302.60 0.12 Cum Volume (acre-ft) 1.69

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations. Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections. Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: LemonCreek

RS: 2199.00 REACH: Reach1

INPUT Description:

Station Elevation Data num= 150

Elev Sta Elev Sta Elev Elev Sta Elev

	LemonC	reekPR ren		
240.02 583.24 240.76 244.89 584.59 245.78 250.77 587.36 252.16 258.73 591 260.9 264.65 594 265.99 289.22 596.15 291.97 298.14 599 299.97 305.43 602.98 305.48 311.13 606.09 313.48 Manning's n Values 5ta n Val Sta 0.024 67.86 185.74 .024 220.09 289.22 .07	622 57.02 620 75.81 607.43 114.58 592.42 121.39 590.96 130.92 589.82 138.31 588.23 145.51 585.48 149.77 582 157.36 579.49 160.64 574 163.5 571.59 174.88 579.13 216.71 579.03 219.76 579.28 221.61 579.28 221.61 581 227.34 582.56 233.32 582.73 236.25 583.38 241.86 585 253.43 592 262.19 594.15 568.6 585 247.79 588 253.43 592 262.19 594.15 568.6 596.55 294.5 600 300.73 607.37 607.37 314.63 num= 11 n val 5ta .07 233.32	587.31 146.32 585 151.83 581 157.6 579.41 161.49 576 163.26 573 163.53 575.02 181.23 578.22 185.74 579.14 217.85 579.08 220.09 579.39 222.58 581.39 229.62 582.71 233.84 582.8 238.54 583.62 242.57 585.97 248.01 588.58 254.34 592.64 262.96 594.43 275.27 597 296.31 604 308.36 608 316.94	389.14 146.47 583.91 152.9 580.89 159.44 579 162.51 575.62 163.32 572.72 163.7 576 182.68 579 207.39 579.1 218.87 579.04 220.23 579.63 223.57 582.22 234.31 583.05 238.66 583.73 243.62 586.07 249.98 589.26.21 593 263.64 598 296.61 601 303.78 604.57 309.14 609.26 318.26	586.77 583.35 580 578.33 575.57 573.33 576.92 579.07 579.07 582.38 582.72 583.07 589.85 596 598.17 602.08 609.99 n Val .024
Bank Sta: Left Right 145.51 183.12	Lengths: Left (Channel Right 114.9 122.27	Coeff Contr.	Expan.
CROSS SECTION OUTPUT Pro	file #50-YR			
E.G. Elev (ft)	583.63 E1	ement	Left OB	Channe1
Right OB Vel Head (ft) 0.026 W.S. Elev (ft)	1.29 Wt			0.048
W.S. Elev (ft) 122.27	582.34 Re	ach Len. (ft)	107.55	114.90
Crit W.S. (ft)	Fl	ow Area (sq ft)		212.10
E.G. Slope (ft/ft)	0.007119 Ar	ea (sq ft)		212.10
Q Total (CTS)	3182.00 FI	ow (cfs)		1746.56
Top Width (ft)	76.23 To	p Width (ft)		28.31
Vel Total (ft/s)		g. Vel. (ft/s)		8.23
10,09 Max Chl Dpth (ft)	11.34 Hy	dr. Depth (ft)		7.49
2.97 Conv. Total (cfs) 17012.5		nv. (cfs)		20699.8
Length Wtd. (ft)	116.99 We	tted Per. (ft)		37.57
49.01 Min Ch El (ft)	571.00 Sh	ear (1b/sq ft) age 24		2.51

1.29	Le	monCreekPR.rep		
Alpha 0.00	1.03	Stream Power (1b/ft s)	318.26	0.00
Frctn Loss (ft) 2.18	0.90	cum Volume (acre-ft)	1.69	8.89
C & E Loss (ft) 0.78	0.01	Cum SA (acres)	0.75	0.98

Note: Manning's n values were composited to a single value in the main channel. CROSS SECTION

RIVER: Le REACH: Re			RS: 208	4.10					
INPUT									
	on.								
Descripti		Data	Marian.	140					
Station E			num=	148	-7-		-1-c		m2
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	621	3.93	621	27.02	621	27.82	621	30.55	620.39
32.32	620	38.16	617.43	41.04	616.12	52.35	610.8	53.62	610.14
54	610	70.5	602.03	74.6	600	80.58	597.05	94.87	590
98.96	588.37	100.96	587.55	105.57	585.65	109.94	585.41	112.13	585.34
115.6	585.21	121.02	585	121.05	585	121.1	585	121.18	585
121.46	585	121.48	585	121.51	585	121.55	585	121.89	584.69
122.62	584	123.59	583	123.97	582.62	124.57	582	121.89 125.23	581.31
125.54	581	126.34	580.18	126.51	580	126.55	579.96	127.46	579
127.67	578.78	128.41	578	128.82	577.56	129.34	577	130.02	576.26
130.26	576	131	575.19	131.17	575	131.21	574.95	132.07	574
132.29	573.75	132.97	573	133.27	572.65	133.85	572	134.25	571.53
134.72	571	135.23	570.37	135.54	570	143.14	570	146.82	570
148.56	570	148.57	570	148.64	570	149.94	570.77	150.32	571
150.78	571.28	151.95	572	152.36	572.26	153.55	573	154.51	573.6
155.15	574	156.31	574.73	156.74	575	158.07	575.84	158.33	576
159.84	576.95	159.92	577	160.56	577.41	161.5	578	161.67	578.11
162.61	578.7	163.09	579	173.62	579.5	184.09	580	185.19	580.57
186.02	581	187.42	581.74	187.92	582	188.13	582.12	189.66	583
190.51	583.52	191.3	584	191.69	584.25	192.91	585	193.86	585.6
194.51	586	195.65	586.72	196.1	587	197.5	587.9	197.66	588
198.13	588.3	199.21	589	199.55	589.22	200.75	590	201.72	590.63
202.29	591	202.73	591.29	203.82	592	205.03	592.79	205.34	593
205.7	593.24	206.83	594	208.26	594,74	208.8	595	209.74	595.17
210.73	595.34	211.32	595.44	212.69	595.6	221.26	596	225.08	596
226.54	596.88	226.74	597	227.07	597.18	228.53	598	229.47	598.53
230.32	599	231.69	599.77	232.11	600	232.4	600.16	233.9	601
235.04	601.64	235.68	602	237.3	602.9	237.47	603	237.55	603.05
239.26	604	240.39	604.63	241.05	605	241.65	605.33	242.84	606
244.25	606.79	244.63	607	245.09	607.26	246.42	608	247.56	608.64
248.21			609.83	250	610	240.42	000	247.30	000.04
240.21	609	249.7	009.03	250	010				
Manning's	n value	-	num=	10					
Sta	n Val	Sta	n val	Sta	n val	Sta	n Val	Sta	n val
0	.024	27.82	025	105.57	.024	121.55	.07	132.07	.04
155.15	.07	163.09	.024	184.09	.07	212.69	.024	225.08	.07
133.13	.07	103.09	.024	104.09	.07	212.09	.024	223.00	.07
Bank Sta:	Left	Right	Lengths	: Left C	hanne1	Right	coeff	contr.	Expan.
	21.55 1				208.44	211.8	-4-5	.1	.3
CROSS SEC	TION OUT	PUT Pro	file #50	I-YR					
			4.5					and a	with reserve \$
E.G. El	ev (ft)		582.7	2 Ele	ement		L	eft OB	Channel
Right OB									

		monCreekPR.rep		
Vel Head (ft) 0.025	1.27	Wt. n-val.		0.054
W.S. Elev (ft) 211.80	581.45	Reach Len. (ft)	202.44	208.44
Crit W.S. (ft) 44.13		Flow Area (sq ft)		307.79
E.G. Slope (ft/ft) 44.13	0.008415	Area (sq ft)		307.79
Q Total (cfs) 368.61	3182.00	Flow (cfs)		2813.39
Top Width (ft) 24.25	61.76	Top Width (ft)		37.51
Vel Total (ft/s) 8.35	9.04	Avg. Vel. (ft/s)		9.14
Max Chl Dpth (ft)	11.45	Hydr. Depth (ft)		8.21
Conv. Total (cfs)	34687.8	Conv. (cfs)		30669.5
4018.3 Length Wtd. (ft) 24.72	208.64	wetted Per. (ft)		45.05
Min Ch El (ft) 0.94	570.00	Shear (1b/sq ft)		3.59
Alpha 0.00	1.00	Stream Power (1b/ft s)	250.00	0.00
Frctn Loss (ft) 1.92	1.91	Cum volume (acre-ft)	1.69	8.21
C & E Loss (ft) 0.68	0.06	Cum SA (acres)	0.75	0.89

warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek

RS: 1875.66 REACH: Reach1

INPUT Description: Station Elevation Data Sta Elev St 0 605 1.6 num= Sta 34.48 75.76 102.59 106.13 118.42 147.2 147.49 147.73 Elev 605.605.605.89 584.68.583.82 583.01 564.83 564.84 564.27 564.21 579.29 587.18 588.87 590.67 593.59 595.42 595.42 595.42 Elev 601.34 592.15 584.61 583.68 564.99 564.76 564.66 579.48 589 589 591 593.06 596.59 698.75 601 Sta 18.76 74.23 93.91 105.48 110.89 147.12 147.47 147.69 156.15 164.84 168.41 195.67 201.36 219.79 223.66 230.1 236.99 243.49 250 Elev 605 Sta 1.68 62.63 79.67 105.07 107.86 119.26 147.35 147.89 148.02 156.21 166.63 190.72 200.54 201.91 221.52 227.49 233.83 240.77 247.24 Sta 12.27 64.9 88.46 105.22 110.81 147.42 147.64 148.03 156.54 167.03 201.32 202.25 222.33 227.66 235.39 242.81 249.04 Elev 605 605 597.1 585 583.88 583.28 564.87 564.69 564.48 37.13 77.81 104.46 107.01 118.84 147.27 147.54 598.03 590 584.51 583.68 564.98 564.75 564.27 578.47 579.87 588.02 589 590 591.51 594 596.59 601.33 147.77 147.98 156.2 166.29 180.45 199.74 201.51 219.81 227.2 232.73 239.67 246.26 564.48 564.3 564.21 579.23 582.82 588.72 589 590 592.89 595 597.59 147.94 156.17 165.85 171.21 196.56 201.38 219.8 224.9 232.12 238.08 579.91 588.18 589 590 592 594.76 597 244.26 599.28

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LemonCreekPR, rep

Manning's n values Sta n Val Sta 0 .024 37.1 156.54 .07 165.8	n Val 3 .035 10	10 Sta n Val Sta 7.86 .024 119.26 1.21 .07 201.91	n Val Sta .07 147.09 .024 219.79	n Val .04 .07
Bank Sta: Left Right 119.26 165.85	Lengths: L 107	eft Channel Right .36 105.37 108.86	Coeff Contr.	Expan.
CROSS SECTION OUTPUT P	rofile #50-YR			
E.G. Elev (ft) Right OB	580.75	Element	Left OB	Channel
Vel Head (ft)	1.09	Wt. n-Val.		0.065
0.024 W.S. Elev (ft) 108.86	579.66	Reach Len. (ft)	107.36	105.37
Crit W.S. (ft)		Flow Area (sq ft)		379.75
0.55 E.G. Slope (ft/ft) 0.55	0.010025	Area (sq ft)		379.75
Q Total (cfs)	3182.00	Flow (cfs)		3180.55
1.45 Top Width (ft) 1.82	43.24	Top width (ft)		41.42
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.38
2.65 Max Chl Dpth (ft) 0.30	15.45	Hydr. Depth (ft)		9.17
Conv. Total (cfs)	31780.8	Conv. (cfs)		31766.3
14.5 Length Wtd. (ft) 1.95	105.64	Wetted Per. (ft)		54.19
Min Ch El (ft)	564.21	Shear (1b/sq ft)		4.39
0.18 Alpha 0.00	1.00	Stream Power (1b/ft s	250.00	0.00
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	1.69	6.56
1.81 C & E Loss (ft) 0.61	0.05	Cum SA (acres)	0.75	0.71
0.00				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION

RIVER: LemonCreek

RS: 1770.29 REACH: Reach1

INPUT

Description:

Station Elevation Data

Sta Elev Sta

0 589 25.87

73.75 589 81.34

94.34 584.09 95.21

108.88 572.35 116.93

125.38 565.69 125.41

138.43 574.09 138.45 108 num= num= Elev 589 589 583.95 565.92 565.71 574.1 5ta 51.04 85.71 95.22 117.88 125.66 141.94 Sta Elev 54.32 589 91.33 585 95.99 583.28 118.6 565.18 125.78 566 145.34 574.51 58.56 93.06 108.67 125.31 125.94 147.29 589 584.49 572.52 565.62 566.24 574.98 589 587.25 583.94 565.16 565.91 574.37

	Len	ionCreekPR.re	D			
160.68 578.23 161.47 163.04 578.99 163.06 168.78 581 169.35 174.79 583 175.98 180.78 583 181.98 186.6 583.72 186.75 192.9 585 193.21 206.96 585.41 207.3 209.45 585.53 209.69 212.25 585.76 213.55 218.32 588 219.58 224.33 590.47 225.62 230.48 593 231.7 236.32 595.43 237.68 242.43 598 243.81 248.32 600.48 249.55	579 16: 581.2 17: 583.11 18: 583.74 18: 585.41 20: 585.53 21: 586.212 588.52 220: 591.22: 593.51 22: 5996.23	51 578.51 61 582 52 583 49 583.26 97 584 97 584 97 585.41 15 585.75 98 586.39 75 591 71 596.85 81 599 250 601.19	161.63 165.94 173.83 179.09 185.35 191.87 193.5 208.9 211.71 215.89 221.94 228.05 233.84 240.06 245.93	578.55 580.583 583.57 584.8 585.53 585.75 587.75 589.49 592.594.39 597.599.47	161.89 166.26 174.16 179.76 186.2 192.29 193.54 209.2 211.97 217.74 223.19 228.37 235.3 240.56 247.18	578.63 580.11 583 583.67 584.88 585.53 585.76 587.76 592.13 595 597.21 600
Manning's n Values Sta n Val Sta 0 .024 81.34 145.34 .07 174.16	.035 95	Sta n Val 6.99 .07 0.78 .07	Sta 108.67 192.9	. 04	Sta 138.43 213.55	n Va1 .024 .07
Bank Sta: Left Right 95.99 138.43	Lengths: Le	eft Channel 22 176.46	Right 170.8	Coeff	Contr.	Expan.
CROSS SECTION OUTPUT Pro			2,7,7			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
E.G. Elev (ft)	580.04	Element		L	eft OB	Channe'
Right OB Vel Head (ft)		Wt. n-val.				0.048
0.034 W.S. Elev (ft)	579.13	Reach Len.	(ft)	1	81.22	176.46
170.80		- A I	sa ft)			343.05
76.75 E.G. Slope (ft/ft)	0.004238)			343.05
76.75 Q Total (cfs)		Flow (cfs)	•			2696.70
485.30 Top Width (ft)	62.55	Top Width (ft)			37.55
25.00	7.58	Avg. Vel. (7.86
6.32 Max Chl Dpth (ft)	13.97	Hydr. Depth				9.14
3.07 Conv. Total (cfs)		conv. (cfs)				41425.1
7454.8 Length wtd. (ft)	175.08	Wetted Per.				45.10
25 61						2.01
0.79		Shear (1b/s			50.00	
Alpha 0.00 From Loss (ft)	1.02	Stream Powe			50.00	0.00
1.72	9.50	Cum Volume			1.69	5.69
C & E Loss (ft) 0.58	0.05	Cum SA (acr	es)		0.75	0.61

Note: Manning's n values were composited to a single value in the main channel. CROSS SECTION

Page 28

DTV/FR: LomonCrook	Lei	monCreekPR.re	ep.			
RIVER: LemonCreek REACH: Reachl	RS: 1593.8	3				
INPUT Description: Station Elevation Data Sta Elev St 0 582 3.9 100.29 581.34 100.3			Sta 00 25	Elev	Sta	Elev
00.29 581.34 100.3 100.55 581.16 100.6 101.55 580.45 102.0 102.61 579.92 102.8 120.8 564.26 122.3 133.94 570.51 134.8 172.63 579.54 181.5 182.12 580.51 182.4 196.39 582 198. 212.28 582 212.3 216.83 584.09 218. 223.18 587 223.9 228.86 589.59 229.7 233.75 592 234.0 239.46 594.89 239.6 243.73 597 245.7	581.08 10' 9 580.06 10 8 579.87 10 3 564.26 12 3 579.87 10 3 580.45 18 1 580.45 18 1 582 19 5 582.03 21 5 582.03 21 5 582.03 21 5 587.34 22 5 590 23 7 592.17 23	0.62 581.62 0.68 581.07 2.17 579.99 2.97 579.85 6.98 564.28 5.83 570.93 1.85 580.48 8.49 581 8.49 582 4.45 583 8.83 585.01 5.37 588 6.96 593 6.97 583 6.98 595.08 6.99 593 6.55 590.88 6.55 590.88 6.55 590.88 6.55 590.88	100.84 102.2 114.77 127.2 143.73 181.97 187.92 200.96 215.94 220.98 226.54 231.85	580.95 579.99 569.5 564.29 571.03 580.49 581.1 582 583.69 586 588.54 591 593.16	100.85 102.22 120.75 127.64 160.54 182.02 191.92 211.94 216.62 222.27 227.56	580.95 579.99 564.25 564.66 576.19 580.5 581.53 582 584 586.59 591.84 596.7
248.57 599.32 25	0 600				247.91	299
Manning's n Yalues Sta n Val St 0 .024 99.2 172.63 ,035 196.3	num⊨ a n ∨al 5 .07 10. 9 .024 21	8 Sta n Val 2.97 .04 1.94 .07	Sta 134.85	n Val .024	Sta 143.73	n Val .07
Bank Sta: Left Right 101.55 134.85 Left Levee Station	Lengths: L 130 = 99.25	eft Channel .89 127.96 Elevation=	Right 126.93 582	Coeff	Contr.	Expan.
CROSS SECTION OUTPUT P	rofile #50-YR					
E.G. Elev (ft)	579.43	Element		L	eft OB	Channe
Vel Head (ft)	0.75	wt. n-val.				0.040
0.034 W.S. Elev (ft) 126.93	578.69	Reach Len.	(ft)	1	30.89	127.96
Crit W.S. (ft)						295.17
165.05 E.G. Slope (ft/ft) 165.05 Q Total (cfs) 1061.95 Top Width (ft) 34.70	0.002473	Area (sq ft	(:)			295.17
Q Total (cfs) 1061.95	3182.00	Flow (cfs)				2120.06
Top Width (ft)	65.25	Top Width ((ft)			30.55
Vel Total (ft/s)						7.18
6.43 Max Chl Dpth (ft)	14.44	Hydr. Depth	(ft)			9.66
4.76 Conv. Total (cfs)		Conv. (cfs)				42629.8
21353.4 Length Wtd. (ft)		wetted Per.				38.51
35.81 Min Ch El (ft)		Shear (1b/s	a ft)			1.18
0.71 Alpha		Stream Powe		s) 2	50.00	
0.00 Frctn Loss (ft) 1.24						4.40
1.24						

LemonCreekPR.rep C & E Loss (ft) 0.46 0.75 0.47 Cum SA (acres)

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Lemon REACH: Reach			RS: 146	5.87					
INPUT Description Station Elevants	Elev 82.77 580 77.48 75.43 77.13 77.95 77.49 68.71 77.37		24.	109 Sta 5.3 52.47 77.62 83.1 103.3 123.24 134.13 169.7 184.66 198.6 228.157 265.78 280.77 288.51 293.35 299.31	Elev 580.91 580.91 577.36 577.36 576.92 577.14 577.55 571.44 563.87 572.96 578.67 584.67 584.58	Sta 7.45 60.67 77.63 83.54 113.01 123.5 143.06 170.05 188.44 199.94 237.14 237.16 269.65 281.86 289.07 299.75	Elev 580 580 577.53 575.48 577.46 577.46 566.17 564.31 578.45 580.67 580.67 582.58	Sta 8.93 73.91 77.66 83.56 83.56 126.76 154.18 170.37 189.75 204.04 239.45 257.74 271.84 282.52 289.72 295.48	Elev 580 580 576.67 575.17 577.15 577.15 577.97 563.7 565.41 576.66 578.9 580.12 582.3 585.3 587.05
301.88 306.15 312.35	588 90.02 593 95.29 598	302.37 308.19 314.18 318.5 323.19	588.23 591 593.88 596 598.33	303.99 308.22 314.43 319.36 324.58	589 591.02 594 596.43	305.72 310.27 314.8	589.82 592 594.18 597 599.21	306.1 311.01 316.5 321.48	590 592.35 595 597.49
0	n Val	Sta 7.45 242.76	num= n val .024 .024	9 Sta 161.22 248.91	n val .07 .035	Sta 171.84 286.94	n Val .04 .07	Sta 205.5	n Val .024
Ineffective Sta L	9.7 Flow Sta R	205.5 num= Elev	9.19	41.14 nt	hannel 39.95	Right 45.44	Coeff	Contr.	Expan.
Left Levee	5	tation=	154.18	Ele	vation≃	579			
Distant adese.									
E.G. Elev Right OB Vel Head	2.50		579.1		ment n-Val.			eft OB 0.042	0.042
0.026 w.s. Elev 45.44								41.14	39.95
19.44									

Page 30

	Le	monCreekPR.rep		
crit W.S. (ft)	573.46		13.58	343.09
243.66	* *****			
E.G. Slope (ft/ft) 243.66	0.001079	Area (sq ft)	13.58	343.09
Q Total (cfs)	3182.00	Flow (cfs)	14.14	1579.12
1588.74				
Top width (ft) 50.63	101.95	Top width (ft)	15.52	35.80
Vel Total (ft/s) 6.52	5.30	Avg. Vel. (ft/s)	1.04	4.60
Max Chl Dpth (ft)	15.55	Hydr. Depth (ft)	0.87	9.58
Conv. Total (cfs)	96878.0	Conv. (cfs)	430.6	48077.3
48370.0	200			
Length Wtd. (ft) 51.85	41.36	wetted Per. (ft)	16.22	43.88
Min Ch El (ft) 0.32	563.11	Shear (1b/sq ft)	0.06	0.53
Alpha 0.00	1.13	Stream Power (lb/ft s)	325.00	154.18
Frctn Loss (ft) 0.65	0.08	Cum Volume (acre-ft)	1.67	3.46
C & E Loss (ft) 0.34	0.04	Cum SA (acres)	0.72	0.37

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1 RS: 1425.92

INPUT

ı	pescripti	on:								
5	station E	Tevation	Data	num=	145					
	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
	0	583	2.22	583	3.42	582.51	9.35	580	24.98	580
	35	580	53.74	580	60.06	580	66.66	580	77.33	580
	84.84	580	85.06	579.81	85.96	579	87.06	579	88.34	579
	90.08	579	102.9	579	104.54	579	115	579	129.29	579
	129.56	578.35	130.11	576.57	132.74	576.56	135.29	576.54	135.59	576.25
	135.8	576.04	135.93	575.16	136.01	574.54	153.8	574.94	154.62	574.96
	154.94	574.97	155.96	574.93	173.7	574.38	173.85	575.47	173.91	575.88
	174.28	576.24	174.42	576.37	178.45	576.36	179.57	576.35	181.38	576.59
	182.33	576.89	183.26	577.17	185.45	577.16	193.13	577.13	206.94	576.86
	217.76	577	219.19	576.22	221.48	574.97	223.31	574.56	223.33	574.57
	224.21	573.34	224.89	563.51	228.69	563.51	230.99	563.51	242.37	563.51
	244.65	563.51	244.83	563.51	247.69	573.13	248.26	573.38	248.36	573.95
	248.54	573.83	253.19	573.81	261.95	577.35	262.76	577.82	266.54	577.85
	273.43	577.88	274.65	577.86	275.02	577.89	277.09	577.96	280.42	578.07
	280.88	578.08	281.42	578.1	281.55	578.1	289.48	578.44	289.87	578.46
	290.5	578.48	291.08	578.51	292.63	578.57	295.74	578.7	302.21	578.98
	302.26	578.98	302.76	579	306.18	579.22	318.43	580	320.22	580.16
	321.72	580.29	321.96	580.31	324.19	580.48	324.44	580.5	324.89	580.52
	330.48	581	330.71	581	330.75	581	330.97	581	331.68	581.25
	332.96	581.71	333.86	582	335.27	582.6	336.27	583	336.32	583.02
	336.38	583.05	337.53	583.57	338.45	584	339.22	584.34	340.7	585
	341.39	585.3	342.46	585.75	343.03	586	344.57	586.65	345.38	587

		LemonCre	ekPR. re	D			
346.67 587.55 347.7 350.28 589.07 350.1 356.19 591.99 356.2 358.63 593.12 359.4 360.7 594 361.1 362.37 594.56 362.7 364.18 595.12 364.2	4 588 6 589.21 1 592 4 593.48 1 594.15 7 594.68	349.9 352.4 356.55 360.32 361.51 362.91 364.7	588.92 590 592.16 593.84 594.29 594.73 595.3	350.1 353.8 358.36 360.48 361.87 363.53	589 590.74 593 593.91 594.4 594.92 595.38	350.22 354.3 358.51 360.53 362.1 363.79 365	589.05 591 593.07 593.93 594.47 595 595.39
Manning's n Values Sta n Val St. 0 .024 2.2 248.36 .024 253.1	2 .035	8 Sta 9.35 330.48	n val .024 .07	Sta 217.76	n Val .07	Sta 223.31	n val
Bank Sta: Left Right 219.19 262.76 Ineffective Flow nu Sta L Sta R Ele 0 183.26 577.1 183.26 224.89 577.3	m= 3 V Permanen 7 F 4 F	28.9		Right 28.7	Coeff	Contr.	Expan.
244.89 365 577.3 Left Levee Station		Elev	ation=	579			
CROSS SECTION OUTPUT P	rofile #50-	YR					
E.G. Elev (ft)	579.04	Elen	iont		7	eft OB	Channe1
Right OB					-		
Vel неаd (ft) 0.035	0.89		n-val.			0.025	0.041
w.s. Elev (ft) 28.70	578.15	Read	h Len.	(ft)	d	28.90	26.50
Crit W.S. (ft)	572.74	Flov	Area (sq ft)	19	41.09	389.40
E.G. Slope (ft/ft)	0.003886	Area	(sq ft)		41.09	389.40
Q Total (cfs)	3182.00	Flov	(cfs)		1	63.14	3014.37
4.49 Top Width (ft)	99.37	Тор	width (ft)		35.93	43.57
19.87 Vel Total (ft/s)	7.31	Avg.	vel. (ft/s)		3.97	7.74
0.99 Max Chl Dpth (ft)	14.64	Hydr	. Depth	(ft)		1.14	8.94
0.23 Conv. Total (cfs)	51047.1	Cons	. (cfs)		2	617.2	48357.9
72.0 Length Wtd. (ft)	26.50	Wett	ed Per.	(ft)		37.11	62.30
19.87 Min Ch El (ft)	563.51	Shea	r (1b/s	n ft)		0.27	1.52
0.06 Alpha	1.08		2.00	r (1b/ft		65.00	183.26
0.00	1.00						
Frctn Loss (ft) 0.52				(acre-ft)		1.64	3.12
C & E Loss (ft) 0.30		Cum	SA (acr	es)		0.70	0.34

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: LemonCreek

REACH: Reach1

RS: 1412.68

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LemonCreekPR. rep

```
INPUT
Description: Culvert #2
Distance from Upstream XS =
Deck/Roadway Width =
  Weir Coefficient
                                                                                               2.6
 Upstream Deck/Roadway Coordinates
            num=
                                            5
      Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord 217.76 577 224.89 577.34 262.76 577.82
                                                                                                                                                              Sta Hi Cord Lo Cord
                                                                                                                                                     234.89 577.34
 Upstream Bridge Cross Section Data
Station Elevation Data num=
                                                                                                       145
                                                                                                                            582.51
580
                                                                                                                                                                                                       Sta
24.98
77.33
               Sta
                                   Elev
                                                            Sta
2.22
                                                                                    Elev
                                                                                                           Sta
3.42
                                                                                                                                                                                    Elev
                                                                                                                                                                                                                                   Elev
                                       583
                                                                                       583
580
                                                                                                                                                            9.35
                                                                                                                                                                                      580
580
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580
      0 583 2.22
84.84 85 580 85.06
90.08 579 102.9
129.56 578.35 130.11
135.8 576.04 135.93
154.94 574.97 155.96
174.28 576.24 174.42
182.33 576.89 183.26
217.76 577 219.19
224.21 573.34 224.89
244.65 563.51 244.83
248.54 573.83 253.19
273.43 577.88 274.65
280.88 578.08 281.42
290.5 578.48 291.08
302.26 578.98 302.76
321.72 580.29 321.96
330.48 581.30.71
332.96 581.71 333.86
330.48 581.71 333.86
336.38 583.05 337.53
341.39 585.3 342.46
346.67 587.55 347.74
350.28 589.07 350.6
356.19 591.99 356.21
358.63 593.12 359.44
360.7 594 361.11
362.37 594.56 362.77
364.18 595.12 359.44
                                       580
                                                          53.74
                                                                                                          60.06
                                                                                                                                                         66.66
                                                                                                                            579
579
576.566
574.54
574.38
576.366
577.16
574.97
578.57
577.89
577.859
578.57
578.57
578.57
578.58
582.66
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579
                                                                            579.81

576.57

575.19

576.37

577.17

576.22

563.51

573.81

577.86

578.91

577.86

578.91

582

583.77

588.75

588

581.75

588

589.21

594.15

594.68

595.46
                                                                                                     85.96
104.54
132.74
136.01
173.7
178.45
221.48
228.69
247.69
261.95
292.63
306.18
324.19
330.75
335.27
                                                                                                                                                   87.06
115
125.29
153.8
173.85
179.57
193.13
223.31
230.91
248.26
262.76
277.09
248.26
27.09
289.48
295.74
318.44
330.27
336.27
336.27
350.1
353.8
358.36
360.48
361.87
363.53
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129.29
135.59
154.62
173.91
181.38
206.94
223.33
242.37
248.36
266.54
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289.87
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576.54
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584.34
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578.98
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324.89
331.68
336.32
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580.52
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338.45
343.03
349.9
352.4
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360.32
361.51
362.91
364.7
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587
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586.65
589
590.74
593
593.91
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588.92
590
592.16
593.84
594.29
594.73
595.3
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360.53
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594.92
595.38
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363.79
365
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                                                                                                                                                     364.97
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 Manning's n Values
                                                                               num=
               Sta n Val
                                                                           n Val Sta
.035 9.35
.035 330.48
                                                                                                                             n Val
                                                           Sta
2.22
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                                                                                                                                   .024
                                                                                                                                                    217.76
                                                                                                                                                                                       . 07
                                                                                                                                                                                                                                       .04
                                                                                                                                      .07
       248.36
                                 .024 253.19
Bank Sta: Left Right Coeff Cont 219.19 262.76
Ineffective Flow num= Sta L Sta R Elev 0 183.26 577.17
183.26 224.89 577.34 F 244.89 365 577.34 F 244.89 Station= 183.26
                                                                              Coeff Contr.
                                                                                                                          Expan.
 Left Levee
                                               Station= 183.26
                                                                                                                  Elevation=
 Downstream Deck/Roadway Coordinates
      num= 5
Sta Hi Cord Lo Cord
179.99 573.89
205.12 577.34
                                                                              Sta Hi Cord Lo Cord
185.12 577.34
212.17 576.66
                                                                                                                                                              Sta Hi Cord Lo Cord
                                                                                                                                                     195.12 577.34
```

Downstream Bridge Cross Section Data

```
LemonCreekPR.rep
  Station Elevation Data
                                                                              num=
                                                                                                        152
                                                                                                              Sta
                Sta
0
                                    Elev
                                                     Sta
22.76
96.62
102.22
139.54
143.1
153.01
174.43
186.91
200.25
221.19
262.79
244.07
245.28
256.51
267.33
270.39
276.6
281.52
285.03
287.8
293.77
297.2
297.2
301.56
312.23
317.55
511
                                                                                    Elev
                                                                                                                                    Elev
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                                                                                                                                                                                                                                 Elev
                                         580
                                                                                                             23.1
                                                                                                                            579,71
575,98
573,96
574,65
575,68
573,92
563,39
563,39
577,12
578,33
579,04
579,54
580,78
581,12
581,19
581,19
582,73
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127.82 574.22
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221.41
224.09
246.82
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294.03
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                                                                              573.86
575.85
575.63
574.45
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        127.82
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179.99
189.25
208.93
        151.82
173.95
185.12
199.62
219.47
220.7
243.98
244.99
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261.28
267.03
270.2
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                               575.64
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                              563.39
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563.39
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576.66
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212.17
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579.04
579.78
                                                                                                                                                                                                   220.38 577.17
235.21 578
                                                                                                                                                     220.08
223.44
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248.15
252.72
259.32
264.62
268.5
271.17
277.06
284.12
286.66
291.69
295.35
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302.97
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314.04
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328.18
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260.14
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279.43
284.29
286.67
292.88
295.88
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280.07
284.66
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293.54
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302.47
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 Manning's n Values

Sta n Val Sta

0 .024 157.4

212.17 .035 302.97
                                                                               num=
                                                                               n val Sta
.035 163.01
.07
                                                                                                                          n val Sta
.07 173.95
                                                                                                                                                            Sta n val
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                                                                                                                                                                                      .04 208.93
                                                                                                                                                                                                                                    .07
Bank Sta: Left Right Coeff Cont.
174.43 212.17
Ineffective Flow num=
Sta L Sta R Elev
0 185.12 577.34
205.12 330 577.34
Left Levee Station= 140.25
                                                                               Coeff Contr.
                                                                                                                          Expan.
                                                                                                        .1
                                                                                                                  Elevation= 578.5
 Upstream Embankment side slope = Downstream Embankment side slope = Maximum allowable submergence for weir flow = Elevation at which weir flow begins = Energy head used in spillway design = Spillway height used in design = Weir crest shape =
                                                                                                                                                          0 horiz. to 1.0 vertical 0 horiz. to 1.0 vertical
                                                                                                                                    = Broad Crested
  Number of Culverts = 1
 Culvert Name Shape Rise Spai
Culvert #1 Arch 10.25 13.:
FHWA Chart # 41- Arch; Corrugated metal
FHWA Scale # 1 - 90 Degree headwall
  Solution Criteria = Highest U.S. EG
                                                                                           Top n Bottom n Depth Blocked Entrance Loss Coef
  Culvert Upstrm Dist Length
  Exit Loss Coef
                                                      5
                                                                    16.5
                                                                                                .024
                                                                                                                            .024
                                                                                                                                                             0
                                                                                                                                                                                                                         .5
                    1
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LemonCreekPR.rep

CROSS SECTION

RIVER: LemonCreek REACH: Reach1	RS: 1399.42			
INPUT Description: Station Elevation Data Sta Elev S 0 580 22. 96.33 576.44 96. 102.2 575.46 102. 127.82 574.22 139. 140.25 575.86 143. 173.95 574.5 174. 185.12 563.39 186. 199.62 563.39 200. 219.47 577.14 219. 220.7 577.19 221. 243.98 578 244. 244.99 578.11 245. 252.33 579 252. 255.51 579.36 256 261.28 580 262. 267.03 580.64 267. 270.2 581 270. 274.31 581.59 276 280.07 582.4 281. 284.66 583 285. 287.22 583.25 287 293.54 583.25 287 293.54 583.25 287 293.54 583.25 293. 297.04 583.14 297 300.33 583.03 301. 302.66 583 302. 305.98 584 306 311.35 586.59 312. 315.7 588.32 317. 324.33 591.56 325.	ta Elev St 766 580 23. 622 575.98 96.8 625.75.93 10.2 654 573.86 139.6 6575.83 157. 643 574.45 179.5 915 563.39 205.1 6577.14 219.8 6577.14 219.8 6577.14 219.8 6586 577.14 219.8 6587 579.42 221.4 67 578.01 244.0 67 578.01 245.0 67 580.67 268.3 68 581.93 257.1 69 580.67 268.3 69 581.93 268.3 69 581.93 268.3 69 581.93 268.3 69 581.93 276.8 60 581.93 276.8 60 583.30 286.3 60 583.05 286.3	1 579.71 23.89 9 575.88 101.69 4 573.96 117.29 574.65 139.74 4 575.68 163.01 4 575.68 163.01 4 575.68 163.01 10 575.68 163.01 10 575.68 103.01 10 576.80 189.25 2563.39 189.25 2563.39 189.25 2563.39 189.25 2577.25 200.08 14 577.15 200.08 14 577.15 200.08 14 577.15 220.08 14 577.25 223.44 15 278.33 248.15 25 580.18 264.62 25 580.78 264.52 26 580.78 264.53 27 27 27 28 28 28 28 28 28 28 28 28 28 28 28 28	Elev Sta 579 94.84 575.96 101.74 574.33 120.97 575.36 140.01 575.82 147.94 575.37 168.11 573.89 180.08 563.39 195.87 574.42 212.17 577.16 220.38 577.22 235.21 578.01 244.79 578.01 244.79 578.01 244.79 578.01 244.79 579.04 250.14 580.39 265.05 580.88 268.64 581.14 271.62 580.88 268.64 581.14 271.62 583.33 292.88 583.19 295.57 583.38 292.84 583.19 295.57 583.38 302.47 583.302.99 585.88 302.47 583.302.99 585.88 310.06 587.69 314.85 590.65 322.84 593 328.8	
Manning's n Values Sta n Val S 0 .024 157 212.17 .035 302.	ta n Val St .4 .035 163.0	a n Val Sta 01 .07 173.95	n val Sta .04 208.93	n Val .07
Bank Sta: Left Right 174.43 212.17 Ineffective Flow n Sta L Sta R Ell 0 185.12 577. 205.12 330 577. Left Levee Statio	ev Permanent 34 F 34 F	Channel Right 35.82	Coeff Contr.	Expan.
CROSS SECTION OUTPUT	Profile #50-YR			
E.G. Elev (ft) Right OB Vel Head (ft)	4.60 W		Left OB	Channel 0.040

	Le	monCreekPR.rep					
W.S. Elev (ft)	572.63	Reach Len. (ft)	31.63	31.45			
35.82 Crit w.s. (ft) 572.63		Flow Area (sq ft)		184.89			
E.G. Slope (ft/ft)	0.011063	Area (sq ft)		221.29			
Q Total (cfs)	3182.00	Flow (cfs)		3182.00			
Top width (ft)	27.88	Top Width (ft)		27.88			
vel Total (ft/s)	17.21	Avg. Vel. (ft/s)		17.21			
Max Chl Dpth (ft)	9.24	Hydr. Depth (ft)	t) 9.24				
Conv. Total (cfs)	30252.5	Conv. (cfs)		30252.5			
Length Wtd. (ft)	31.45	Wetted Per. (ft)		20.00			
Min Ch El (ft)	563.39	Shear (1b/sq ft)		6.38			
Alpha	1.00	Stream Power (1b/ft s)	330.00	140.25			
0.00 Freth Loss (ft)	0.29	Cum Volume (acre-ft)	1.64	2.83			
0.52 C & E Loss (ft)	0.87	Cum SA (acres)	0.69	0.32			

warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may wish to examine this cross section and enter a single n value for the entire channel.

entire channel.

Note: Manning's n values were composited to a single value in the main channel. Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

0.29

RIVER: LemonCreek RS: 1367.97 REACH: Reach1

INPUT Description:

Station Elevation Data 109 num= Elev 579 579 579 579 579 Sta Elev 8.23 579 46.74 579 92.63 577.04 Sta 12.97 50.21 579 579 579 579 Sta 0 Sta 36.92 90.42 23.32 32.63 95.28 98.13 575.43 575.44 84.89

	1 144	and allen as	La la				
100.36 575.42 100.66 115.87 573.79 119.69 138.45 574.82 138.56 146.7 574.4 153.19 158.64 571.35 171.55 184.24 562.82 185.4 208.63 576.44 208.86 216.87 576.45 217.37 230.26 577.64 232.28 237.74 578.95 238.07 244.38 580 247.88 254.47 581.65 256.76 260.73 582.59 261.58 265.05 583.23 266.79 270.19 584 270.95 276.63 584 277.1 294.17 584.48 295.42 303.04 584.73 303.4 310.7 584.95 312.39	575.13 100 573.88 138 574.92 138 572.07 15; 569.51 17; 562.66 15 576.48 22; 578 23; 579 23; 580.6 25(583.49 25; 582.71 26; 584.74 30;	oncreekPR. re 1,87 574.92 1,62 573.76 1,96 575.32 1,99 571.84 1,34 569.01 1,41 562.66 1,77 576.23 1,13 578.33 1,16 579.33 1,16 579.33 1,16 579.33 1,16 579.33 1,16 579.33 1,16 579.33 1,16 579.33 1,16 579.33 1,16 579.33 1,16 579.33 1,16 584.56 1,17 584.56 1,18 584.56 1,18 584.58		574.03 573.32 575.32 575.1.66 568.75 562.65 576.25 577.8.43 581.18 582.08 583.94 584.61 584.61 584.61	101.07 138.29 144.03 158.29 183.44 196.69 214.74 228.62 237.28 243.77 252.34 259.64 269.94 271.9 278.14 300.98 305.96	573.42 573.63 575.3 571.41 563.33 564.51 576.32 577.34 578.87 579.9 581.32 582.42 583.15 583.96 584 584.67	
Manning's n Values Sta n Val Sta 0 .024 144.03 270.19 .024 278.14		8 Sta n Val 3.64 .07 2.39 .07	Sta 171.55	n Val .04	Sta 208.63	n Val .035	
Bank Sta: Left Right 158.64 208.63 Ineffective Flow num= Sta L Sta R Elev 0 138.96 575.32	1111.		Right 108.69	Coeff	Contr.	Expan.	
Left Levee Station= CROSS SECTION OUTPUT Pro		Elevation≡	575.32				
E.G. Elev (ft) Right OB	575.08	Element		L	eft OB	Channel	
Vel Head (ft)	1.70	wt. n-val.		7	0.035	0.041	
W.S. Elev (ft) 108.69	573.38	Reach Len.	(ft)	1	11.43	110.10	
Crit W.S. (ft)	572.29	Flow Area (sq ft)	1	11.11	297.62	
E.G. Slope (ft/ft)	0.007973	Area (sq ft)		11.11	297.62	
Q Total (cfs)	3182.00	Flow (cfs)		- 1	47.09	3134.91	
Top width (ft)	56.02	Top Width (ft)		9.10	46.93	
Vel Total (ft/s)	10.31	Avg. Vel. (ft/s)		4.24	10.53	
Max Ch1 Dpth (ft)	10.73	Hydr. Depth	(ft)		1.22	6.34	
Conv. Total (cfs)	35636.8	Conv. (cfs)		9	527.4	35109.4	
Length Wtd. (ft)	110.13	Wetted Per.	(ft)		9.39	53.19	
Min Ch El (ft)	562.65	Shear (1b/s	q ft)		0.59	2.79	
Alpha	1.03	Stream Powe	r (1b/ft	s) 3:	15.00	138.96	
0.00 Frctn Loss (ft)	0.86	Cum Volume	(acre-ft)		1.64	2.64	
0.52 C & E Loss (ft) 0.29	0.00	Cum SA (acr	es)		0.68	0.29	

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LemonCreekPR.rep

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Len			RS: 125	7.87						
INPUT Descriptic Station E	levation Elevation Elevation 577, 576.88 573.44 571.9 571.56 573.57 570.06 569.38 568.94 568.94 568.93 565.21 569.98 570.4 570.73 571.53 571.07 571.53 572.9 571.53 572.9 571.53 572.9 573.57 571.53 572.9 573.57 573.57 573.57 573.57 573.57 573.57 573.57 574.58 583.61 583.44 583.61 583.44 583.61 583.45 583.61 583.45 583.61 583.78 583.61 583.78 583.61 583.78 583.61 583.78 583.78 583.61 583.78 583.78 583.78 583.78 583.78 583.78 583.78 583.78 583.78	Sta 3.91 32.26 40.05 64.98 67.03 105.44 111.12.3 118.91 124.16 128.27 169.05 177.33 180.16 89 223.17 229.83 242.84 247.58 255.71 265.08 275.09 276.09 278.97 293.42 304.88	Elev 5777 577 577 573 .45 572 .57 570 .59 569 .91 569 .88 568 .73 562 .02 570 .82 571 .15 570 .82 571 .15 578 .82 .19 582 .87 583 .64 .67 583 .87 584 .03 584 .47 585 .16	9.63 33.95 55.66.38 83.08 105.45 111.34 112.59 120.34 125.27 128.27 134.11 137.08 150.35 163.68 170.61 174.02 177.61 181.13 186.28 195.03 214.12 2217.34 224.37 233.67 243.48 256.62 266.84 273.44 281.51 283.83 297.06	Elev 577 577 573 45 571.92 573.06 572.23 573.06 572.81 569.37 569.38 568.81 570.16 570.51 570.85 571.31 570.85 571.31 570.85 572.23 573.74 582.44 582.91 583.69 583.59 583.69 583.58 584.66 585.17	Sta 23.34 35.71 59.54 66.67 86.17 105.93 111.49 121.18 126.64 129.75 143.38 154.11 163.85 170.9 175 178.71 181.57 186.81 196.51 224.62 245.83 2245.83 2245.83 2259.6 268.04 276.13 281.55 286.09 299.04	Elev 577 577 577 577 577 577 577 577 577 57	Sta 26.84 36.7 60.83 66.82 104.44 105.97 111.75 128.18 130.14 135.25 171.16 175.85 171.16 175.85 171.20.03 246.09 227.01 220.03 246.09 227.01 220.03 246.09 227.01 220.03 2303.41	E1ev 577 5773.79 572.96 571.58 573.56 570.21 569.17 568.74 562.04 570.22 570.68 571.41 570.22 570.68 571.41 572.69 574.26 577 579.3 582.59 583.59 583.59 583.78 583.95	
Manning's Sta 0 196.51	n Value n Val .024 .024	Sta 112.59 213.53	num= n Val .035 .07	8 Sta 132.53 226.93	n val .07 .035	Sta 137.08		Sta 163.27	n val .035	
Bank Sta: 1: Ineffectiv Sta L 0	Left 35.41 1 we Flow Sta R 111.15	Right .63.85 num= Elev 573.57	Lengths 1 Permane	107.54	thannel 106.66	Right 108.3	Coeff	Contr.	Expan.	
Left Leve	e 5	tation=	111.15		vation=	573.57				
CROSS SECT	TION OUT	PUT Pro	TILE #50	-YR						
E.G. Ele	ev (ft)		574.2		ment		L	eft OB	Channel	

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	Le	monCreekPR.rep		
Right OB			0.172	1.1.00
Vel неаd (ft) 0.035	1.71	Wt. n-Val.	0.040	0.042
W.S. Elev (ft) 108.30	572.52	Reach Len. (ft)	107.54	106.66
Crit W.S. (ft) 41.65	572.19	Flow Area (sq ft)	58.16	231.46
E.G. Slope (ft/ft) 41.65	0.007602	Area (sq ft)	58.16	231.46
Q Total (cfs) 221.38	3182.00	Flow (cfs)	352.77	2607.85
Top Width (ft) 24,00	76.45	Top Width (ft)	24.02	28.44
Vel Total (ft/s)	9.61	Avg. Vel. (ft/s)	6.07	11.27
Max Chl Dpth (ft)	10.73	Hydr. Depth (ft)	2.42	8.14
Conv. Total (cfs) 2539.1	36495.2	Conv. (cfs)	4046.0	29910.1
Length Wtd. (ft) 24.21	106.96	wetted Per. (ft)	24.76	33.17
Min Ch El (ft) 0.82	561.79	Shear (1b/sq ft)	1.11	3.31
Alpha 0.00	1.19	Stream Power (1b/ft s)	305.00	111.15
Frctn Loss (ft) 0.47	0.27	Cum Volume (acre-ft)	1.55	1.97
C & E Loss (ft) 0.26	0.40	Cum SA (acres)	0.64	0.19

LamonCrook DD non

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Manning's n values were composited to a single value in the main channel. Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: LemonCreek

REACH: Reach1 RS: 1151.21 INPUT Description: num= E1ev 576 572.69 572.14 570.84 572.06 572 567.49 560.85 568.94 571.94 572.83 573.96 574.47 Station Elevation Data 116 Sta Elev 5.78 575 30.16 572.65 31.97 570.64 81.13 570.46 82.85 572.46 130.66 570 144.7 570.87 160.05 563.27 187.87 567.66 195.62 207.67 571.19 215.13 572.47 218.7 573 223.22 574.1 235.48 574.48 tation Elevation
Sta Elev
0 576
23.1 574.28
31.07 572.62
56.93 570.98
81.33 571.96
91.29 570.24
135.68 572
152.9 568.02
191.72 568.30
201.39 570.21
157 571.91
216.74 572.71
221.59 573.94
232.51 574.45 num= Elev 575 572.65 E1ev 575.11 572.68 572.01 570.79 572.46 570 572 567.03 560.85 568.99 571 572 573 574 Sta 5.53 31.73 65 81.83 98.76 140.74 155.43 174.25 195.59 212.05 218.68 221.78 234.3 Sta 22.52 31.03 45.74 81.17 86.83 135.19 151.9 161.98 190.05 196.81 210.6 215.71 221.45 223.33 236.16 3.19 24.52 31.71 62.36 81.43 91.77 139.58 154.25 169.83 195.25 203.38 211.73 217.53 217.53 221.65 233.68 570.83 570.76 572.46 571.81 568.77 561.53 568.04 569.21 571.73 572.55 573.89 574.1 574.47

	Ler	monCreekPR.re	en			
236.83 574.47 238 240.72 574.49 245.56 249.42 574.56 250.07 254.05 574.61 255.63 260.53 574.77 260.7 263.15 574.74 263.29 264.26 574.75 264.39 265.16 574.77 265.35	574.49 23 574.52 2- 574.57 25 574.63 25 574.7 26 574.74 26 574.76 26	8.64 574.48 46.6 574.53 1.15 574.58 7.28 574.65 1.95 574.72 3.63 574.74 4.59 574.76 5.61 574.77	239.19 247.46 252.45 258.91 262.13 263.83 264.81 265.78	574.48 574.54 574.59 574.68 574.72 574.75 574.76	240.29 248.32 253.91 259.03 262.99 264.06 264.99 277.83	574.49 574.55 574.61 574.68 574.73 574.75 574.76
278.39 575	3/4.// 20	3.01 3/4.//	203.70	274.70	277.03	3, 3
Manning's n Values Sta n Val Sta 0 .024 140.74 221.78 .035	num= n Val .035 1	6 Sta n Val 51.9 .07	Sta 155.43	n val	Sta 187.87	n Val
Bank Sta: Left Right 154.25 187.87 Ineffective Flow num= Sta L Sta R Elev 0 86.83 572.46	20	eft Channel .39 20	Right 20.37	Coeff	Contr.	Expan.
86.83 140.74 572	F	Elevation=	672			
		de favorit en	3/2			
CROSS SECTION OUTPUT Pro	itile #50-YR					
E.G. Elev (ft)	573.55	Element		L	eft OB	channe?
Right OB Vel Head (ft)	0.36	Wt. n-Val.			0.026	0.041
0.070 W.S. Elev (ft)	573.18	Reach Len.	(ft)		20.39	20.00
20.37 Crit W.S. (ft)	570.03	Flow Area (21.56	334.94
86.54 E.G. Slope (ft/ft)	0.001277	Area (sq ft	the cost		21.56	334.94
86.54 Q Total (cfs)	3182.00	Flow (cfs)	27,		90.18	1864.09
127.73						
Top Width (ft) 31.39	195.18	Top Width (N		30.17	33.62
Vel Total (ft/s)	4.28	Avg. Vel. ((ft/s)		3.70	5.57
Max Chl Dpth (ft) 2.76	12.33	Hydr. Depth	(ft)		2.47	9.96
Conv. Total (cfs) 3574.4	89046.0	Conv. (cfs)		33	306.4	52165.3
Length Wtd. (ft)	20.17	Wetted Per.	(ft)	1	35.12	37.35
31,88 Min Ch El (ft)	560.85	Shear (1b/s	q ft)		0.19	0.71
0.22 Alpha	1.27	Stream Powe	er (1b/ft	5) 2	78.39	140.74
0.00 Frctn Loss (ft)	0.02	Cum Volume	(acre-ft)		1.08	1.28
0.31 C & E Loss (ft) 0.19	0.02	Cum SA (acr	Section 1997		0.45	0.12

Note: Manning's n values were composited to a single value in the main channel. Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1 RS: 1131.21 12020-0090-0090	Len	nonCreekPR.re	p				
New The property is State Part	REACH: Reach1	RS: 1131.2	1				
E.G. Elev (ft) 573.50 Element Left OB Channel Right OB Vel Head (ft) 0.30 Wt. n-Val. 0.025 0.040 0.035 W.S. Elev (ft) 573.20 Reach Len. (ft) 30.43 29.50 29.97 Crit W.S. (ft) 569.90 Flow Area (sq ft) 362.94 341.89 67.44 E.G. Slope (ft/ft) 0.001061 Area (sq ft) 362.94 341.89 67.44 Q Total (cfs) 3182.00 Flow (cfs) 1288.04 1730.80 163.15 Top Width (ft) 204.62 Top Width (ft) 140.96 33.61 30.05 Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06	IMPUT Description: Station Elevation Data Sta Elev Sta 0 575 20.14 38.81 572.54 45.23 46.21 570.49 59.05 77.08 570.72 85 103.85 571.75 104.31 114.02 570.28 114.69 158.85 571.75 104.31 184.91 560.43 187.35 194.01 560.43 187.35 194.01 560.43 187.35 194.01 560.43 187.35 122.71 568.7 212.92 214.74 569 217.6 223.54 570.35 225.18 227.89 571.03 227.9 233.89 572 233.9 240.92 573.12 241.3 244.89 573.31 245.49 254.98 573.31 245.49 268.06 574 269.19 274.83 574.16 275.33 282.14 574.33 282.14 574.33 282.98 291.03 574.55 292.92 298.71 574.76 299.79 302.74 574.86 303.11 304.51 574.91 304.87 306.93 574.98 307.64	num= 1: E1ev 575 35 575 35 575 44 570.66 7: 570.130 572.15 568.81 176 567.16 18: 560.43 18: 560.43 18: 560.43 18: 560.43 18: 560.43 18: 570.61 22: 571.03 23: 570.51 23: 572 23: 573.13 242 571.03 26: 574.62 29: 574.79 30: 574.87 30: 574.87 30: 574.92 30: 574.92 30: 574.92 30: 574.92 30: 574.92 30: 574.93 30: 574.92 30: 574.93 30: 575.50 33:	37 5ta Elev 5,88 575 5,44 572.35 2,31 570.29 4,36 572.25 5,55 570 9,48 572.25 3,1 568.67 1,02 564.32 9,58 560.43 3,55 568.78 3,35 569.71 3,35 7 572 2,22 573.2 1,64 573.65 1,35 570.79 3,57 572 1,22 573.2 1,35 574.04 1,78 574.04 1,78 574.04 1,78 574.04 1,74 574.88 1,74	303.84 305.57 Sta 212.2	574.89 574.94 n Val	304.27 306.87 Sta 240.92	574.9 574.98 n Val .035
E.G. Elev (ft) 573.50 Element Left 08 Channel Right 08 Vel Head (ft) 0.30 Wt. n-Val. 0.025 0.040 0.035 W.S. Elev (ft) 573.20 Reach Len. (ft) 30.43 29.50 29.97 Crit W.S. (ft) 569.90 Flow Area (sq ft) 362.94 341.89 67.44 E.G. Slope (ft/ft) 0.001061 Area (sq ft) 362.94 341.89 67.44 Q Total (cfs) 3182.00 Flow (cfs) 1288.04 1730.80 163.15 Top Width (ft) 204.62 Top Width (ft) 140.96 33.61 30.05 Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06				29.97		.1	.3
Right OB Vel Head (ft) 0.30 wt. n-val. 0.025 0.040 0.035 W.S. Elev (ft) 573.20 Reach Len. (ft) 30.43 29.50 29.97 Crit W.S. (ft) 569.90 Flow Area (sq ft) 362.94 341.89 67.44 E.G. Slope (ft/ft) 0.001061 Area (sq ft) 362.94 341.89 67.47 Q Total (cfs) 3182.00 Flow (cfs) 1288.04 1730.80 163.15 Top Width (ft) 204.62 Top Width (ft) 140.96 33.61 30.05 Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06							
0.035 W.S. Elev (ft) 573.20 Reach Len. (ft) 30.43 29.50 29.97 Crit W.S. (ft) 569.90 Flow Area (sq ft) 362.94 341.89 67.44 E.G. Slope (ft/ft) 0.001061 Area (sq ft) 362.94 341.89 67.44 Q Total (cfs) 3182.00 Flow (cfs) 1288.04 1730.80 163.15 Top Width (ft) 204.62 Top Width (ft) 140.96 33.61 30.05 Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06	Right OB Vel Head (ft)						
Crit W.S. (ft) 569.90 Flow Area (sq ft) 362.94 341.89 67.44 E.G. Slope (ft/ft) 0.001061 Area (sq ft) 362.94 341.89 67.44 Q Total (cfs) 3182.00 Flow (cfs) 1288.04 1730.80 163.15 Top Width (ft) 204.62 Top Width (ft) 140.96 33.61 30.05 Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06	0.035 W.S. Elev (ft)						
E.G. Slope (ft/ft) 0.001061 Area (sq ft) 362.94 341.89 67.44 Q Total (cfs) 3182.00 Flow (cfs) 1288.04 1730.80 163.15 Top Width (ft) 204.62 Top Width (ft) 140.96 33.61 30.05 Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06	Crit W.S. (ft)	569.90	Flow Area (sq ft)	3	62.94	341.89
Q Total (cfs) 3182.00 Flow (cfs) 1288.04 1730.80 163.15 Top Width (ft) 204.62 Top Width (ft) 140.96 33.61 30.05 Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06	E.G. Slope (ft/ft)	0.001061	Area (sq ft)	3	62.94	341.89
Top width (ft) 204.62 Top width (ft) 140.96 33.61 30.05 Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06	O Total (cts)	3182 00	Flow (cts)		12	88 04	1730 80
Vel Total (ft/s) 4.12 Avg. Vel. (ft/s) 3.55 5.06	Top Width (ft)	204.62	Top Width (ft)	1	40.96	33.61
	Vel Total (ft/s)	4.12	Avg. Vel. (ft/s)		3.55	5.06

Le	monCreekPR.rep		
12.77	Hydr. Depth (ft)	2.57	10.17
97689.2	Conv. (cfs)	39543.6	53136.7
29.91	Wetted Per. (ft)	145.61	39.95
560.43	Shear (1b/sq ft)	0.17	0.57
1.14	Stream Power (1b/ft 5)	307.64	164.13
0.03	Cum Volume (acre-ft)	0.92	1.13
0.00	Cum SA (acres)	0.39	0.10
	12.77 97689.2 29.91 560.43 1.14 0.03	97689.2 Conv. (cfs) 29.91 Wetted Per. (ft) 560.43 Shear (lb/sq ft) 1.14 Stream Power (lb/ft s) 0.03 Cum Volume (acre-ft)	12.77 Hydr. Depth (ft) 2.57 97689.2 Conv. (cfs) 39543.6 29.91 Wetted Per. (ft) 145.61 560.43 Shear (lb/sq ft) 0.17 1.14 Stream Power (lb/ft s) 307.64 0.03 Cum volume (acre-ft) 0.92

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: LemonCreek

REACH: Reach1 RS: 1101.71

INPUT Description	on:								
Station E		Data	num=	156					
Station E Sta 0 35.06 76.07 84.28 113.19 150.93 161.33 173.03 204.69 217.44 225.47	Elev 576 575 572.32 571.54 570.55 570.07 571.64 570 572 567.36	Data Sta 1.27 59.83 81.28 84.54 118.23 156.26 161.54 178.46 207.32 217.63 226.2	num= Elev 576 575 572.29 570.27 570.46 569.97 571.82 570 572 567.33 563.93	56 Sta 2.8 66.45 83.47 94.51 119.62 160.72 164.12 197.04 208.3 217.82 228.43	Elev 575.42 575 572.27 570.37 570.45 569.83 571.8 570 571.57 567.31	Sta 3.77 73.94 83.55 102.25 130 160.88 167.36 199.14 214.99 219.32 231.96	Elev 575 575 572.22 570.45 570.5 570.83 571.77 570.82 568.59 567.07	Sta 20.07 75.33 84.23 106.87 138 160.95 168.98 202.18 217.1 220.35 233.64	Elev 575 573.27 571.77 570.5 570.39 571.33 571.26 572 567.51 566.9
233.66 251.8 260.94 263.72 270.1 277.49 283.33 285.46 288.37 312.05	559.8 567.98 568.81 569.04 569.82 571.27 573 573 573 573 573.43	234.91 258.54 262.13 264.01 270.42 280.85 283.89 286.23 288.81 312.78	559.8 568.57 568.91 569.07 569.86 571.93 573 573 573 573	234.94 258.9 263.25 266.29 271.21 281.14 283.95 286.95 289.29 313.45	559.8 568.62 569 569.28 570	235.13 259.35 263.64 267.08 274.33 281.21 284.58 287.58 289.79 313.93	559.8 568.67 569.03 569.39 570.64 572 573 573 573 573.47	235.44 260.02 263.68 268.35 276.11 282.22 285.29 288.08 311.6 314.44	559.8 568.73 569.03 569.53 571 572.48 573 573.43 573.43
315.01 318.38 322.93 331.17 334.66 337.51 357.82 361.07 365.28 368.06 369.09	573.48 573.54 573.61 573.75 573.81 573.87 574.54 574.67 574.85 574.97	315.53 319.03 324.22 331.89 335.29 337.52 358.48 362.28 366.37 368.12	573.5 573.54 573.63 573.76 573.82 573.87 574.57 574.72 574.9	316.15 319.55 325.51 332.78 335.86 342.99 358.88 362.49 366.53 368.95	573.5 573.55 573.65 573.78 574.57 574.58 574.73 574.9 575	316.86 320.56 329.11 333.37 336.42 352.9 359.73 363.78 367.22 368.96	573.51 573.57 573.72 573.79 573.84 574.37 574.62 574.79 574.93	317. 51 321. 69 330. 21 334 337. 3 353. 1 360.04 364. 03 367. 33 368. 97	573.52 573.59 573.73 573.86 574.38 574.63 574.63 574.8 574.94
Manning's Sta	n Value	s Sta	num=	5 Sta	n Val	Sta	n Val	Sta	n Val

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0 ,024 207.3		monCreekPR.rep 0.35 .04 251.8	.07 283.33	.035
Bank Sta: Left Right 217.63 251.8 Ineffective Flow nur Sta L Sta R Eler 0 207.32 573 Left Levee Station:	m= 1 V Permanent 2 F	eft Channel Right .38 20.19 20.28	Coeff Contr.	Expan.
CROSS SECTION OUTPUT P	rofile #50-YR			
E.G. Elev (ft)	573.47	Element	Left OB	Channel
Right OB Vel Head (ft)	0.29	Wt. n-Val.	0.025	0.040
0.070 W.S. Elev (ft)	573.18	Reach Len. (ft)	22.38	20.19
20.28 Crit W.S. (ft)	570.35	Flow Area (sq ft)	376.18	327.56
108.45 E.G. Slope (ft/ft)	0.001078	Area (sq ft)	376.18	327.56
108.45 Q Total (cfs)	3182.00	Flow (cfs)	1384.06	1631.96
165.98 Top Width (ft)	223.34	Top width (ft)	142.23	34.17
46.94 Vel_Total (ft/s)	3.92	Avg. Vel. (ft/s)	3.68	4.98
1.53 Max_Chl Dpth (ft)	13.38	Hydr. Depth (ft)	2.64	9.59
2.31 Conv. Total (cfs)	96899.6	Conv. (cfs)	42147.9	49697.2
5054.4 Length Wtd. (ft)	21.06	Wetted Per. (ft)	147.16	40.21
47.48 Min Ch El (ft)	559.80	Shear (1b/sq ft)	0.17	0.55
0.15 Alpha	1.22	Stream Power (1b/ft s)	369.09	207.32
0.00 Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.66	0.90
0.21 C & E Loss (ft) 0.15	0.01	Cum SA (acres)	0.29	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1 RS: 1081.52

| INPUT | Description: | Station Elevation | Data | Num= | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 211 | | 21

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193.67 572 193.76 201.34 572 202.97 210.4 571.56 211.04 218.7 568.83 218.74 219.48 568.76 222.85 227.13 567.85 227.31 243.37 558.84 243.68 270.8 568 272.17 280.56 570.18 283.68 279.8 573 293.32 293.17 573 293.32 293.17 573 293.32 293.17 573 303.27 294.93 573 295.14 296.93 573 296.95 300.78 573 301.28 303.07 573 303.27 305.8 573 306.03 309.34 573.36 309.34 573.36 330.45 573.37 329.99 573.05 330.25 330.45 573.73 340.46 573.28 347.09 350.04 573.48 354.06 357.29 573.68 357.57 359.46 573.78 359.76 361.9 573.76 359.76 361.9 573.76 362.83 366.68 573.89 367.95 370.01 574 370.83 372.26 574.11 373.05 375.63 574.31 376.83 382.45 574.72 382.69 384.03 574.8 385.14	572 12 571.38 2 568.83 2 568.83 2 568.83 2 568.83 2 571.38 2 573.22 2 573.573 3 573.573 3 573.573 3 573.05 573.05 573.06 3 573.05 573.21 3 573.05 573.21 3 573.05 573.21 573.42 573.573 3 573.65 573.71 573.42 573.573 3 573.65 573.71 573.42 573.573 573.573 573.573 573.573 573.573 573.573 573.573 573.573 573.573 573.573 573.573 573.573 574.85 574.73 574.85 574.73 574.85 574.73 574.85 574.73 574.85	emonCree 197.17 105.16 112.93 118.82 123.17 132.03 136.09 185.79 193.78 1995.92 1997.7 101.34 103.34 103.34 103.34 104.23 130.29 131.47 133.47	ekPR. rei 572 572 670. 77 668. 82 659. 4 567. 3 573. 573 573. 573 573. 573 573. 05 573. 08 573. 32 573. 42 673. 73 573. 66 673. 73 573. 66 673. 73 573. 88 673. 73 573. 88 673. 73 674. 86	208.45 215.06 218.87 223.45 232.345 232.32 226.45 279.49 287.71 290.57 294 290.57 307.3 302.06 304.55 307.3 314.31 338.33 338.75 348.63 355.76 356.92 369.77 378.38 383.21 377.79 378.38	572 570 14 568.83 559.3 567.62 572 572 572 573 573 573 573 573 573 573 573 67 573 .05 573 .05 573 .05 573 .05 573 .05 573 .05 573 .05 573 .45 573 .45 573 .45 573 .45	200 . 89 208 . 46 218 . 39 218 . 92 226 . 17 232 . 41 270 . 69 279 . 89 294 . 22 296 . 13 304 . 73 304 . 73 304 . 73 315 . 27 330 . 37 340 . 17 349 . 65 340 . 17 349 . 65 356 . 29 359 . 15 361 . 71 365 . 6 367 . 0 372 . 0 387 . 2 383 . 383 . 38 372 . 0 387 . 2 383 . 3 384 . 17 385 . 18	572 568.89 568.89 568.16 558.84 567.99 572.26 573 573 573 573 573 573 573 573 573 573	
Manning's n Values Sta n Val Sta 0 .024 208.46	num= n Val .035 2	5 Sta 26.17	n va1	Sta 260.6	n Val	Sta 292.89	n Val .035	
Bank Sta: Left Right 226.17 260.6 Ineffective Flow num= Sta L Sta R Elev 0 208.45 572 Left Levee Station=	Lengths: 7 1 Permanent F 208.45	Left Cha 79.44 & Eleva	annel 31.52 ation=	Right 87.79	Coeff	Contr.	Expan.	
CROSS SECTION OUTPUT Pro								
E.G. Elev (ft) Right OB Vel Head (ft) 0.070 W.S. Elev (ft) 87.79 Crit W.S. (ft) 122.17 E.G. Slope (ft/ft)	573.44	Eleme	ent n-val.		Le (eft OB	Channel 0.040	
0.070 W.S. Elev (ft)	573.17	Reach	Len.	(ft)		79.44	81.52	
87.79 Crit W.S. (ft)	568.52	Flow	Area (sq ft)	35	9.40	389.95	
122.17 E.G. Slope (ft/ft) 122.17	0.000870	Area	(sq ft)	35	9.40	389.95	
Q Total (cfs)	3182.00	Flow	(cfs)		111	17.34	1894.90	
Top Width (ft)	253.28	тор и	vidth (ft)	14	14.09	34.43	
122.17 Q Total (cfs) 169.77 Top Width (ft) 74.76 Vel Total (ft/s) 1.39	3.65	Avg.	vel. (ft/s)		3.11	4.86	
		00000						

Page 4	Pa	g	e	4	4
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	Le	monCreekPR.rep		
Max Chl Dpth (ft)	14.33	Hydr. Depth (ft)	2.49	11.33
Conv. Total (cfs)	107880.9	Conv. (cfs)	37881.7	64243.6
Length Wtd. (ft) 75.36	81.20	Wetted Per. (ft)	148.44	41.75
Min Ch El (ft) 0.09	558.84	Shear (1b/sq ft)	0.13	0.51
Alpha 0.00	1.32	Stream Power (1b/ft s)	388,33	208.45
Frctn Loss (ft) 0.16	0.10	Cum Volume (acre-ft)	0.47	0.73
C & E Loss (ft)	0.03	Cum SA (acres)	0.22	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: LemonCreek REACH: Reach1 RS: 1000.00

574 574 571.06 571 571	Sta 24.01	Elev						on:	INPUT Descripti
574 574 571.06 571 571	24.01							on:	Descripti
574 574 571.06 571 571	24.01								
574 574 571.06 571 571	24.01				228	num=			Station E
574 571.06 571 571			Sta	Elev	Sta	Elev	Sta	Elev	Sta
571.06 571 571		574	15.07	574.58	13.4	575	12.09	575	0
571 571	106.9	574	83.9	574	74.6	574	62.41	574	50.27
571	120.16	571.44	119.8	574	117.67	574	113.28	574	108.44
	126.76	571	125.36	571	124.49	571.03	120.59	571.03	120.18
	135	571	134.05	571	132.62	571	131.62	571	127.11
	144.68	571	144.41	571	144.02	571	139.17	571	136.02
	149.69	571	147.96	571	147.81	571	147.58	571	146.31
	153.76	571	153.61	571	153.21	571	152.34	571	150.72
	164.87	570.97	164.63	570.96	160.82	571	156.53	571	156.47
	171.05	570.87	170.99	570.81	168.07	570.97	164.94	570.96	164.9
571	177.14	570.94	174.57	570.94	174.56	570.94	174.55	570.86	171.11
				5/1.21		571.24			
				572 00					
						570 78			
						571 04			
572	262 49								
								572	
							268 77		
				572 38		572.34			
		572 66		572 64					
		572.92				572.86			
572.98		572.98		572.98		572.97			
573	292.15					572.99			
	295.55						293.63		292.93
	299.38	573	299.31	573	298.08	573	298.06	573	296.93
	302.72	573	302.41	573	301.7	573	300.72	573	300.56
435553447549394552553	183.4 191.9 198.66 202.1 210.65 230.0 243.0 249.9 251.4 260.5 262.4 266.5 271.7 289.2 284.6 287.2 290.1 295.5	571 571 571 571.71 570.65 558.72 572.65 572.572 572.572 572.572 572.92 572.92 572.93 573.573	183, 08 191, 39 196, 15 201, 67 209, 71 211, 68 222, 38 242, 92 242, 92 242, 92 251, 06 260, 09 261, 98 265, 38 269, 99 278, 09 278, 09 278, 09 286, 74 289, 55 291, 39 294, 35 299, 31	571 571 571 571.28 571.21 558.73 558.89 572.09 570.89 572.572 572 572 572.364 572.91 572.91 572.93 573.573	178.86 188.04 199.58 205.02 211.28 222.33 242.58 245.25 250.5 260.01 261.65 264.65 264.65 276.31 282.59 286.52 288.74 291.13 294.14	571 571 571 571.24 558.76 558.76 572.07 570.78 571.94 572.57 572.57 572.57 572.57 572.57 572.99	178.77 187.58 195.35 199.2 204.74 211.26 222.25 236.21 245.22 250.17 258.68 261.23 263.76 263.76 275.58 286.04 288.68 290.79 293.63	571 571 571 571.78 571.74 570.57 558.6 559.13 570.73 572.57 572.57 572.48 572.85 572.85 572.99 573.573	178.68 187.1 192.41 198.89 204.46 210.91 212 235.45 243.09 252.1 260.7 263.13 267.29 275.06 280.53 285.63 287.92 290.77 292.93 296.93

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	L	emonCreekPR.re	D				
303.05 573 303.36 304.72 573 305.36 306.73 573 305.36 308.32 573 308.43 309.06 573 309.22 310.19 573 310.71 315.47 572.74 315.69 318.94 572.73 320.14 322.95 572.73 324.23 327.12 572.79 327.43 329.79 572.84 330.71 332.6 572.89 332.71 334.73 572.9 334.85	573 3 573 3 573 3 573 3 573 3 573 3 572.74 3 572.74 3 572.74 3 572.78 3	03.85 573 07.26 573 08.57 573 08.57 573 14.81 572.72 20.56 572.73 20.56 572.73 24.98 572.73 24.98 572.73 30.83 572.81 30.83 572.82 31.84 572.89	304.16 305.81 307.53 308.7 309.63 315.02 317.29 321.63 325.38 328.65 331.71 333.58	573 573 573 573 573 572.73 572.74 572.75 572.82 572.82 572.87	304.47 306.6 308.25 308.8 310.09 315.2 318.57 322.07 326.21 329.59 331.82 333.71	573 573 573 573 573 572.73 572.73 572.73 572.77 572.84 572.84 572.88	
Manning's n Values Sta n Val Sta 0 .024 210.91	num= n Val .04 2	3 Sta n Val 45.22 .024					
Bank Sta: Left Right 210.91 245.22		Left Channel 9.02 0	Right 4.06	Coeff	Contr.	Expan.	
CROSS SECTION OUTPUT Pro	ofile #50-Y	R					
E.G. Elev (ft)	573.31	Element		t to	eft OB	Channe1	
Right OB Vel Head (ft)	0.56	Wt. n-Val.			0.024	0.040	
0.024			322		0.024	0.040	
W.S. Elev (ft)	572.75	Reach Len.	(ft)				
Crit W.S. (ft)	567.17	Flow Area (sq ft)	1	57.81	393.08	
33.68 E.G. Slope (ft/ft)	0.002020	Area (sq ft)	1	57.81	393.08	
33.68 Q Total (cfs)	3255.00	Flow (cfs)		6	24.52	2547.43	
83.05 Top Width (ft)	176.45	Top Width (ft)	- 1	92.20	34.31	
49.94 Vel Total (ft/s)	5.57	Avg. Vel. (3.96	6.48	
2.47							
Max Chl Dpth (ft) 0.67	14.15	Hydr. Depth	(ft)		1.71	11.46	
Conv. Total (cfs) 1847.9	72423.2	Conv. (cfs)		13	895.5	56679.8	
Length Wtd. (ft)		Wetted Per.	(ft)	79	93.04	51.40	
50.47 Min Ch El (ft)	558.60	shear (1b/s	q ft)		0.21	0.96	
0.08 Alpha	1.16	Stream Powe	r (lh/ft	5) 3	35.00	0.00	
0.00 Frctn Loss (ft)		Cum Volume				2.50	
C & E Loss (ft)		Cum SA (acr	es)				

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES
River:LemonCreek

Reach1_		3105.07		.035		.024		.035	.024	91	.07
Reach1	.07	.024 3034.84		. 035		.024		.07	.04	2	.07
.024 Reach1		2901.88		.035		.024		.07	.04		.07
.035 Reach1	.024	2778.60		.035		.024		.07	.035		.024
Reach1		2685.91		.035		.024		.035	.07		.035
.024 Reach1		2660.91		.035		.024		.035	.07	,	.035
.024 Reach1		2577.93	cu1v								
			32/8			025		024	025		024
Reach1 .07	.035	2502.40	.035	.024	.024	.035	.035	.024	.035		.024
Reach1 .04	.07	.035	,024	.024	.035	.035		.024	.035		.07
Reach1		2327.19		.024		.035		.024	.035	in the	.07
.04 Reach1	.07	.035	.024	.024		.035		.024	.035		.07
.04	.07	.024	.07		.024		.07				
Reach1 .07	.04	2246.00	.024	.024	.07	.035	.024	.024	.07	0	.024
Reach1		2230.01	Culv	ert							
Reach1	6.2	2216.36	1.10	.024	646	.035	- 1-2	.024	.035		.04
.024 Reach1	.07	2199.00	.07	.024	.024	.035	.07	.024	.07		.04
.024	.07	.024	.07		024		.07				
Reach1 .07	.024	2084.10	.024	.024	.07	.035		.024	.07		.04
Reach1		1875.66		.024		.035		-024	.07	ń	.04
.07 Reach1	.024	1770.29	.024	.024	.07	.035		.07	.04		.024
.07	.024	.07	.024		.07						
Reach1 .035	.024	1593.83		.024		. 07		.04	.024		.07
Reach1 .07	.024	1465.87	.07	.035		.024		.07	.04	F	.024
Reach1		1425.92	.07	.024		.035		.024	.07	p.	.04
.024 Reach1	.035	.07 1412.68	Culv	ert							
Reach1		1399.42		.024		.035		.07	.04		.07
. 035	.07										
Reach1 .024	.035	1367.97		.024		.035		.07	.04	n	.035
Reach1		1257.87		.024		.035		.07	.04	pi ,	.035
.024 Reach1	.07	1151.21		.024		.035		.07	.04	Ra F	.07
.035 Reach1		1131.21		. 024		.035		.04	.035		.035
Reach1		1101.71		.024		.035		.04	.07		.035
Reach1		1081.52		.024		.035		.04	.07		.035
Reach1		1000.00		.024		.04		.024			

LemonCreekPR.rep n1 n2

n11

nS

Reach

LemonCreekPR.rep

SUMMARY OF REACH LENGTHS

River: LemonCreek

Reach	River Sta.	Left	Channe1	Right	
Reach1	3105.07	73.02	70.23	65.15	
Reach1	3034.84	141.38	132.96	131.7	
Reach1	2901.88	123.39	123.28	123.92	
Reach1	2778.60	80.84	92.69	99.08	
Reach1	2685.91	32.36	25	27.33	
Reach1	2660.91	168.68	158.51	172.97	
Reach1	2577.93	Culvert			
Reach1	2502.40	35	30.97	31.13	
Reach1	2471.43	139.55	144.24	152.45	
Reach1	2327.19	55.09	56.19	66.43	
Reach1	2271.00	21.66	25	41.57	
Reach1	2246.00	33.12	29.64	31.84	
Reach1	2230.01	culvert			
Reach1	2216.36	29.71	17.36	12.78	
Reach1	2199.00	107.55	114.9	122.27	
Reach1	2084.10	202.44	208.44	211.8	
Reach1	1875.66	107.36	105.37	108.86	
Reach1	1770.29	181.22	176.46	170.8	
Reach1	1593.83	130.89	127.96	126.93	
Reach1	1465.87	41.14	39.95	45.44	
Reach1	1425.92	28.9	26.5	28.7	
Reach1	1412.68	culvert			
Reach1	1399.42	31.63	31.45	35.82	
Reach1	1367.97	111.43	110.1	108.69	
Reach1	1257.87	107.54	106.66	108.3	
Reach1	1151.21	20.39	20	20.37	
Reach1	1131.21	30.43	29.5	29.97	
Reach1	1101.71	22.38	20.19	20.28	
Reach1	1081.52	79.44	81.52	87.79	
Reach1	1000.00	9.02	0	4.06	

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: LemonCreek

Reach	River Sta.	Contr.	Expan.
Reach1	3105.07	.1	.3
Reach1	3034.84	.1	.3
Reach1	2901.88	.1	. 3
Reach1	2778.60	.1	. 3
Reach1	2685.91	.1	.3
Reach1	2660.91	.1	.3
Reach1	2577.93 Cu	lvert	
Reach1	2502.40	.1	.3
Reach1	2471.43	.1	. 3
Reach1	2327.19	.1	.3
Reach1	2271.00	.1	. 3
Reach1	2246.00	.1	. 3
Reach1	2230.01 Cu	lvert	
Reach1	2216.36	.1	. 3
Reach1	2199.00	.1	. 3
Reach1	2084.10	.1	. 3
Reach1	1875.66	.1	. 3
Reach1	1875.66	.1	. 3

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		LemonCreek	PR. rep
Reach1	1770.29	.1	. 3
Reach1	1593.83	.1	. 3
Reach1	1465.87	.1	. 3
Reach1	1425.92	.1	. 3
Reach1	1412.68	Culvert	- 10
Reach1	1399.42	.1	. 3
Reach1	1367.97	.1	. 3
Reach1	1257.87	.1	. 3
Reach1	1151.21	.1	. 3
Reach1	1131.21	.1	. 3
Reach1	1101.71	.1	. 3
Reach1	1081.52	.1	. 3
Reach1	1000.00	.1	. 3

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Worksheet for La Puente Road Pre-Dev. Broad Crested Weir

400.00 ft

Project	Descr	ipt	ion
---------	-------	-----	-----

Solve For Headwater Elevation

In	but	Data

Discharge		1255.00	ft³/s
Crest Elevation		571.50	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		86.00	ft

Results

Crest Length

Headwater Elevation	572.52	ft
Headwater Height Above Crest	1.02	ft
Tailwater Height Above Crest	-571.50	ft
Weir Coefficient	3.04	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.04	US
Flow Area	408.75	ft²
Velocity	3.07	ft/s
Wetted Perimeter	402.04	ft
Top Width	400.00	ft

Worksheet for La Puente Road Post-Dev. Broad Crested Weir

Project	Description
---------	-------------

Solve For Headwater Elevation

Input Data

Discharge		1230.00	ft³/s
Crest Elevation		571.50	ft
Tailwater Elevation		0.00	ft
Crest Surface Type	Paved		
Crest Breadth		86.00	ft
Crest Length		300.00	ft

Results

Headwater Elevation	572.72	ft
Headwater Height Above Crest	1.22	ft
Tailwater Height Above Crest	-571.50	ft
Weir Coefficient	3.04	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.04	US
Flow Area	366.40	ft²
Velocity	3.36	ft/s
Wetted Perimeter	302.44	ft
Top Width	300.00	ft

Worksheet for Existing and Proposed 18" RCP

WOIKS	neet for Existing	g and Pr	oposea 18" RCP
Project Description			
Friction Method	Manning Formula		
Solve For	Full Flow Capacity		
Input Data			
Roughness Coefficient		0.013	
Channel Slope		0.02000	ft/ft
Normal Depth		1.50	ft
Diameter		1.50	ft
Discharge		14.85	ft³/s
Results			
Discharge		14.85	ft³/s
Normal Depth		1.50	ft
Flow Area		1.77	ft²
Wetted Perimeter		4.71	ft
Hydraulic Radius		0.38	ft
Top Width		0.00	ft
Critical Depth		1.40	ft
Percent Full		100.0	%
Critical Slope		0.01729	ft/ft
Velocity		8.41	ft/s
Velocity Head		1.10	ft
Specific Energy		2.60	ft
Froude Number		0.00	
Maximum Discharge		15.98	ft³/s
Discharge Full		14.85	ft³/s
Slope Full		0.02000	ft/ft
Flow Type	SubCritical		
GVF Input Data			
Downstream Depth		0.00	ft
Length		0.00	ft
Number Of Steps		0	
GVF Output Data			
Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Average End Depth Over Rise		0.00	%

Worksheet for Existing and Proposed 18" RCP

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.40	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01729	ft/ft

Worksheet for Existing and Proposed 33" RCP

Worksheet for Existing and Proposed 33" RCP			
Project Description			
Friction Method	Manning Formula		
Solve For	Full Flow Capacity		
Input Data			
Roughness Coefficient	(0.013	
Channel Slope	0.0	2000	ft/ft
Normal Depth		2.75	i ft
Diameter		2.75	i ft
Discharge	7	74.79) ft³/s
Results			
Discharge	.	74.79) ft³/s
Normal Depth		2.75	i ft
Flow Area		5.94	ft²
Wetted Perimeter		8.64	ft
Hydraulic Radius		0.69) ft
Top Width		0.00) ft
Critical Depth		2.62	t ft
Percent Full		100.0	%
Critical Slope	0.0	1736	6 ft/ft
Velocity		12.59) ft/s
Velocity Head		2.46	i ft
Specific Energy		5.21	ft
Froude Number		0.00	
Maximum Discharge	8	30.45	i ft³/s
Discharge Full	7	74.79	ft³/s
Slope Full	0.0	2000	ft/ft
Flow Type	SubCritical		
GVF Input Data			
Downstream Depth		0.00) ft
Length		0.00) ft
Number Of Steps		0	
GVF Output Data			
Upstream Depth		0.00) ft
Profile Description			
Profile Headloss		0.00) ft

0.00 %

Average End Depth Over Rise

Worksheet for Existing and Proposed 33" RCP

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.75	ft
Critical Depth	2.62	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01736	ft/ft

Worksheet for Proposed 21" RCP

Project Description	
Friction Method	Manning Formula

Solve For Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02000	ft/ft
Normal Depth	1.75	ft
Diameter	1.75	ft
Discharge	22.41	ft³/s

Results

Discharge		22.41	ft³/s
Normal Depth		1.75	ft
Flow Area		2.41	ft²
Wetted Perimeter		5.50	ft
Hydraulic Radius		0.44	ft
Top Width		0.00	ft
Critical Depth		1.65	ft
Percent Full		100.0	%
Critical Slope		0.01729	ft/ft
Velocity		9.32	ft/s
Velocity Head		1.35	ft
Specific Energy		3.10	ft
Froude Number		0.00	
Maximum Discharge		24.10	ft³/s
Discharge Full		22.41	ft³/s
Slope Full		0.02000	ft/ft
Flow Type	SubCritical		

GVF Input Data

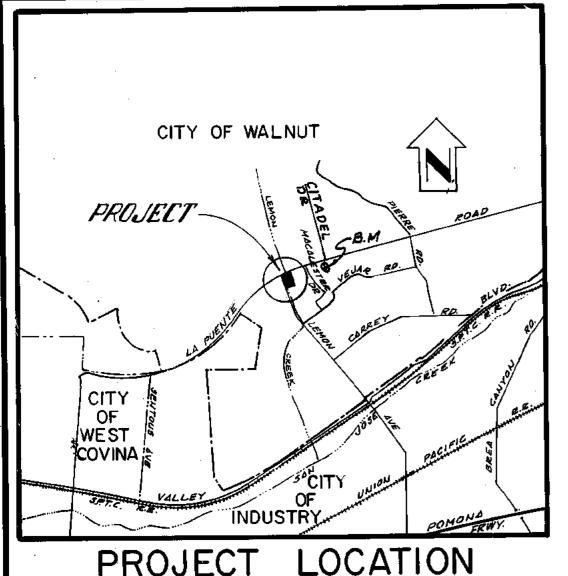
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Proposed 21" RCP

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.75	ft
Critical Depth	1.65	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.01729	ft/ft

Appendix D: Storm Drain Improvement Plans for P.M. No. 14987



STRUCTURAL NOTES.

GENERAL

I DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER OF BAR AND SHALL BE TWO INCHES LINLESS OTHERWISE SHOWN.

2. CONCRETE DIMENSIONS SHALL BE MEASURED HORIZONTALLY OR VERTICALLY ON THE PROFILE, AND PARALLEL TO OR AT RIGHT ANGLES (OR RADIALLY) TO CENTERLINE OF CONDUIT ON THE PLAN EXCEPT AS OTHERWISE SHOWN. 3. ALL BAR BENDS AND HOOK SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" SECTION 801.

4 PLACING OF REINFORCEMENT SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" SECTION 803.

5. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.

G. TRANSVERSE CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL ISE IN THE SAME PLANE, NO STAG-GERING OF JOINTS WILL BE PERMITTED, TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO THE CENTERLINE OF CONSTRUCTION.

7. THE TRANSVERSE REINFORCING STEEL SHALL TERMINATE ONE AND ONE-HALF INCHES FROM THE CONCRETE SURFACES UNLESS OTHERWISE SHOWN ON THE STRUCTURAL DETAILS. 8. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE ROUNDED OR BEVELED.

9. NO SPLICES IN TRANSVERSE STEEL REINFORCEMENT WILL BE PERMITTED OTHER THAN SHOWN ON THE DRAWING WITHOUT APPROVAL OF THE ENGINEER, NO MORE THAN TWO SPLICES WILL BE PERMITTED IN ANY LONGITUDINAL BAR BETWEEN TRANSVERSE JOINTS, SPLICES SHALL BE STAGGERED. 10. LONGITUDINAL AND TRANSVERSE STEEL SHALL BE LAPPED 30 BAR DIAMETERS AT SPLICES.

II. FIELD BENDING OF REINFORCING STEEL IS NOT PERMITTED.

CONCEDUCTION NOTES AND QUANTITY ESTIMATE

CONSTRUCT DOUBLE 8'X7' REINFORCED CONCRETE BOX. SEE DETAILS PER SHT. NO 4		•
C	71,49) :
(2)—REMOVE EXIST TRAP CHANNEL B=8', Z=1 H=7.5' AND CONSTRUCT R.C. TRANS. STRUCTURE PER SHT. NO.5	5.10	ŧ
3 CONSTRUCT MANIHOLE NO.3 PER LA. CO. F.C.D., NO.2 D 104	2	
A-CONSTRUCT FLOW EQUALIZING WINDOW PER L.A.CO.F.C.D., NO.2 D205	Z	Ĺ
(5) INSTALL PROTECTION BARRIER PER L.A. CO. FC.D., NO.3 - D 261.1 THRU 261.3	1	
(6)— CONSTRUCT JUNCTION STRUCTURE NO. 3 PER L.A.CO. F.C.D., NO. 2-D191	1	1
(7) (NSTALL 30" R.C.P. (1000.D) STUB & PLUG	8	ι
8 CONSTRUCT TRANSITION STRUCTURE (SEE DETAIL, SHEET 5 OF 5)	?1 .05	; 1

BENCH MARK:

CG. 3419 RDBM TAG 4' W/O BCR 32' S/O . 57' W/O & INT. LA PUENTÉ RO. AND CITADEL DR.

ELEV. 568.559 (COVINA 1975)

STORM DRAIN PLANS IN P.M. No. 14987

GENERAL NOTES (Cont'd)

24. A SOILS ENGINEER SHALL CERTIFY THAT ALL FILLS AND BACKFILLS OVER UNDERGROUND STORM DRAINS OUTSIDE OF ST. R/W HAVE BEEN COMPACTED OR CONSOLIDATED TO A 90% DENSITY. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE CITY.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7-10. 4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS, EVIDENCE OF COMPLIANCE AND A COPY OF PERMIT SHALL BE SUBMITTED TO CITY ENGINEER PRIOR TO ANY TRENCHING 5' OR DEEPER.
 THE CONTRACTOR SHALL CONFORM TO THE. "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY ENGINEER STANDARD S-2.

27. ALL PIPE SHALL BE PLACED IN A TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE TOP OF PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS. ALL BACKFILL IN EASEMENTS SHALL BE COMPACTED TO THE DENSITY REQUIRED BY THE GRADING PLAN.

28. THE INSPECTOR MAY HAVE THE OPTION TO REQUIRE CONCRETE BACKFILL DURING CONSTRUCTION WHEN THE BOX OR PIPE HAS LESS THAN ONE POOT OF COVER AND IS SUBJECTED TO HEAVY EQUIPMENT TRAFFIC. THE CONCRETE BACKFILL SHALL CONSIST OF 1:3:5 MIX CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM DEPTH OF 4 INCHES OVER TOP OF PIPE.

L.A. CO. FLOOD CONTROL STD. DWGS.

DWG. NO. 2-D 104 2-D 191

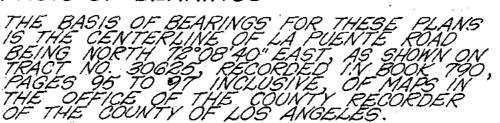
2-D 260

DETAIL DESCRIPTION

MANHOLE NO.3 (BOX OR ARCH) JUNCTION STRUCTURE NO.3 (30"OR SMALLER SIDE INLET TO BOX) WINDOW DETAILS FOR MULTIPLE BOX STRUCTURES. 2-D 205 2-D 261.1TO 3 PROJECTION BARRIER PROTECTION FOR SEWER CROSSING 2-D 251

TRANSITION STRUCTURE

BASIS OF BEARINGS:



GENERAL NOTES:

ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929, ALL WORK SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION 1979 EDITION WITH 1980 \$1981 SUPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE CITY ENGINEER.

APPROVAL OF THIS PLAN BY THE CITY OF WALNUT DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION, OR THE EXISTENCE OR NON-EXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.

3. THE CONTRATOR SHALL NOTIFY THE CONSTRUCTION SECTION OF THE CITY ENGR BY TELEPHONE, 595-2275 AT LEAST 48 HOURS BEFORE STARTING ANY WORK UNDER THIS CONTRACT.

4. ALL CONSTRUCTION JOINTS IN THE FOOTING OF SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.

5. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAS BEEN PLACED, IN-SPECTED AND APPROVED.

6. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO CONDUIT CENTERLINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.

7. ALL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAYS COMPRESSIVE STRENGTH OF 4000 p.s.i. UNLESS OTHERWISE NOTED. COMPRESSION TEST CYLINDERS ARE REQUIRED.

8. ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4" CHAMFER.

9. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 21" CLEARANCE UNLESS OTHERWISE SPECIFIED.

10. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL AS PER A.S.T.M. A-615- GRADE 60.

11. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE".

12. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTERLINE OF STEEL UNLESS OTHERWISE NOTED.

13. ALL BACKFILLS AND FILLS TO BE USED AS SUBGRADE SHALL BE COMPACTED TO A RELATIVE DENSITY OF 90% UNLESS OTHERWISE SPECIFIED.

14. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18", WHICH-

15. ALL CATCH BASINS AND CONNECTOR PIPES BETWEEN CATCH BASINS TO BE INSPECTED BY THE CITY

16. PIPE SHALL BE EMBEDDED & INCHES INTO ALL STRUCTURES INCLUDING INLET & HEADWALLS, UNLESS OTHERWISE SPECIFIED.

17. WHERE PIPE IS TO BE PLACED IN FILL, THE FILL SHALL BE COMPACTED TO A MINIMUM DEPTH OF 3 FEET ABOVE THE TOP OF PIPE PRIOR TO TRENCHING.

18. ALL BACKFILL AND FILL AROUND CLOSED CONDUIT IN STREET RIGHTS OF WAY SHALL BE BROUGHT UP TO SUBGRADE OF THE ROAD OR TO 2 FEET ABOVE THE TOP OF THE CONDUIT, WHICHEVER IS LESS. THE CITY ENGINEER SHALL INSPECT ALL BACKFILL AND FILL ABOVE AFOREMENTIONED LIMITS.

19. ALL REINFORCED CONCRETE PIPE SHALL BE BEDDED IN ACCORDANCE WITH LOS ANGELES COUNTY ENGINEER CASE AND BEDDING PER STANDARD DRAWING D-54, UNLESS OTHERWISE NOTED.

20. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.

21. THIS STORM DRAIN WILL NOT BE ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE, AND THE SYSTEM IS CLEANED TO THE SATISFACTION OF THE CITY

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND. UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS MAP. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS PURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNEC-TION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIA-BILITY ARISING FROM THE GOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

IF CONSTRUCTION OF IMPROVEMENTS SHOWN HEREON ARE NOT COMMENCED WITHIN IB MONTHS OF APPROVAL DATE, THESE PLANS ARE SUBJECT TO REVIEW BY THE CITY.

APPROVED CITY OF WALNUT

CITY ENGINEER - KON KRANZER R.C.E. 18603 DATE 10-4-82

ANACAL ENGINEERING CO. 1900 E. LA PALMA AVE. ANAHEIM, CALIF. 92803-3668 PHONE: (714) 774-1763

CITY WALNUT OF

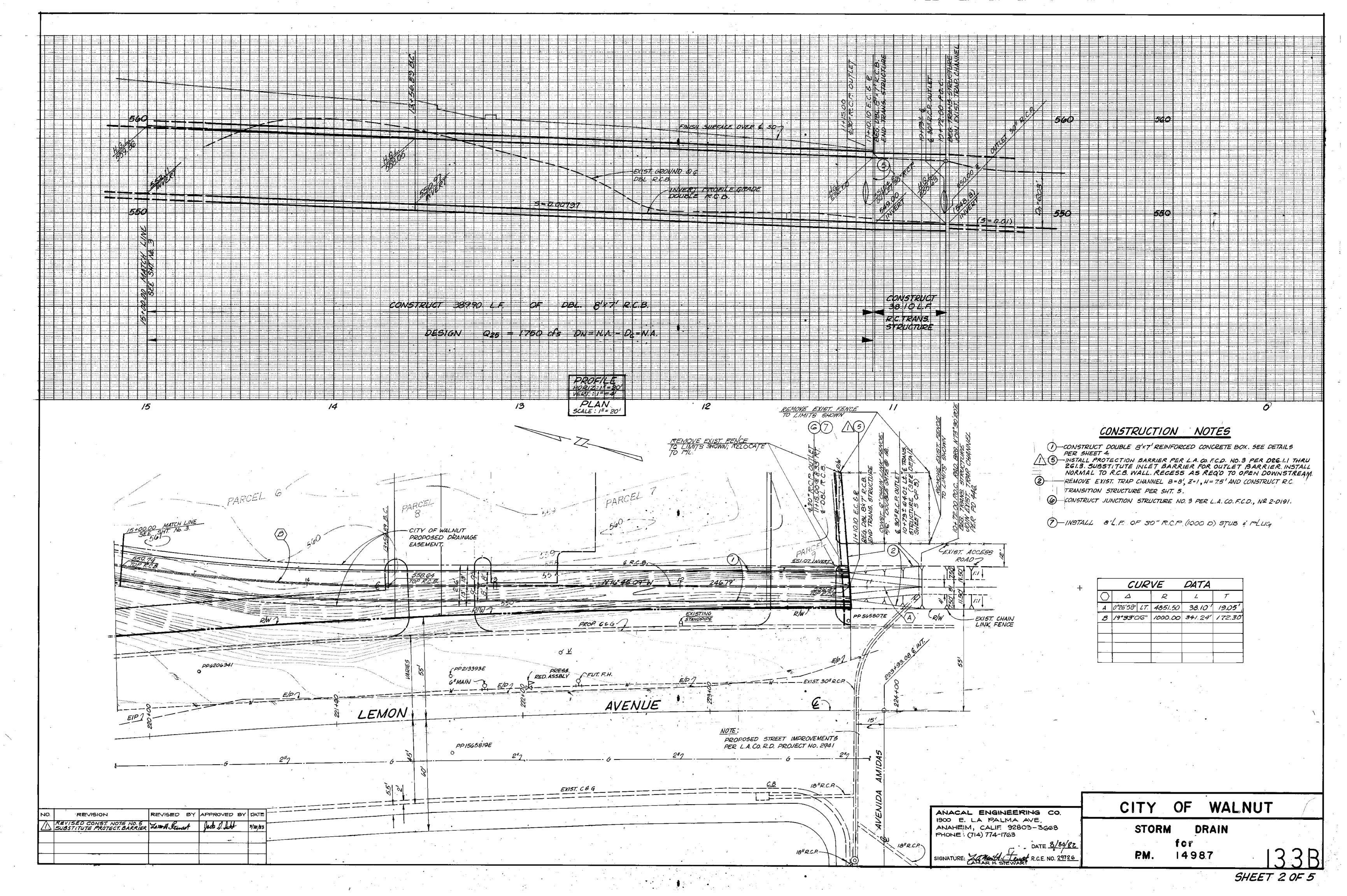
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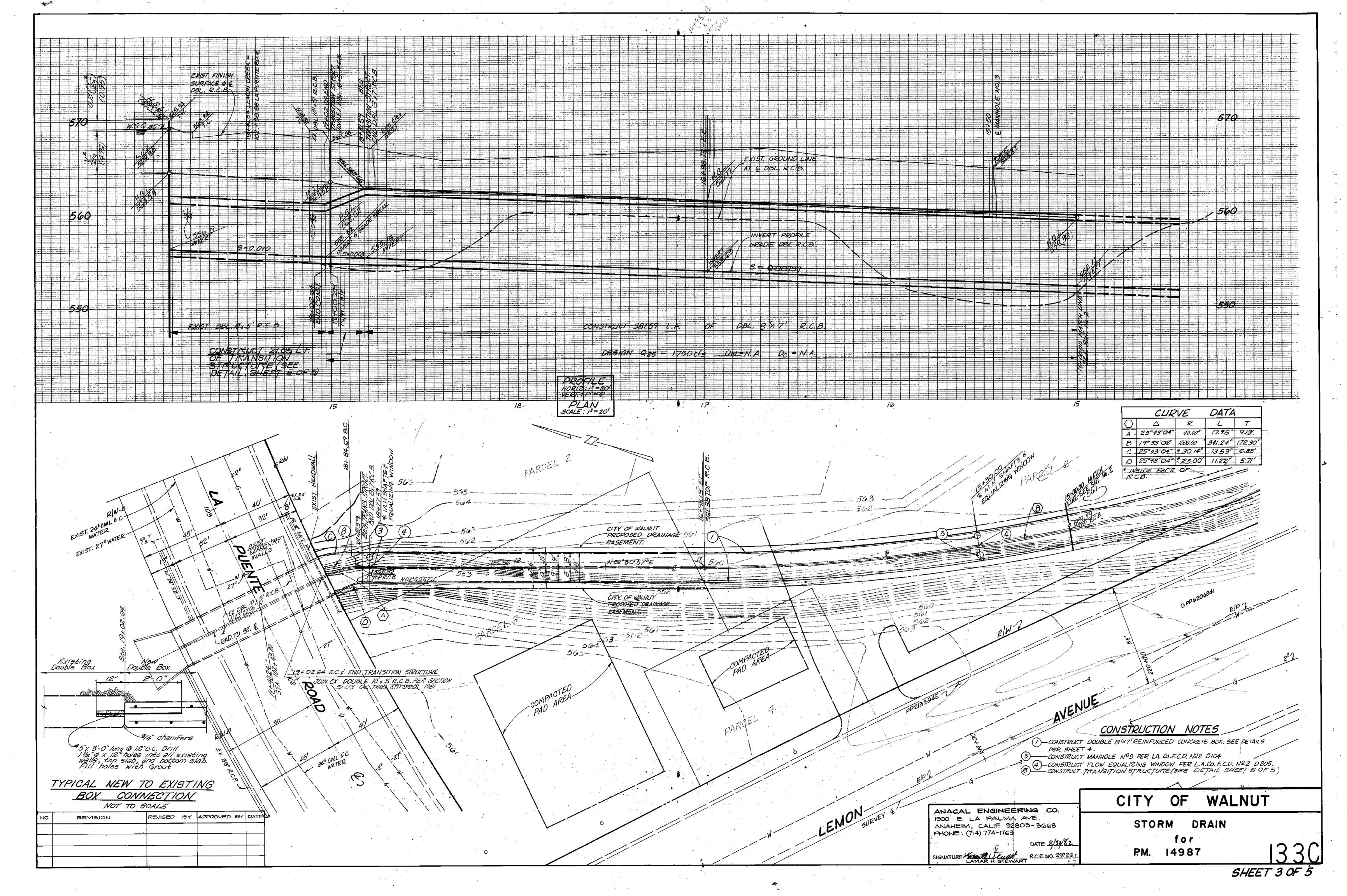
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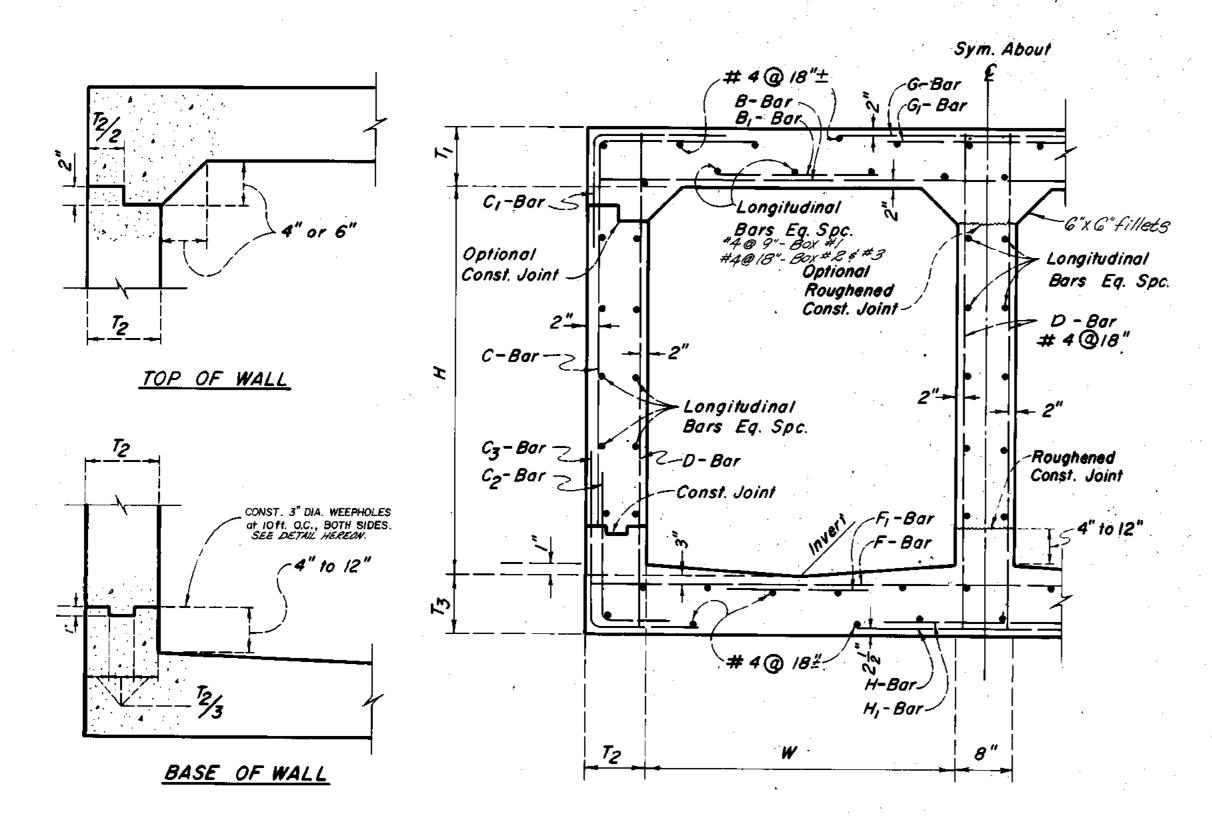
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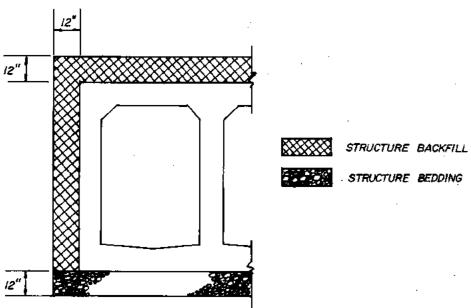




diameters

TRANSVERSE JOINT

CONSTRUCTION JOINT DETAILS NOT TO SCALE



R.C.B. BACKFILL & BEDDING DETAIL NOT TO SCALE

NO.	REVISION	REVISED BY	APPROVED BY	DATE
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TYPICAL R.C. BOX SECTION NOT TO SCALE

DESIGN DATA

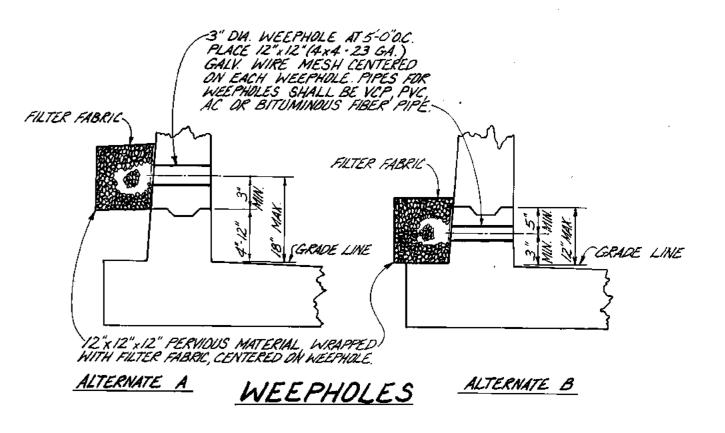
LIVE LOAD H20-SI6-44 unless otherwise noted DEAD LOAD Earth load per Marston's formula: w= 110 p.c.f. Ku = Ku = 0 150 Bd= Outside width of box plus 3 feet Side earth 37 p.s.f. per foot of depth Internal water pressure: 62.4 p.s.f. per foot of depth Weight of concrete: 150 p.c.f. ALLOWABLE STRESSES fc'= 4000 p.s.i. at 28 days fc= 1800 p.s.i. fs= 24000 p.s.i. shear and bond stresses per A.C.I. 3/8 - 63

·	<u> </u>		1.
BOX SECTION NO.	/	2	3
Design Cover	0'-0"	6'-0"	7'-0"
Width W	8'-0"	8'-0"	8'-0"70 10'-0"
Height H	7'= 0"	7'-0"	7'-0" 105'-0"
Live Load	H-20 ·	H-20	H-20
Top Stab Thickness Ti	8.00"	8.00"	9.50"
Side Wall Thickness T2	8.00"	8.00"	8.00"
Bottom Slab Thickness T3	8.00"	8.00"	10.00"
B Bar No. & Spacing	#6@7"	#5@16"	#7@8"
Bars Length	17'-9"	17'-9"	Varies
B _I Bar No. & Spacing	·	#5@16"	
Bars Length	-	7'- 7/2"	
C Bar No. & Spacing	#4@14"	#4@14"	#4@ 7"O.C.
Horiz. Length	3'-8/2"	3'-5"	4'-21/2"
Bars Vert. Length	7'-1"	7'-1"	Varies
C, Bar No. & Spacing	#4@14"	#4@/4"	
	2'-1"	2'-1"	
Bars Vert. Length	3'-21/2"	2'-1"	
C ₂ Bar No. & Spacing Horiz, Length	#4@14"	#5@14"	#4@7"O.C.
	3'-3"	4'-0"	4'-3"
Bars Vert. Length	2'-1"	2'-1"	2'-6"
C3 Bar No. & Spacing		<u> </u>	. —
noriz. Length		· <u> </u>	
Bars Vert. Length			
D Bar No. & Spacing	#4@18"	#4@18"	#4@18"0.C.
Bars Length	8'-1"	8'-/"	Varies
F Bar No.& Spacing	#4@20"	#6@10"	#7@8" O.C.*
Bars Length	17'-9"	17'-9"	Varies
F ₁ Bar No. & Spacing	#6020"		
Bars Length	7'-101/2"		
G Bar No. & Spacing	#5@12"	#4@9"	#5@10"*
Bars Length	12'-8"	6'-51/2"	15'-8"
G _I Bar No. 8 Spacing	#5012"	#5@9"	#7@10"*
Bars Length	4'-8"	4'-8"	5'-0"
H Bar No. & Spacing	#40//"	#5@//"	#5@10" *
Bars Length	7'- 7"	13'-0"	15'-8"
H, Bar No. & Spacing	#5@//"	#7@//"	#7@10"
Bars Length	4'-0"	4'-61/2"	5'-0"
NUMBER LONGITUDINAL RE	INFORCEMEN	T#4 BARS	<u> </u>
Top Slab (Includes Distrib.)	44	27	3/
Ext. Walls	16	16	16
Int. Walls	8	8	8
Inv. Slab	28	26	3/
TOTAL	96	77	86

		QUANTIT	ES
Concrete Cu. Yds. / Lin. Ft.	1.45	1.45	1.65 Average
Steel Lbs./Lin. Ft.	184±	187±	265±

* Spacing as measured at center wall.

Box	Stat	ion	Box	Sta	tion
Sect.	From	To	Sect.	From	To
/	11+10.10	13+45.00			
2	13+45.00	18+81.59			
3	18+81.59	19+02.64			. '
	•		•		



ADDITIONAL NOTES FOR BOX SECTIONS

- 1. LONGITUDINAL STEEL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL CONSTRUCTION JOINTS.
- 2. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, TRANSVERSE JOINT KEYWAYS (IN BOTH SLABS AND WALLS), AS DETAILED FOR LONGITUDINAL KEYWAYS AT THE BASE OF THE WALLS, SHALL BE PLACED AT THE END OF EACH POUR, BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET OR BE LESS THAN 10 FEET. ALL CONSTRUCTION JOINTS IN BOTTOM SLAB, TOP SLAB, AND SIDE WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
- 3. UNLESS OTHERWISE SHOWN ON THE DETAILS, IN CURVED SECTIONS TRANSVERSE BARS SHALL BE PLACED RADIALLY, STRAIGHT TRANSVERSE BARS IN TOP AND BOTTOM SLABS SHALL BE SPACED AS SHOWN ON THE TYPICAL SECTIONS: SPACING SHALL BE AT THE CENTERLINE OF THE BARREL ON THE OUTSIDE OF THE CURVE FOR DOUBLE BARREL BOXES. STRAIGHT BARS AND L-BARS IN WALLS SHALL BE SPACED AS SHOWN ON THE TYPICAL SECTIONS, WITH THE SPACING MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
- 4. AT THE BEGINNING AND ENDING OF ALL POURS, A CURTAIN OF REINFORCE-MENT COMPOSED OF B, C, C₂, D, F, G, AND H BARS SHALL BE PLACED THREE INCHES FROM THE TRANSVERSE CONSTRUCTION JOINT.
- 5. THE VERTICAL WALL STEEL IN INTERIOR WALLS AND IN THE INTERIOR FACE OF EXTERIOR WALLS MAY BE SPLICED AT THE CONSTRUCTION JOINT AT THE BASE OF THE WALL. THE SPLICES SHALL BE 30 BAR DIAMETERS IN LENGTH.
- 6. IN ALL SECTIONS LAP C AND C₂ BARS. THE VERTICAL LENGTH OF C AND C₃ BARS HAS BEEN CALCULATED FOR A FOUR-INCH STARTER WALL. IF THE HEIGHT OF THE STARTER WALL IS VARIED, THE VERTICAL LENGTH OF THE C AND C₂ BARS SHALL BE VARIED CORRESPONDINGLY SO AS TO MAINTAIN A 30 DIAMETER LAP BETWEEN THE TWO BARS. THE LAPS SHALL BE BASED ON THE SMALLER BAR.
- 7. CONCRETE QUANTITIES ARE BASED ON A SIX-BY-SIX INCH FILLET.
- 8. THE CONTRACTOR SHALL HAVE THE OPTION OF PLACING THE 3 INCH DIA-METER WEEPHOLES, INDICATED ON THE "BASE OF WALL" DETAIL, ABOVE OR BELOW THE CONSTRUCTION JOINT, IF THE BOTTOM OF THE CONSTRUCTION JOINT IS AT LEAST 6 INCHES ABOVE THE BOTTOM OF THE BOX.
- 9. THE STRUCTURE BACKFILL AND BEDDING SHALL CONFORM TO THE R.C.B. BACKFILL AND BEDDING DETAIL HEREON: AND SECTIONS 200 AND 300 7.4 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

DOUBLE R.C.B. DETAILS

OF WALNUT ANACAL ENGINEERING CO. 1900 E. LA PALMA AVE.

ANAHEIM, CALIF. 92803-3668

DATE 8/31/82

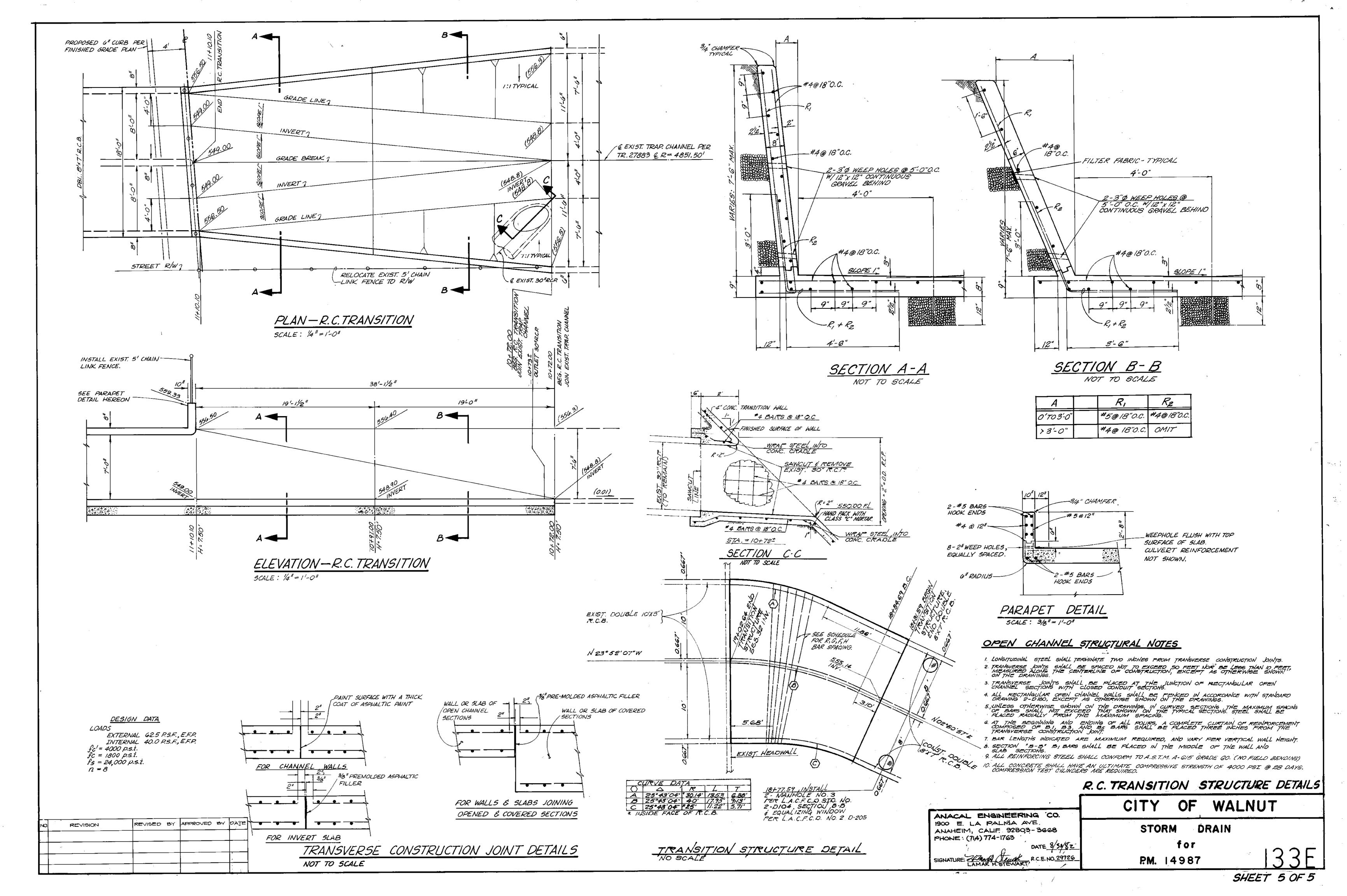
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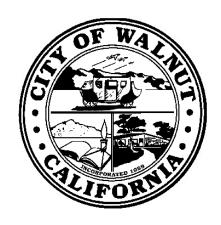
STORM DRAIN

for

14987

SHEET 4 OF 5





APPENDIX N Acoustical Assessment





CONSULTANT:

Michael Baker International

14725 Alton Parkway Irvine, California 92618

Michael Baker

INTERNATIONAL



ACOUSTICAL ASSESSMENT

for the

Brookside Project

City of Walnut

Consultant:

MICHAEL BAKER INTERNATIONAL, INC.

14725 Alton Parkway
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949.330.4104

April 7, 2016

JN 146566

This document is designed for double-sided printing to conserve natural resources.

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DEFINITIONS OF COMMONLY USED TERMS IN NOISE CONTROL

The definitions that follow are in general agreement with those contained in publications of various professional organizations, including the American National Standards Institute (ANSI); the American Society for Testing and Materials (ASTM); the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); the International Organization for Standardization (ISO); and the International Electrotechnical Commission (IEC).

TERMINOLOGY

acoustic; acoustical: *Acoustic* is usually used when the term being qualified designates something that has the properties, dimensions, or physical characteristics associated with sound waves (e.g., acoustic power); *acoustical* is usually used when the term which it modifies does not explicitly designate something that has the properties, dimensions, or physical characteristics of sound (e.g., acoustical material).

ambient noise: The all-encompassing noise associated with a given environment at a specified time, usually being a composite of sound from many sources arriving from many directions, near and far; no particular sound is dominant.

attenuation: The decrease in level of sound, usually from absorption, divergence, scattering, or the cancellation of the sound waves.

average sound level (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. Unit: decibel.

A-weighted sound level (L_A): The sound level measured with a sound-level meter using A-weighting. *Unit*: decibel (dBA).

background noise: The total noise from all sources other than a particular sound that is of interest (e.g., other than the noise being measured or other than the speech or music being listened to).

decibel (dB): A unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels correspond to the logarithm (to the base 10) of this ratio. [In many sound fields, the sound pressure ratios are not proportional to the corresponding power ratios, but it is common practice to extend the use of the decibel to such cases. One decibel equals one-tenth of a *bel*.]

equivalent continuous sound level (average sound level) (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. *Unit*: decibel (dBA).

frequency (*f*): Of a periodic function, the number of times that a quantity repeats itself in one second, i.e., the number of cycles per second. *Unit*: hertz (Hz).

noise: Any disagreeable or undesired sound, i.e., unwanted sound.

noise level: Same as sound level. Usually used to describe the sound level of an unwanted sound.

noise reduction (NR): The difference in sound pressure level between any two points along a path of sound propagation.

sound: (1) A change in air pressure that is capable of being detected by the human ear.

(2) The hearing sensation excited by a change in air pressure.

sound level: Ten times the logarithm to the base 10 of the square of the ratio of the frequency-weighted (and time-averaged) sound pressure to the reference sound pressure of 20 micropascals. The frequency-weightings and time-weighting employed should be specified; if they are not specified, it is understood that A-frequency-weighting is used and that an averaging time of 0.125 is used. *Unit*: decibel (dBA).

SYMBOLS, ABBREVIATIONS, AND ACRONYMS

ADT Average Daily Traffic

ANSI American National Standards Institute

AM Ante Meridiem

APN Assessor's Parcel Number

CEQA California Environmental Quality Act
CNEL Community Noise Equivalent Level

dB decibel

dBA A-weighted decibel

EPA United States Environmental Protection Agency

FHWA Federal Highway Administration FTA Federal Transit Administration

INCE Institute of Noise Control Engineering HVAC heating, ventilation, and air conditioning

in/sec inches per second

Ldn average day/night sound level

Leq equivalent sound level
Lmax maximum noise level
Lmin minimum noise level
Ln exceedance level
MPH miles per hour
PM Post Meridiem

PPV peak particle velocity STC sound transmission class

VdB velocity decibels

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EXECUTIVE SUMMARY

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed Brookside Project ("project" or "proposed project") in the City of Walnut.

The proposed project is located north of La Puente Road, south of Meadow Pass Road, east of North Lemon Avenue, and west of Broken Lance Road within the City of Walnut, California. The project site is located approximately two miles north of State Route 60 (SR-60). Overall, the project site is located within a developed area of the City at 800 Meadow Pass Road.

The project proposes to construct 28 detached single-family homes and 10 open space lots located along a central street system with access to Meadow Pass Road and San Vicente Drive. The site would maintain natural open space, areas of Lemon Creek, and the existing equestrian trail along the western site boundary that traverses the site. In addition, two of the original barns would be retained in the northeastern part of the site. Vehicular access to the project site would be provided via Meadow Pass Road and San Vicente Drive. An emergency vehicle access location is proposed at La Puente Road on the southern project boundary.

<u>Temporary Impacts</u>. Based upon the results of the analysis, noise from construction activities would not exceed the noise standards of the City of Walnut's *Municipal Code* at nearby residential uses with compliance with Mitigation Measure NOI-1. Additionally, short-term vibration impacts from construction would be reduced to a less than significant level.

<u>Long-Term Impacts</u>. The analysis has concluded that implementation of the proposed project would result in less than significant impacts with regard to mobile noise sources from project operations. Implementation of Mitigation Measure NOI-2 which would require perimeter walls of 8-feet and 10-feet in height along select locations would reduce on-site noise levels to a less than significant level. Less than significant impacts have been identified in regard to stationary sources.

1.0 INTRODUCTION

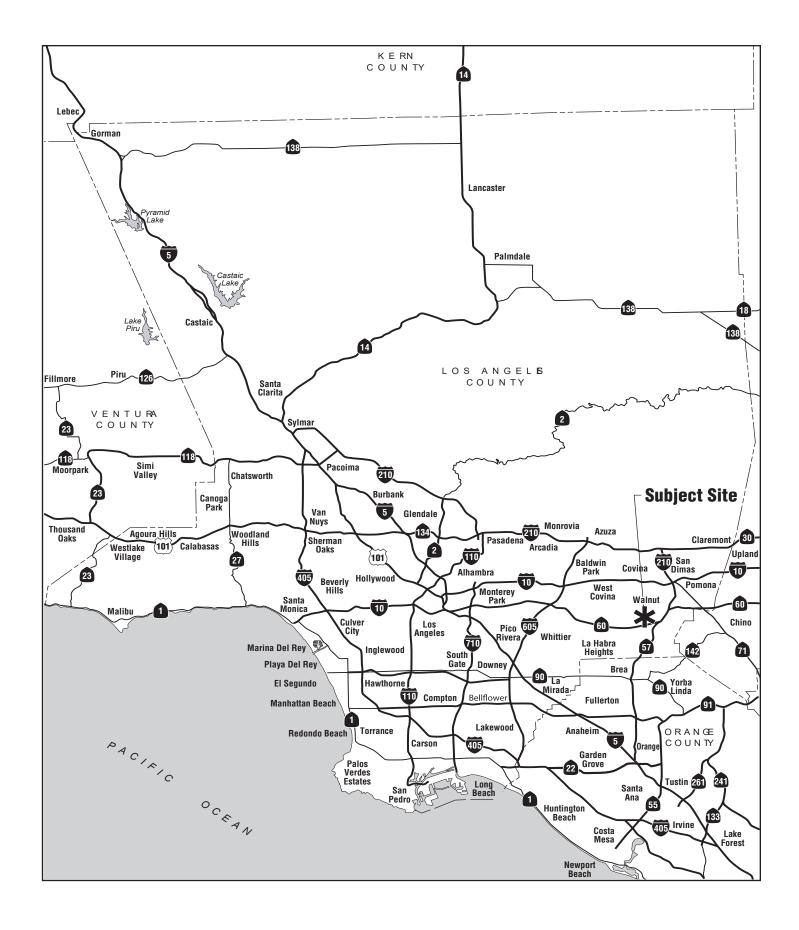
The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed Brookside Project ("project" or "proposed project") in the City of Walnut (City).

1.1 PROJECT LOCATION

The proposed project is located north of La Puente Road, south of Meadow Pass Road, east of North Lemon Avenue, and west of Broken Lance Road within the City of Walnut, California. The project site is located approximately two miles north of State Route 60 (SR-60); refer to Exhibit 1, <u>Regional Location</u>. Overall, the project site is located within a developed area of the City at 800 Meadow Pass Road; refer to Exhibit 2, <u>Local Vicinity</u>.

1.2 PROJECT DESCRIPTION

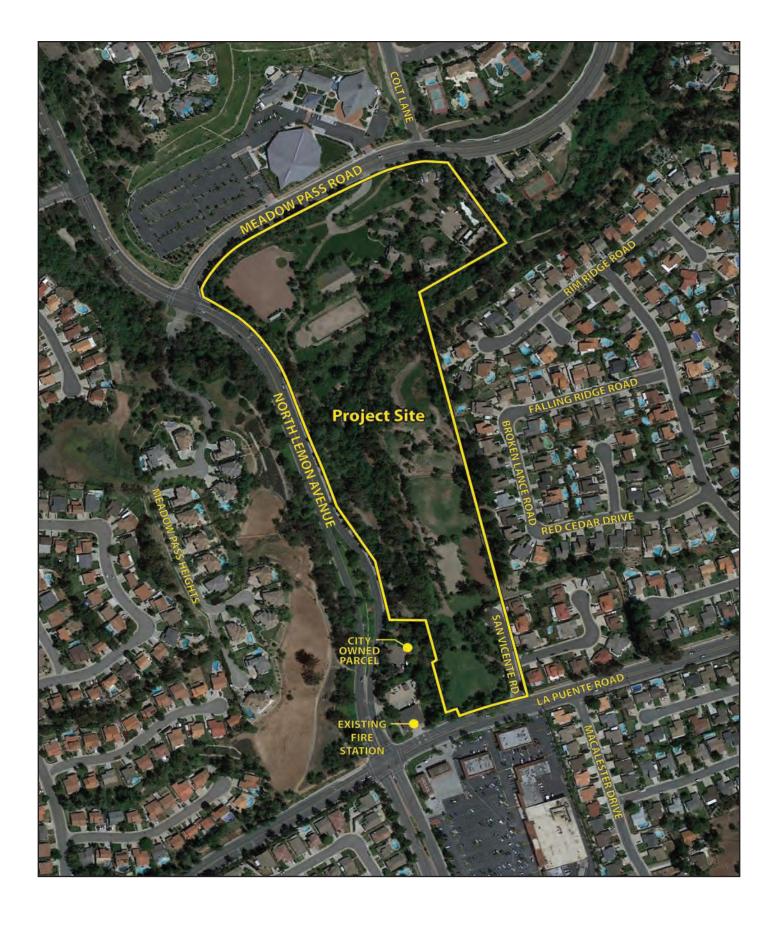
The 25.84-acre site is comprised of three parcels that are currently occupied by the Brookside Equestrian Center. The project proposes to construct 28 detached single-family homes and 10 open space lots located along a central street system with access to Meadow Pass Road and San Vicente Drive; refer to Exhibit 3, Site Plan. The site would maintain natural open space, areas of Lemon Creek, and the existing equestrian trail along the western site boundary that traverses the site. In addition, two of the original barns would be retained in the northeastern part of the site. Vehicular access to the project site would be provided via Meadow Pass Road and San Vicente Drive. An emergency vehicle access (EVA) location is proposed at La Puente Road on the southern project boundary.



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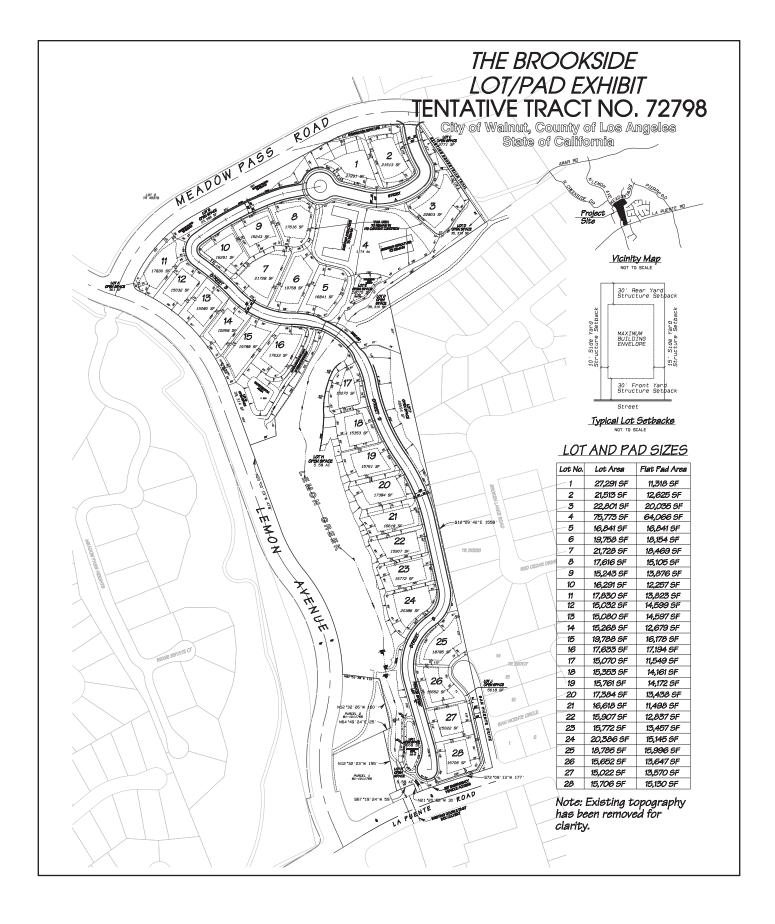
ACOUSTICAL ASSESSMENT THE BROOKSIDE PROJECT



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ACOUSTICAL ASSESSMENT THE BROOKSIDE PROJECT

2.0 DESCRIPTION OF NOISE METRICS

2.1 STANDARD UNIT OF MEASUREMENT

Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by differentiating among frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is perceived to be twice as loud and 20 dBA higher is perceived to be four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Exhibit 4, Common Environmental Noise Levels.

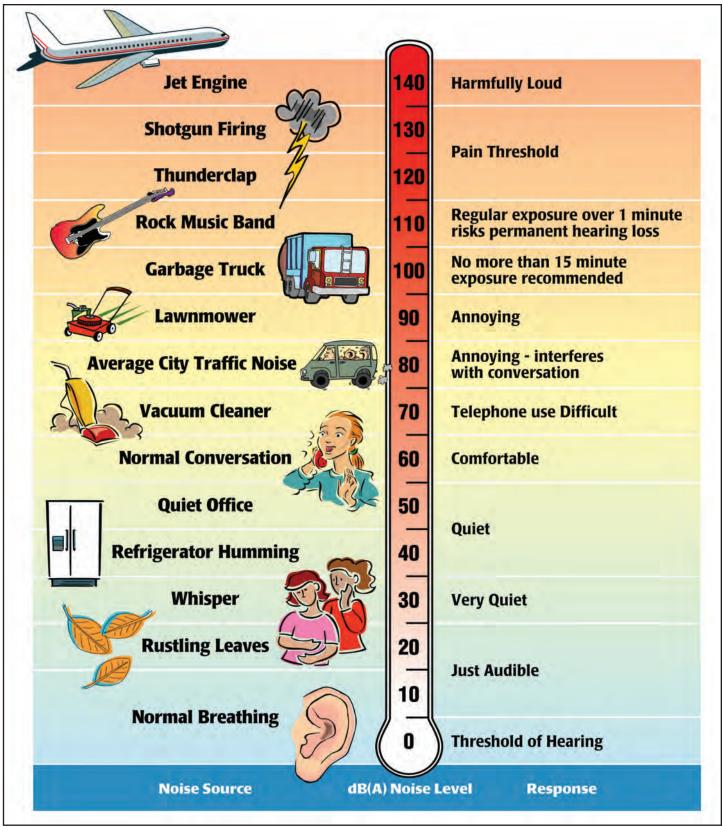
Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

<u>Table 1</u>, <u>Noise Descriptors</u>, provides a listing of methods to measure sound over a period of time.

2.2 HEALTH EFFECTS OF NOISE

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. The percentage of people claiming to be annoyed by noise generally increases with the environmental sound level. However, many factors also influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses would range from "not annoyed" to "highly annoyed."



Source: Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004), March 1974.

NOT TO SCALE

Michael Bake

ACOUSTICAL ASSESSMENT THE BROOKSIDE PROJECT



Table 1 Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (Leq)	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L _{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L _{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM.
Day/Night Average (L _{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq} . The L_{dn} is calculated by averaging the L_{eq} 's for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM) by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Exceedance Level (Ln)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L ₀₁ , L ₁₀ , L ₅₀ , L ₉₀ , respectively) of the time during the measurement period.
Source: Cyril M. Harris, Handbook of Noise	

When the noise level of an activity rises above 70 dBA, the chance of receiving a complaint is possible, and as the noise level rises, dissatisfaction among the public steadily increases. However, an individual's reaction to a particular noise depends on many factors, such as the source of the sound, its loudness relative to the background noise, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community.

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

- Noise-Induced Hearing Loss;
- Interference with Communication;
- Effects of Noise on Sleep;
- Effects on Performance and Behavior;
- Extra-Auditory Health Effects; and
- Annoyance.

Although it often causes discomfort and sometimes pain, noise-induced hearing loss usually takes years to develop. Noise-induced hearing loss can impair the quality of life through a reduction in the ability to hear important sounds and to communicate with family and friends. Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. While the loss may be temporary at first, it could become permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly caused by the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by non-occupational sources.

According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools, and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

Interference with communication has proven to be one of the most important components of noise-related annoyance. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high and the task sufficiently complex for effects on performance to occur.

Recent research indicates that more moderate noise levels can produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, increased anxiety, decreased incidence of "helping" behavior, and increased incidence of "hostile" behavior. Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. As with other categories, quantifying these effects is difficult due to the amount of variables that need to be considered in each situation. As a biological stressor, noise can influence the entire physiological system. Most effects seem to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals.

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the relationship between the effects of annoyance and the community were quantified. In areas where exterior noise levels were consistently above 60 dBA Community Noise Equivalent Level (CNEL), approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA CNEL, that percentage rises to 15 percent. Although evidence for the various effects of noise have differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress related.

3.0 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land uses deemed sensitive by the State of California (State) within the vicinity of the project site include schools. Many jurisdictions also consider single- and multi-family residential uses particularly noise-sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some jurisdictions may also identify other noise-sensitive uses such as churches. Land uses that are relatively insensitive to noise include office, commercial, and retail developments. There is a range of insensitive noise receptors that include uses that generate significant noise levels and that typically have a low level of human occupancy.

This noise analysis was conducted in accordance with Federal, State, and local criteria described in the following sections.

3.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

The U.S. Environmental Protection Agency (EPA) offers guidelines for community noise exposure in the publication *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*. These guidelines consider occupational noise exposure as well as noise exposure in homes. The EPA recognizes an exterior noise level of 55 decibels day-night level (dB Ldn) as a general goal to protect the public from hearing loss, activity interference, sleep disturbance, and annoyance. The EPA and other Federal agencies have adopted suggested land use compatibility guidelines that indicate that residential noise exposures of 55 to 65 dB Ldn are acceptable. However, the EPA notes that these levels are not regulatory goals, but are levels defined by a negotiated scientific consensus, without concern for economic and technological feasibility or the needs and desires of any particular community.

3.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The State Office of Planning and Research Noise Element Guidelines include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The Noise Element Guidelines contain a land use compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL. <u>Table 2</u>, <u>Land Use Compatibility for Community Noise Environments</u>, presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

Table 2
Land Use Compatibility for Community Noise Environments

	Community Noise Exposure (Ldn or CNEL, dBA)					
Land Use Category	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable		
Residential - Low Density, Single-Family, Duplex, Mobile Homes	50 – 60	55 - 70	70-75	75-85		
Residential - Multiple Family	50 – 65	60 - 70	70 – 75	70 - 85		
Transient Lodging - Motel, Hotels	50 – 65	60 - 70	70 – 80	80 - 85		
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 - 70	70 – 80	80 - 85		
Auditoriums, Concert Halls, Amphitheaters	NA	50 - 70	NA	65 - 85		
Sports Arenas, Outdoor Spectator Sports	NA	50 - 75	NA	70 - 85		
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 75	72.5 - 85		
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 - 85		
Office Buildings, Business Commercial and Professional	50 – 70	67.5 - 77.5	75 – 85	NA		
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 - 80	75 – 85	NA		

NA: Not Applicable; Ldn: average day/night sound level; CNEL: Community Noise Equivalent Level

Notes

Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable - New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable - New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

<u>Clearly Unacceptable</u> – New construction or development should generally not be undertaken.

Source: Office of Planning and Research, California, General Plan Guidelines, October 2003.

3.3 LOCAL JURISDICTION

CITY OF WALNUT GENERAL PLAN

The City adopted noise guidelines and standards within the Noise Element of the City of Walnut General Plan. The City of Walnut General Plan Noise Element (Noise Element) sets forth maximum noise level standards by land use; refer to Table 3, Noise Levels by Land Use. The ambient noise level standards quantify the goals and objectives of the City with respect to acceptable noise levels.

Table 3 Noise Levels by Land Use

	Maximum Noise Level dB(A)					
Land Use Zone	Day (7:00 a.m. to 10:00 p.m.)	Night (10:00 p.m. to 7:00 a.m.)				
Single-Family Residential	60	45				
Multi-Family Residential	60	50				
Commercial	65	55				
Industrial	70	65				
Source: Urban Engineering, City of Walnut General Plan Noise Element, July 1978.						

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The Noise Element provides criteria for compatible noise levels for local fixed point noise sources such as construction sites. Qualitative criteria have been developed by various associations such as the League of California Cities and the American Speech and Hearing Association. These criteria state that noise "shall not cause annoyance or discomfort to a reasonable person of normal sensitiveness residing in the general area". The Noise Element acknowledges that construction site noise level varies, but is only temporary in nature.

In addition, the Noise Element contains the following objectives related to noise that are pertinent to the proposed project:

Objective 1. Single Family Residential Land Use.

- a) Single family residential districts should be generally quiet.
- b) Single family residential districts should be quieter at night than during the day.
- c) Single family residential districts should be quieter than multi-family residential, commercial and industrial districts.
- d) The interiors of all residential dwellings shall be free from excessive sound transmission.

Objective 5. Special Land Uses.

- a) Noise levels for the following land uses should not exceed single family residential levels:
 - 1. Hospitals, rest homes, long term medical care, libraries, churches, schools, and outdoor recreational areas.

CITY OF WALNUT MUNICIPAL CODE

The City of Walnut Municipal Code (Municipal Code) Chapter 16B Noise regulates noise from construction, emergency work and signals, and the use of leaf blowers. Section 16B-3(a), Certain Noise Prohibited – Construction indicates that construction operation or causing the operation of any tools, equipment, impact devices, derricks or hoists used in construction, drilling, repair, alteration, demolition or earthwork are prohibited between the weekday hours of 8:00 p.m. and 7:00 a.m. the following day, or at any time on Saturdays, Sundays or holidays; except for construction by City Manager approval, emergency work, testing of emergency signal devices, an alarm signal activated by violent nature conditions or other extraordinary circumstances, and public telephone utility audible alarms whose only duty is to furnish telephone service pursuant to tariffs on file with the California Public Utilities Commission.

Section 16B-4, *Exceptions* states the following activities shall be exempt from Section 16B-3, *Certain Noise Prohibited* including: (b) Emergency work. Work performed for the purpose of preventing or alleviating the physical trauma or property damage threatened or caused by an emergency or work by private or public utilities when restoring utility service shall be permitted, provided the person performing such work notifies the city manager within one day after the office of said manager is first opened subsequent to performing such activity; (c) Testing of emergency

signaling devices. Testing on emergency signaling devices may be performed between the hours of 8:00 a.m. and 10:00 p.m.; and (d) An alarm signal activated by violent conditions of nature or other extraordinary circumstances which are not subject to the control of the alarm owner shall not constitute a false alarm.

Additionally, leaf blowers have limited hours of operation per Section 16B-3(h), *Certain Noise Prohibited – Leaf Blowers*. The use of or operation of any mechanized machine or equipment used to clean, cut, blow, vacuum, or sweep grass, leaves, dirt and other debris off sidewalks, driveways, lawns and other surfaces shall not be allowed between the hours of 8:00 p.m. and 7:00 a.m. daily.

The Municipal Code also provides exterior noise levels for all receptor properties by time interval. <u>Table 4</u>, <u>City of Walnut Exterior Noise Standards</u>, presents exterior noise standards in Section 16B-5 of the City's Municipal Code. It should be noted that exterior noise standards in <u>Table 4</u> are for stationary source noise, not for traffic noise.

Table 4
City of Walnut Exterior Noise Standards

	Level dB				
Receptor Land Use	Day (7:00 a.m. to 10:00 p.m.)	Night (10:00 p.m. to 7:00 a.m.)			
Residential Properties	50	45			
Commercial Properties	60	55			
Industrial Properties	70	70			

Note: If the measurement location is on a boundary property between two different zones, exterior noise level utilized in Section 16B-5a to determine the exterior standard shall be the daytime exterior noise level of the subject receptor property.

Source: City of Walnut, City of Walnut Municipal Code Section 16B-5a Exterior Noise Standards, October 2015.

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4.0 EXISTING CONDITIONS

4.1 NOISE MEASUREMENTS

In order to quantify existing ambient noise levels in the project area, noise measurements were conducted on July 7, 2015; refer to <u>Table 5</u>, <u>Noise Measurements</u>. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site. Ten-minute measurements were taken, between 11:00 a.m. and 1:00 p.m., at each site during the day. Short-term (L_{eq}) measurements are considered representative of the noise levels in the project vicinity.

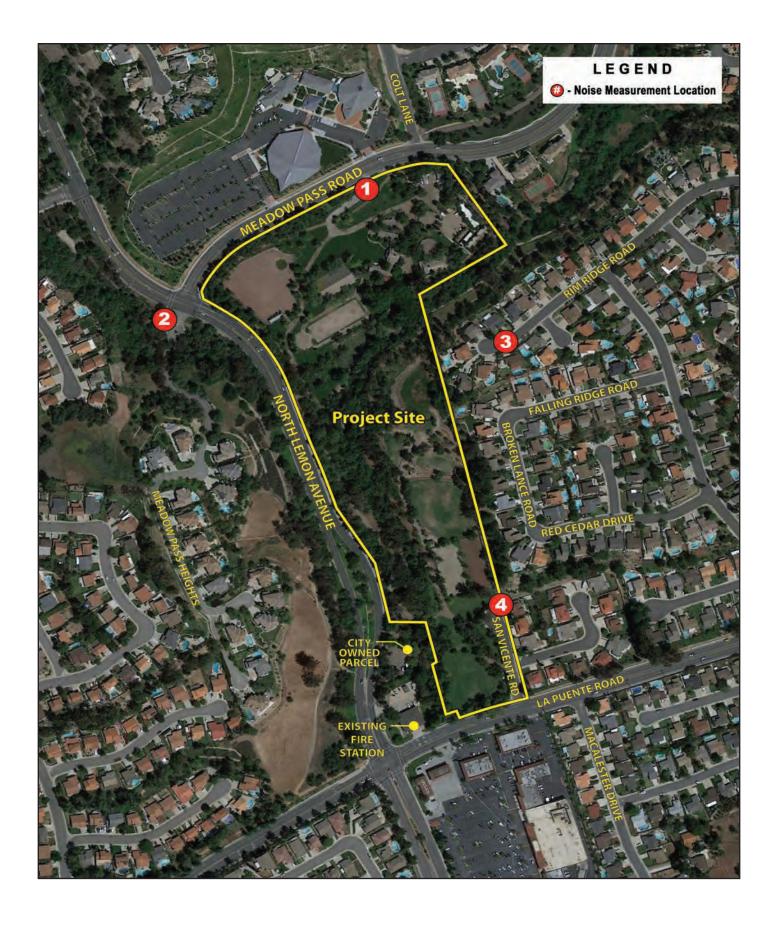
Table 5
Noise Measurements

Site No.	Location	L _{eq} (dBA)	L _{min} (dBA)	L _{max} (dBA)	Peak (dBA)	Time
1	Along Meadow Pass Road, within the northern portion of the project site.	56.7	37.9	85.8	83.3	10:59 a.m.
2	Southwest corner of the intersection of Meadows Pass Road and Lemon Avenue.	60.1	38.7	78.2	96.4	11:14 a.m.
3	Along Rim Ridge Road, approximately 265 feet east of the project site.	49.6	33.4	70.5	95.8	11:30 a.m.
4	Along San Vicente Road within the southwest portion of the project site.	50.1	39.6	70.9	93.9	12:36 p.m.
Source:	Michael Baker International, Inc., July 7, 2015.					

Meteorological conditions were clear skies, cool temperatures, with light wind speeds (0 to 5 miles per hour), and low humidity. Measured noise levels during the daytime measurements ranged from 49.6 to 60.1 dBA Leq. Noise monitoring equipment used for the ambient noise survey consisted of a Brüel & Kjær Hand-held Analyzer Type 2250 equipped with a Type 4189 prepolarized microphone. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. The results of the field measurements are included in <u>Appendix A</u>, <u>Noise Measurement and Modeling Data</u>. Refer to <u>Exhibit 5</u>, <u>Noise Measurement Locations</u>, for the noise measurement sites.

4.2 SENSITIVE RECEPTORS

Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. Existing sensitive receptors located in the project vicinity include residential uses, schools, places of worship, parks, and recreational areas. Sensitive receptors are listed in <u>Table 6</u>, <u>Sensitive Receptors</u>.



NOT TO SCALE



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Table 6 Sensitive Receptors

Туре	Name	Distance from Project Site (feet) ¹	Direction from Project Site	Location
		Adjacent	East	East of San Vicente Road
		105 feet	Southeast	South of La Puente Road
Residential	Residential Uses	170 feet	North	North of Meadow Pass Road.
Residential	Nesiderillar Oses	258 feet	West	West of Lemon Avenue
		385 feet	Southwest	Southwest of La Puente Road and Lemon Avenue intersection
	Vejar Elementary School	1,655 feet	South	20222 East Vejar Road
	Cyrus J Morris Elementary School	2,628 feet	Southwest	19875 Calle Baja
	Walnut United Methodist Pre-School	3,088 feet	East	20601 La Puente Road
	Stanley G. Oswalt Academy	3,200 feet	Northwest	19501 Shadow Oak Drive
Schools	Montessori of Walnut	3,234 feet	South	20121 Alisu Court
	Cross Schools	3,470 feet	East	20675 La Puente Road
	Suzanne Middle School	3,850 feet	East	525 Suzanne Road
	Walnut High School	3,900 feet	East	400 Pierre Road
	Westhoff Elementary	4,550 feet	Northeast	20151 Amar Road
	St. Lorenzo Ruiz Catholic Parish Community Church	170 feet	North	747 Meadow Pass Road
	Walnut Valley First Baptist Church	2,290 feet	East	20425 La Puente Road
Places of Worship	Evangelical Formosan Church of East Valley	3,260 feet	East	20625 La Puente Road
•	Walnut Blessing Church-Nazarene	4,650 feet	East	20801 La Puente Road
Parks/Recreational	The Church of Jesus Christ of Latter- day Saints	4,682 feet	East	20801 Marcon Drive
	Christ the King Lutheran Church	5,350 feet	East	555 Gartel Drive
	Arroyo Park	1,625 feet	West	19891 Camino Arroyo
	Lemon Creek Park	2,115 feet	South	130 Avenida Alipaz
	Butterfield Park	2,555 feet	West	19730 Camino Arroyo
	Creekside Park	2,940 feet	West	780 Creekside Drive
AICOS	Suzanne Park	3,660 feet	East	625 Suzanne Road
	Walnut Hills Park	4,355 feet	West	19475 Avenida Del Sol
	Walnut Ranch Park	4,366 feet	Northeast	20101 Amar Road

Note:

^{1.} Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.

Source: Google Earth, 2016.

4.3 EXISTING NOISE LEVELS

MOBILE SOURCES

The majority of the existing noise in the project area is generated from vehicles traveling along Lemon Avenue, Amar Road, La Puente Road, and Valley Boulevard. Noise models were run using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108) together with several roadway and site parameters. These parameters determine the projected impact of vehicular traffic noise and include the roadway cross-section (such as the number of lanes), roadway width, average daily traffic (ADT), vehicle travel speed, percentages of auto and truck traffic, roadway grade, angle-of-view, and site conditions ("hard" or "soft"). The model does not account for ambient noise levels (i.e., noise from adjacent land uses) or topographical differences between the roadway and adjacent land uses. Noise projections are based on modeled vehicular ADT estimates derived from the Brookside Project Traffic Impact Analysis (Traffic Impact Analysis), prepared by Michael Baker International, dated November 20, 2015. Table 7, Existing Traffic Noise Levels, depict the existing traffic noise levels in the vicinity of the project site. A 25- to 50-mile per hour (mph) average vehicle speed was assumed for existing conditions based on empirical observations and posted maximum speeds along the adjacent roadways. The ADT estimates were obtained from the project's Traffic Impact Analysis; refer to Appendix A. As shown in Table 7, noise within the area from mobile noise ranges from 39.1 dBA to 70.2 dBA.

Table 7
Existing Traffic Noise Levels

	Existing Conditions							
Roadway Segment	ADT	dBA @ 100 Feet from Roadway Segment	60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			
Lemon Avenue								
North of Amar Road	1,600	50.7	14	4	1			
Amar Road to Meadow Pass Road	15,000	64.3	352	111	35			
Meadow Pass Road to La Puente Road	17,900	65.5	420	133	42			
La Puente Road to Valley Boulevard	21,100	66.2	495	157	50			
South of Valley Road	24,900	67.0	584	185	58			
Amar Road								
West of Lemon Avenue	24,900	68.3	775	245	77			
East of Lemon Avenue	23,100	68.0	718	227	72			
Meadow Pass Road								
West of Lemon Avenue	100	39.1	1	0	0			
Lemon Avenue to Colt Lane	4,400	56.9	54	17	5			
East of Colt Lane	4,100	56.6	51	16	5			
La Puente Road								
West of Lemon Avenue	15,100	66.1	470	148	47			
East of Lemon Avenue	13,800	64.5	323	102	32			
Valley Boulevard								
West of Lemon Avenue	30,200	70.0	1220	386	122			
East of Lemon Avenue	31,400	70.2	1268	401	127			
Notes: ADT = average daily traffic; dBA = A-weighted deci								
Source: Noise modeling is based on traffic data within the E	Brookside Project	Traffic Impact Analysis, pre	pared by Michael Bak	er International. (No	vember 20, 2015).			

STATIONARY SOURCES

The primary sources of stationary noise in the project vicinity are those associated with the operations of residential uses on all sides, commercial uses to the south, the Los Angeles County Fire Department station to the west, and institutional uses to the north. The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

5.0 POTENTIAL ACOUSTICAL IMPACTS

CEQA THRESHOLDS

Appendix G of the *CEQA Guidelines* contains analysis guidelines related to the assessment of noise impacts. These guidelines have been utilized as thresholds of significance for this analysis. As stated in Appendix G, a project would create a significant environmental impact if it would:

- Expose persons to, or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (refer to Impact Statement NOI-1);
- Expose persons to or generate excessive ground borne vibration or ground borne noise levels (refer to Impact Statement NOI-2);
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement NOI-1);
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement NOI-1);
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3); and
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3).

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are provided for all potentially significant impacts.

SIGNIFICANCE OF CHANGES IN TRAFFIC NOISE LEVELS

An off-site traffic noise impact typically occurs when there is a discernable increase in traffic and the resulting noise level exceeds an established noise standard. In community noise considerations, changes in noise levels greater than 3 dB are often identified as substantial, while changes less than 1 dB will not be discernible to local residents. In the range of 1 to 3 dB, residents who are very sensitive to noise may perceive a slight change. In laboratory testing situations, humans are able to detect noise level changes of slightly less than 1 dB. However, this is based on a direct, immediate comparison of two sound levels. Community noise exposures occur over a long period of time and changes in noise levels occur over years (rather than the immediate comparison made in a laboratory situation). Therefore, the level at which changes in community

noise levels become discernible is likely to be some value greater than 1 dB, and 3 dB is the most commonly accepted discernable difference. A 5 dB change is generally recognized as a clearly discernable difference.

As traffic noise levels at sensitive uses likely approach or exceed the applicable land use compatibility standard, a 3 dB increase as a result of the project is used as the increase threshold for the project. Thus, a project would result in a significant noise impact when a permanent increase in ambient noise levels of 3 dB occur upon project implementation and the resulting noise level exceeds the applicable exterior standard at a noise sensitive use.

NOI-1

- EXPOSE PERSONS TO, OR GENERATE NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES?
- A SUBSTANTIAL PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT?
- A SUBSTANTIAL TEMPORARY OR PERIODIC INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT?

Level of Significance Before Mitigation: Potentially Significant Impact.

SHORT-TERM CONSTRUCTION

Construction activities would occur in a single phase and would include demolition, site preparation, grading, paving, building construction, and the application of architectural coatings. Ground-borne noise and other types of construction-related noise impacts would typically occur during excavation activities of the grading phase. This phase of construction has the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in <u>Table 8</u>, <u>Maximum Noise Levels Generated by Construction Equipment</u>. It should be noted that the noise levels identified in <u>Table 8</u> are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Table 8
Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	Acoustical Use Factor ¹	L _{max} at 50 Feet (dBA)
Concrete Saw	20	90
Crane	16	81
Concrete Mixer Truck	40	79
Backhoe	40	78
Dozer	40	82
Excavator	40	81
Forklift	40	78
Paver	50	77
Roller	20	80
Tractor	40	84
Water Truck	40	80
Grader	40	85
General Industrial Equipment	50	85

Note:

Source: Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006.

Pursuant to *Municipal Code* Section 16B-3(a), construction activities may occur between the hours of 7:00 a.m. and 8:00 p.m. on weekdays. No construction activities are permitted outside of these hours or on Saturdays, Sundays and holidays. These permitted hours of construction are included in the code in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption.

The potential for construction-related noise to affect nearby residential receptors would depend on the location and proximity of construction activities to these receptors. Construction would occur throughout the project site and would not be concentrated or confined in the area directly adjacent to sensitive receptors. It should be noted that the noise levels depicted in Table 8 are maximum noise levels, which would occur sporadically when construction equipment is operated in proximity to sensitive receptors. With implementation of time limits specified in the Municipal Code, noise impacts would be reduced to a less than significant level. Additionally, to further reduce the potential for noise impacts, Mitigation Measure NOI-1 would be implemented to incorporate best management practices during construction and to ensure nuisances do not occur. Implementation of Mitigation Measure NOI-1 would further minimize impacts from construction noise as it requires construction equipment to be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. Thus, a less than significant noise impact would result from construction activities.

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^{1.} Acoustical Use Factor (percent): Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

LONG-TERM OPERATIONAL IMPACTS

Off-Site Mobile Noise

Future development generated by the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the vicinity of existing and proposed land uses. Based on the Traffic Impact Analysis, the proposed project would result in approximately 267 daily trips. The "Future Without Project" and "Future With Project" scenarios are compared in <u>Table 9</u>, <u>Future Project Traffic Noise Levels</u>. As depicted in <u>Table 9</u>, under the "Future Without Project" scenario, noise levels would range from approximately 39.1 dBA to 70.3 dBA, with the highest noise levels occurring along Valley Boulevard (east of Lemon Avenue). The "Future With Project" scenario noise levels would range from approximately 39.1 dBA to 70.3 dBA with the highest noise levels also occurring along the same roadway segment. The noise levels would result in a maximum increase of 0.2 dBA. This increase in noise would occur along Meadow Pass Road (between Lemon Avenue and Colt Lane). Since the proposed project would not significantly increase noise levels along the roadway segments analyzed, a less than significant impact would occur.

Table 9
Future Project Traffic Noise Levels

Roadway Segment ADT		Future Without Project					Future With Project					
April From Roadway Roadway Centerline Noise Contour Noise Contour	Poadway Segment	100 Feet Centerline to: (Feet) dBA @					Difference In dBA @ 100 Feet					
North of Amar Road	Noauway Deginent	ADT	Roadway	Noise	Noise	Noise	ADT	Roadway	Noise	Noise	Noise	from Roadway
Amar Road to Meadow Pass Road 15,200 64.3 356 113 36 15,300 64.4 359 114 36 Meadow Pass Road to La Puente Road 18,300 65.6 428 136 43 18,400 65.7 431 136 43 La Puente Road to Valley Boulevard 21,500 66.3 504 159 50 21,600 66.3 507 160 51 South of Valley Boulevard 25,300 67.0 592 187 59 25,300 67.0 592 187 59 Amar Road West of Lemon Avenue 25,300 68.4 786 249 79 25,400 68.4 789 250 79 East of Lemon Avenue 25,300 68.0 730 231 73 23,500 68.0 730 231 73 23,500 68.0 730 231 73 28 79 25,400 68.4 789 250 79 25,400 68.0 730 231	mon Avenue											
Pass Road 15,200 64.3 356 113 36 15,300 64.4 359 114 36 Meadow Pass Road to La Puente Road 18,300 65.6 428 136 43 18,400 65.7 431 136 43 La Puente Road to Valley Boulevard 21,500 66.3 504 159 50 21,600 66.3 507 160 51 South of Valley Boulevard 25,300 67.0 592 187 59 25,300 67.0 592 187 59 Amar Road West of Lemon Avenue 25,300 68.4 786 249 79 25,400 68.4 789 250 79 East of Lemon Avenue 23,500 68.0 730 231 73 23,500 68.0 730 231 73 Mest of Lemon Avenue 100 39.1 1 0 0 100 39.1 1 0 0 100 100 100 100 10	orth of Amar Road	1,600	50.7	14	4	1	1,600	50.7	14	4	1	0.0
Puente Road 18,300 65.6 428 136 43 18,400 65.7 431 136 43 La Puente Road to Valley Boulevard 21,500 66.3 504 159 50 21,600 66.3 507 160 51 South of Valley Boulevard 25,300 67.0 592 187 59 25,300 67.0 592 187 59 Amar Road West of Lemon Avenue 25,300 68.4 786 249 79 25,400 68.4 789 250 79 East of Lemon Avenue 23,500 68.0 730 231 73 23,500 68.0 730 231 73 Meadow Pass Road West of Lemon Avenue 100 39.1 1 0 0 100 39.1 1 0 0 Lemon Avenue to Colt Lane 4,600 57.1 57 18 6 4,800 57.3 59 19 6 East of Colt Lane		15,200	64.3	356	113	36	15,300	64.4	359	114	36	0.1
Boulevard 21,500 66.3 504 159 50 21,600 66.3 507 160 51		18,300	65.6	428	136	43	18,400	65.7	431	136	43	0.1
Amar Road West of Lemon Avenue 25,300 68.4 786 249 79 25,400 68.4 789 250 79 East of Lemon Avenue 23,500 68.0 730 231 73 23,500 68.0 730 231 73 Meadow Pass Road West of Lemon Avenue 100 39.1 1 0 0 100 39.1 1 0 0 Lemon Avenue to Colt Lane 4,600 57.1 57 18 6 4,800 57.3 59 19 6 East of Colt Lane 4,300 56.8 53 17 5 4,300 56.8 53 17 5 La Puente Road West of Lemon Avenue 15,300 66.2 476 151 48 15,300 66.2 476 151 48 East of Lemon Avenue 14,000 64.6 328 104 33 14,000 64.6 328 104 33 Valley	,	21,500	66.3	504	159	50	21,600	66.3	507	160	51	0.1
West of Lemon Avenue 25,300 68.4 786 249 79 25,400 68.4 789 250 79 East of Lemon Avenue 23,500 68.0 730 231 73 23,500 68.0 730 231 73 Meadow Pass Road West of Lemon Avenue 100 39.1 1 0 0 100 39.1 1 0 0 Lemon Avenue to Colt Lane 4,600 57.1 57 18 6 4,800 57.3 59 19 6 East of Colt Lane 4,300 56.8 53 17 5 4,300 56.8 53 17 5 La Puente Road West of Lemon Avenue 15,300 66.2 476 151 48 15,300 66.2 476 151 48 15,300 66.2 476 151 48 15,300 64.6 328 104 33 14,000 64.6 328 104 33 1	outh of Valley Boulevard	25,300	67.0	592	187	59	25,300	67.0	592	187	59	0.0
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Meadow Pass Road West of Lemon Avenue 100 39.1 1 0 0 100 39.1 1 0 0 Lemon Avenue to Colt Lane 4,600 57.1 57 18 6 4,800 57.3 59 19 6 East of Colt Lane 4,300 56.8 53 17 5 4,300 56.8 53 17 5 La Puente Road West of Lemon Avenue 15,300 66.2 476 151 48 15,300 66.2 476 151 48 15,300 66.2 476 151 48 15,300 66.2 476 151 48 14,000 64.6 328 104 33 14,000 64.6 328 104 33 14,000 64.6 328 104 33 14,000 64.6 328 104 33 14,000 64.6 328 104 33 125 31,000 70.2 1251 396 125<	est of Lemon Avenue	25,300	68.4	786	249	79	25,400	68.4	789	250	79	0.0
West of Lemon Avenue 100 39.1 1 0 0 100 39.1 1 0 0 Lemon Avenue to Colt Lane 4,600 57.1 57 18 6 4,800 57.3 59 19 6 East of Colt Lane 4,300 56.8 53 17 5 4,300 56.8 53 17 5 La Puente Road West of Lemon Avenue 15,300 66.2 476 151 48 15,300 66.2 476 151 48 15,300 66.2 476 151 48 15,300 64.6 328 104 33 14,000 64.6 328 104 33 14,000 64.6 328 104 33 14,000 64.6 328 104 33 14,000 64.6 328 104 33 125 31,000 70.2 1251 396 125 31,000 70.2 1251 396 125 32,100 70.3 1	ast of Lemon Avenue	23,500	68.0	730	231	73	23,500	68.0	730	231	73	0.0
Lemon Avenue to Colt Lane	adow Pass Road											
Lane 4,600 57.1 57 18 6 4,800 57.3 59 19 6 East of Colt Lane 4,300 56.8 53 17 5 4,300 56.8 53 17 5 La Puente Road West of Lemon Avenue 15,300 66.2 476 151 48 15,300 66.2 476 151 48 East of Lemon Avenue 14,000 64.6 328 104 33 14,000 64.6 328 104 33 /alley Boulevard 409 125 31,000 70.2 1251 396 125 31,000 70.2 1251 396 125 East of Lemon Avenue 32,100 70.3 1295 409 129 32,100 70.3 1295 409 129	est of Lemon Avenue	100	39.1	1	0	0	100	39.1	1	0	0	0.0
La Puente Road West of Lemon Avenue 15,300 66.2 476 151 48 15,300 66.2 476 151 48 East of Lemon Avenue 14,000 64.6 328 104 33 14,000 64.6 328 104 33 Valley Boulevard Vest of Lemon Avenue 31,000 70.2 1251 396 125 31,000 70.2 1251 396 125 East of Lemon Avenue 32,100 70.3 1295 409 129 32,100 70.3 1295 409 129		4,600	57.1	57	18	6	4,800	57.3	59	19	6	0.2
West of Lemon Avenue 15,300 66.2 476 151 48 15,300 66.2 476 151 48 East of Lemon Avenue 14,000 64.6 328 104 33 14,000 64.6 328 104 33 /alley Boulevard	ast of Colt Lane	4,300	56.8	53	17	5	4,300	56.8	53	17	5	0.0
East of Lemon Avenue 14,000 64.6 328 104 33 14,000 64.6 328 104 33 /alley Boulevard	Puente Road											
Valley Boulevard 31,000 70.2 1251 396 125 31,000 70.2 1251 396 125 East of Lemon Avenue 32,100 70.3 1295 409 129 32,100 70.3 1295 409 129	est of Lemon Avenue	15,300	66.2	476	151		15,300	66.2	476	151		0.0
West of Lemon Avenue 31,000 70.2 1251 396 125 31,000 70.2 1251 396 125 East of Lemon Avenue 32,100 70.3 1295 409 129 32,100 70.3 1295 409 129	ast of Lemon Avenue	14,000	64.6	328	104	33	14,000	64.6	328	104	33	0.0
East of Lemon Avenue 32,100 70.3 1295 409 129 32,100 70.3 1295 409 129	,											
	******			_							_	0.0
		32,100	70.3	1295	409	129	,					0.0
Project Driveway - - - - - 300 43.4 3 1 0 Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level		-	-	-	-	-		43.4	3	1	0	-

Cumulative Mobile Source Impacts

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The combined effect compares the "cumulative with project" condition to "existing" conditions. This comparison accounts for the traffic noise increase generated by a project combined with the traffic noise increase generated by projects in the cumulative project list. The following criteria have been utilized to evaluate the combined effect of the cumulative noise increase.

- <u>Combined Effect</u>. The cumulative with project noise level ("Future With Project") would cause a significant cumulative impact if a 3.0 dB increase over existing conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use. Although there may be a significant noise increase due to the proposed project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed project. The following criteria have been utilized to evaluate the incremental effect of the cumulative noise increase.
- *Incremental Effects*. The "Future With Project" causes a 1.0 dBA increase in noise over the "Future Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon, and reduces as distance from the source increases. Consequently, only the proposed project and growth due to occur in the project site's general vicinity would contribute to cumulative noise impacts. <u>Table 10</u>, <u>Cumulative Noise Scenario</u>, lists the traffic noise effects along roadway segments in the project vicinity for "Existing," "Future Without Project," and "Future With Project," conditions, including incremental and net cumulative impacts.

Table 10 Cumulative Noise Scenario

	Existing	Future Without Project	Future With Project	Combined Effects	Incremental Effects	0			
Roadway Segment	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference In dBA Between Existing and Future With Project	Difference In dBA Between Future Without Project and Future With Project	Cumulatively Significant Impact?			
Lemon Avenue									
North of Amar Road	50.7	50.7	50.7	0.0	0.0	No			
Amar Road to Meadow Pass Road	64.3	64.3	64.4	0.1	0.1	No			
Meadow Pass Road to La Puente Road	65.5	65.6	65.7	0.2	0.1	No			
La Puente Road to Valley Boulevard	66.2	66.3	66.3	0.1	0.0	No			
South of Valley Boulevard	67.0	67.0	67.0	0.0	0.0	No			
Amar Road									
West of Lemon Avenue	68.3	68.4	68.4	0.1	0.0	No			
East of Lemon Avenue	68.0	68.0	68.0	0.0	0.0	No			
Meadow Pass Road									
West of Lemon Avenue	39.1	39.1	39.1	0.0	0.0	No			
Lemon Avenue to Colt Lane	56.9	57.1	57.3	0.4	0.2	No			
East of Colt Lane	56.6	56.8	56.8	0.2	0.0	No			
La Puente Road									
West of Lemon Avenue	66.1	66.2	66.2	0.1	0.0	No			
East of Lemon Avenue	64.5	64.6	64.6	0.1	0.0	No			
Valley Boulevard									
West of Lemon Avenue	70.0	70.2	70.2	0.2	0.0	No			
East of Lemon Avenue	70.2	70.3	70.3	0.1	0.0	No			
Project Driveway	-	-	43.4	-	-	-			
Notes: ADT = average daily traffic; d	Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level								

Source: Noise modeling is based on traffic data within the *Brookside Project Traffic Impact Analysis*, prepared by Michael Baker International (November 20, 2015).

As indicated in <u>Table 10</u>, the proposed project would not result in long-term mobile noise impacts based on project generated traffic as well as cumulative and incremental noise levels. None of the roadway segments would exceed both the *Incremental Effects* and *Combined Effects* criteria; thus, none of the roadway segments would be significantly impacted. Therefore, the proposed project in combination with cumulative background traffic noise levels would result in a less than significant cumulative impact in this regard.

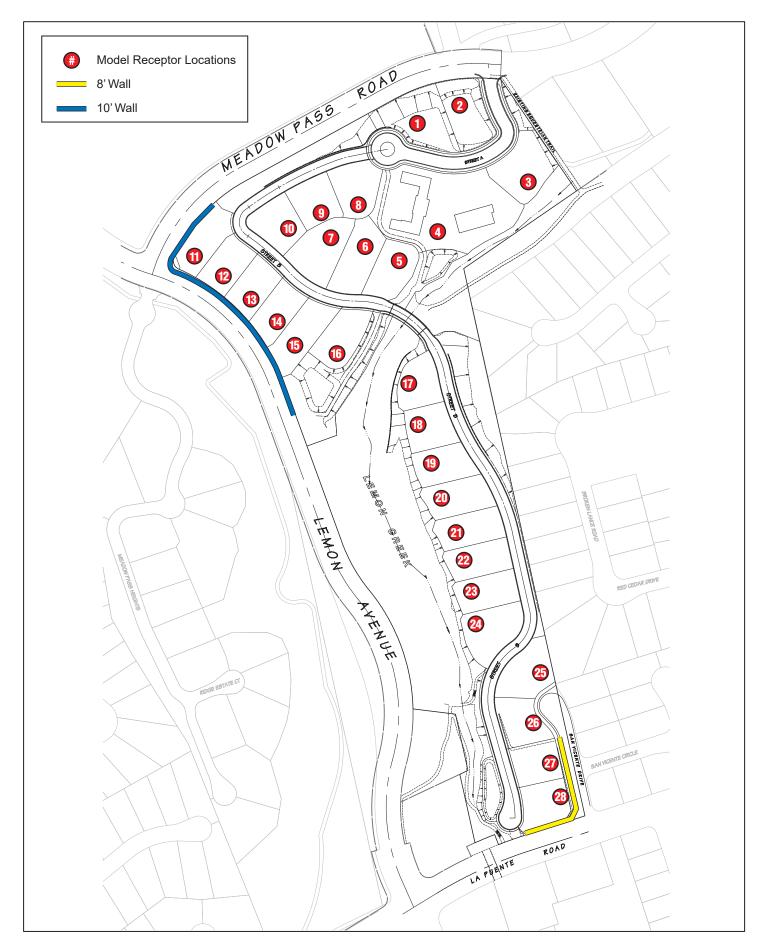
On-Site Mobile Noise

The proposed project includes the construction of 28 detached single-family homes and 10 open space lots. The future residents of the proposed project could be exposed to elevated noise levels from traffic noise along La Puente Road, Lemon Avenue, and Meadow Pass Road. The Federal Highway Administration (FHWA) Traffic Noise Model version 2.5 (TNM 2.5) was used to evaluate the noise impacts from traffic along these roadways to the proposed on-site uses; refer

to the TNM 2.5 outputs provided as part of <u>Appendix A</u>. Noise levels from typical daily traffic along La Puente Road, Lemon Avenue, and Meadow Pass Road were modeled at a total of 28 receptor locations on the project site. The TNM 2.5 noise modeling is based on the details and specifications as part of the proposed project (e.g., site plan, tentative tract map, etc.), and the existing acoustical conditions in the surrounding area (e.g., existing berms, buildings, topography, etc.).

The "Exterior" dBA CNEL/L_{dn} noise standards for Single Family Residential is 60 dBA; refer to <u>Table 3</u>. The exterior noise levels were modeled using TNM 2.5. <u>Table 11</u>, <u>Traffic Noise Modeling Results</u>, depicts the results of the modeling, and <u>Exhibit 6</u>, <u>Noise Modeling Locations</u>, indicates the location of the modeled noise receptors. Based on the modeling results, a combination of 8-foot and 10-foot perimeter walls on the project site would attenuate the modeled receptors (Receptors 11 through 16, and 28) to below 60 dBA and the anticipated exterior noise levels at the receptor locations would range from 49.3 to 59.7 dBA; refer to <u>Table 11</u> and <u>Exhibit 6</u>. It should be noted that the traffic noise levels depicted in <u>Table 11</u> differ from the measured levels depicted in <u>Table 5</u> because they represent noise levels at different locations on the project site and are also reported in different noise metrics (e.g., noise measurements are the L_{eq} values and traffic noise are reported in CNEL).

Therefore, Mitigation Measure NOI-2 would require that the proposed perimeter walls on the project site adhere to the locations and heights in <u>Exhibit 6</u> to ensure that exterior noise levels remain within the City's 60 dBA CNEL noise standard for Single Family Residential. With implementation of the recommended mitigation, the project would result in a less than significant impact to the proposed on-site residences from traffic noise levels.







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Table 11 **Traffic Noise Modeling Results**

	Exterior Noise Level (dBA CNEL/L _{dn}) 1, 2						
Receptor #	No Barrier	With 8-foot and 10-foot Barriers					
1	53.5	53.4					
2	54.9	54.9					
3	49.4	49.3					
4	50.4	50.1					
5	51.9	50.7					
6	53.4	52.0					
7	55.0	53.2					
8	53.4	52.3					
9	55.6	53.9					
10	58.9	55.3					
11	67.8	58.1					
12	68.3	57.9					
13	68.1	58.4					
14	67.5	59.0					
15	65.6	59.4					
16	61.1	57.8					
17	56.2	54.8					
18	57.1	56.3					
19	57.6	57.0					
20	57.6	57.1					
21	57.4	57.3					
22	57.9	57.9					
23	57.7	57.7					
24	58.1	58.0					
25	55.0	54.8					
26	56.4	55.8					
27	59.1	56.8					
28	65.9	59.7					

Notes:

Noise levels were modeled using FHWA TNM 2.5.
 Refer to Exhibit 6, Noise Modeling Locations, for receptor and barrier locations. Refer to Appendix A, Noise Measurement and Modeling Data, for detailed modeling outputs.
 Bold text indicates noise levels exceeding the City's noise limits.

STATIONARY NOISE IMPACTS

Residential Uses

The proposed project would include the development of 28 single-family residential units on the project site. Stationary noise that is typical of residential uses include children playing, pets, amplified music, car repair, and home repair. Noise from residential stationary sources would be typical of surrounding residential uses in the project area and would primarily occur during the "daytime" activity hours. Noise impacts to surrounding uses from residential uses associated with future development that would occur under the proposed project are anticipated to be less than significant.

Mechanical Equipment

Another stationary noise source associated with the proposed residential development would be heating, ventilation, and air conditioning (HVAC) units. HVAC units would be positioned on the property of each single-family residence. HVAC systems typically result in noise levels that average between 40 and 50 dBA Leq at 50 feet from the equipment. The closest the HVAC units would be positioned to an adjoining residential structure would be approximately 100 feet from the nearest proposed building footprint.¹ As the project would not place mechanical equipment associated with the project near adjacent residential uses, noise from the HVAC units would not be perceptible at the nearest residents (adjacent to the eastern property line). Impacts from mechanical equipment would be less than significant.

Recreational Uses

The project proposes the development of 10 open space lots, the retention of two former equestrian center's barn structures in the northeastern portion of the project site as well as the existing equestrian trail that traverses the site. Stationary noise associated with operational activities of these uses include horses trotting, hiking, children playing, and pets. It is anticipated that noise from the recreational open space facilities or areas would not disturb surrounding uses due to the quiet nature of these activities. In addition, the use of leaf blowers could be used to clean, cut, and maintain the open space areas. With implementation of time limits specified in the *Municipal Code*, noise impacts from leaf blower operations would be reduced to a less than significant level. Therefore, noise impacts associated with recreational uses are considered less than significant.

Fire Department Station Activity

The project site is adjacent to the Los Angeles County Fire Department Station No. 61 to the west. Fire Station No. 61 has a paramedics unit and a fire engine.² Fire siren and vehicle noise is audible

¹ Michael Baker International, The Brookside Concept Site Plan Tentative Tract No. 72798, May 20, 2015.

² City of Walnut, Fire Department, http://ci.walnut.ca.us/general.asp?id=154, accessed March 23, 2016.

at the project site when emergency vehicles depart and return to the station and when fire engines idle in front of the station. However, fire siren activities are occasional, intermittent, and short-term in nature. As fire department sirens would occur as vehicles depart the site, the noise would only be audible for a few seconds and would not occur over a long enough duration to exceed the City's noise standards, which apply to average noise levels from longer term exposure. Per Section 16B-4 of the *Municipal Code*, emergency work, testing of emergency signaling devices, and alarm signals activated by extraordinary circumstances are exempt from the City prohibiting certain noises (Section 16B-3). Further, testing on emergency signaling devices would be performed between the hours of 8:00 a.m. and 10:00 p.m. Due to the noise exemptions and testing time limits set in the *Municipal Code* as well as the temporary and necessary nature of fire engine sirens, noise generated by the fire station is considered a less than significant impact.

Mitigation Measures:

- NOI-1 Prior to Grading Permit issuance, the Project Applicant/Contractor shall demonstrate, to the satisfaction of the City of Walnut Planning Division that the project complies with the following:
 - Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices.
 - The Project Applicant/Contractor shall utilize construction noise reduction methods to minimize construction noise at sensitive receptors in the project area. These reduction methods include shutting off idling equipment, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.
 - During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.
 - Construction activities shall not take place outside of the allowable hours specified by the City of Walnut's Municipal Code Section 16B-3(a) (7:00 a.m. and 8:00 p.m. on weekdays; construction activities are not permitted on Saturdays, Sundays or holidays).
- NOI-2 Prior to the issuance of building permits, the project applicant shall demonstrate, to the satisfaction of the City of Walnut Building Official that proposed perimeter walls of 8-feet and 10-feet in height are located along the identified locations of the project site. The perimeter walls should be located as shown on Exhibit 6, Noise Modeling Locations. Acceptable materials for the construction of the barrier shall have a density of 3.5 pounds per square foot of surface area and maybe composed of the following: masonry block, stucco veneer over wood framing (or foam core), glass, Plexiglass, or

Lexan 9 ¼ inch thick). The barrier may also be constructed out of a combination of the above listed materials.

Level of Significance After Mitigation: Less Than Significant Impact.

NOI-2 EXPOSURE OF PERSONS TO OR GENERATION OF EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

Level of Significance Before Mitigation: Potentially Significant Impact.

SHORT-TERM CONSTRUCTION

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 inch/second) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 inch per second (in/sec) is considered safe and would not result in any construction vibration damage. The vibration produced by construction equipment, is illustrated in Table 12, Typical Vibration Levels for Construction Equipment.

Groundborne vibration decreases rapidly with distance. As indicated in <u>Table 12</u>, based on the FTA data, vibration velocities from typical heavy construction equipment operation that would be used during project construction range from 0.003 to 0.089 in/sec peak particle velocity (PPV) at 25 feet from the source of activity. The majority of adjacent structures are at least 25 to 50 feet from the project site boundaries and would not be exposed to significant vibration from construction activities. As such, vibration at the nearest sensitive receptor (approximately 25 feet)

during construction activities would be a maximum of approximately 0.089 PPV, which would be below the FTA's 0.20 PPV threshold. Therefore, vibration impacts associated with the proposed project would be less than significant.

Table 12
Typical Vibration Levels for Construction Equipment

Equipment	Approximate peak particle velocity at 25 feet (inches/second) ²	Approximate peak particle velocity at 50 feet (inches/second) ²	Approximate peak particle velocity at 105 feet (inches/second) ²
Large bulldozer	0.089	0.031	0.010
Loaded trucks	0.076	0.027	0.009
Small bulldozer	0.003	0.001	0.0003

Notes:

PPV _{equip} = PPV_{ref} \times (25/D)^{1.5}

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance

PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA Transit Noise and Vibration Impact

Assessment Guidelines

D = the distance from the equipment to the receiver

LONG-TERM OPERATIONAL IMPACTS

The project proposes 28 residential units and 10 open space lots that would not generate ground-borne vibration that could be felt at surrounding uses. The proposed project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. No impact would occur in this regard.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No Impact.

NOI-3

- FOR A PROJECT LOCATED WITHIN AN AIRPORT LAND USE PLAN OR, WHERE SUCH A PLAN HAS NOT BEEN ADOPTED, WITHIN TWO MILES OF A PUBLIC AIRPORT OR PUBLIC USE AIRPORT, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?
- FOR A PROJECT WITHIN THE VICINITY OF A PRIVATE AIRSTRIP, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?

^{1 –} Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006. Table 12-2.

^{2 -} Calculated using the following formula:

Level of Significance Before Mitigation: No Impact.

LONG-TERM OPERATIONAL IMPACTS

The project site is located approximately 6.32 miles southwest of the Brackett Field Airport, and is not located within the Airport Land Use Compatibility Plan for Brackett Field Airport. According to the *Brackett Field Airport Land Use Compatibility Plan*, the project is not located within the airport influence zone and is outside the noise and overflight CNEL contours.³ Therefore, project implementation would not expose people residing or working in the project area to excessive noise levels associated with aircraft. No impacts would occur in this regard.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No Impact.

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³ Los Angeles County Airport Land Use Commission, *Brackett Field Airport Land Use Compatibility Plan Noise* and Overflight Factors Map, December 9, 2015.

6.0 REFERENCES

6.1 LIST OF PREPARERS

MICHAEL BAKER INTERNATIONAL, INC.

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> Eddie Torres, INCE, Environmental Sciences Manager Achilles Malisos, Manager of Air and Noise Studies Alesia Hsiao, Environmental Analyst Erin Coffey, Environmental Analyst Linda Bo, Graphics

6.2 DOCUMENTS

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6.3 SOFTWARE/WEBSITES

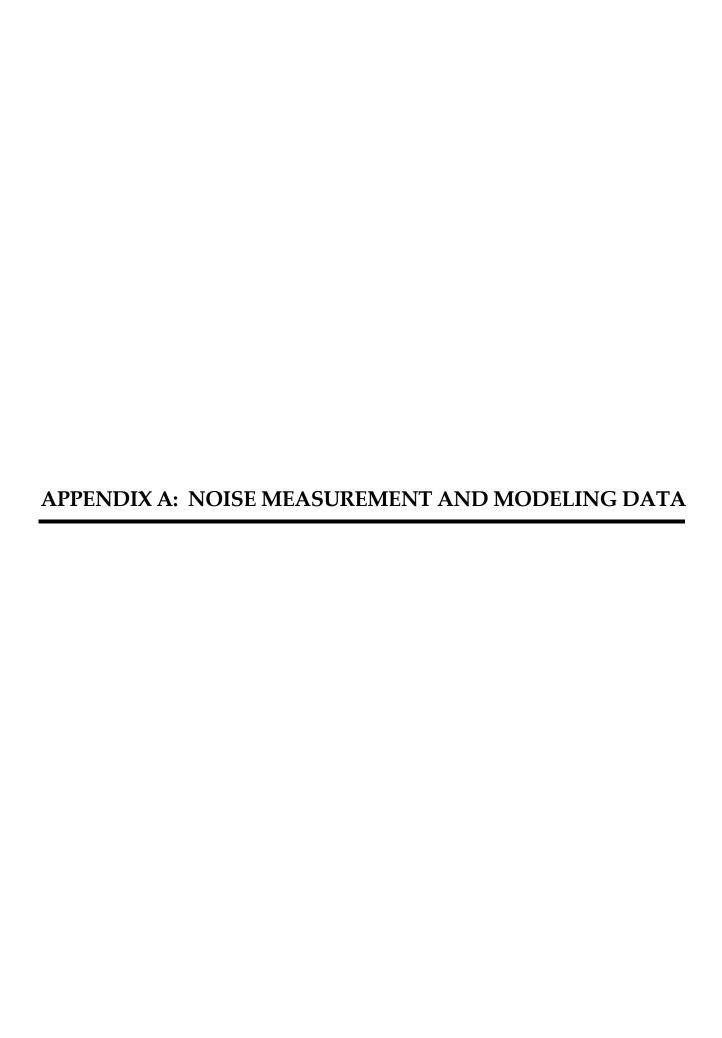
Federal Highway Administration, Highway Traffic Noise Prediction Model (FHWA-RD-77-108).

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Google Earth, 2016.

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Site Number: 1 Recorded By: Adam Furman **Job Number**: 137644 / 146566 **Date:** 7/7/15 **Time:** 10:59 AM Location: Along Meadow Pass Road, within the northern portion of the project site. Source of Peak Noise: Vehicles Noise Data Leq (dB) Lmin (dB) Lmax (dB) Peak (dB) 56.7 85.8 37.9 83.3

Equipment									
Category	Type	Vendor	Mo	odel	Serial No.	Cert. Date	Note		
Sound	Sound Level Meter	Brüel & Kja	ær 22	250	2548189	11/18/2014			
	Microphone	Brüel & Kja	ær 41	189	2543364	11/18/2014			
	Preamp	Brüel & Kja	ær ZC	0032	4265	11/18/2014			
	Calibrator	Brüel & Kja	ær 42	231	2545667	11/18/2014			
Weather Data									
	Duration: 10minu	Duration: 10minutes			Sky: Overcast				
Est.	Note: Sensor Height (ft): 5 ft				5 ft				
	Wind Ave Speed (mph / m/s)		Temperatu	re (degre	ees Fahrenheit)	Barometer Pressure (inches)			
	2.2			75.5		29.92			

Photo of Measurement Location





2250

Instrument:		2250
Application:		BZ7225 Version 4.4
Start Time:		07/07/2015 10:59:51
End Time:		07/07/2015 11:09:51
Elapsed Time:		00:10:00
Bandwidth:		1/3-octave
Max Input Level:		138.48

	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		С
Spectrum:	FS	Z

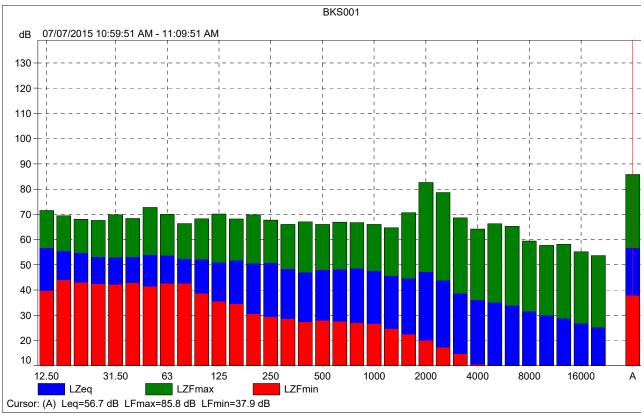
Instrument Serial Number:	2548189
Microphone Serial Number:	2543364
Input:	Top Socket
Windscreen Correction:	None
Sound Field Correction:	Free-field

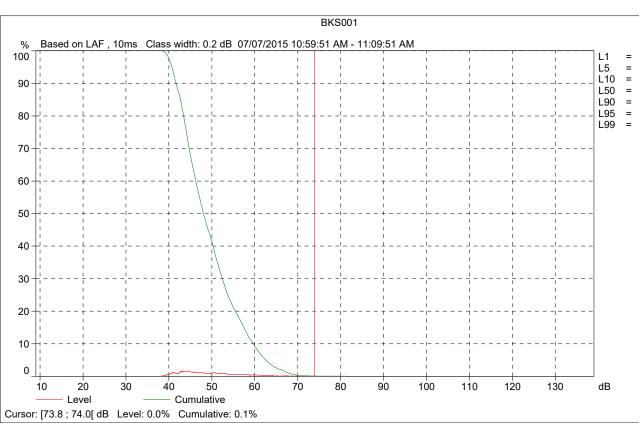
Calibration Time:	07/07/2015 08:19:37		
Calibration Type:	External reference		
Sensitivity:	66.4053931832314 mV/Pa		

BKS001

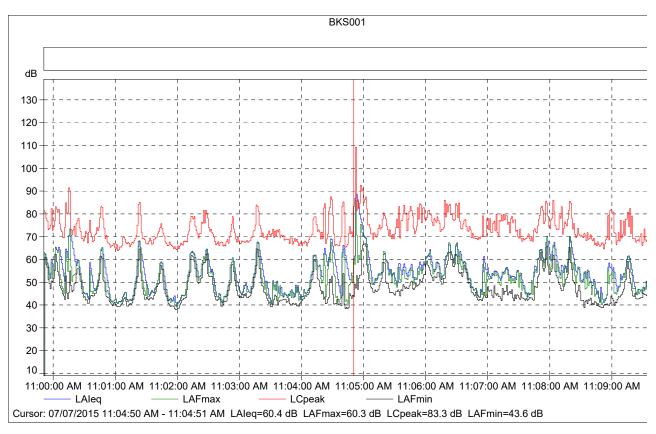
	Start	End	Elapsed	Overload	LAeq	LAFmax	LAFmin
	time	time	time	[%]	[dB]	[dB]	[dB]
Value				0.00	56.7	85.8	37.9
Time	10:59:51 AM	11:09:51 AM	0:10:00				
Date	07/07/2015	07/07/2015					







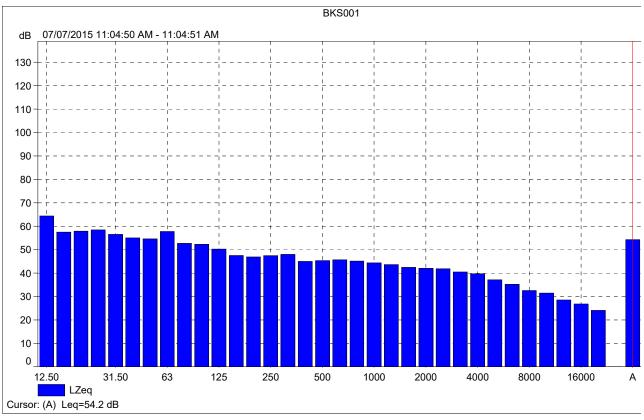


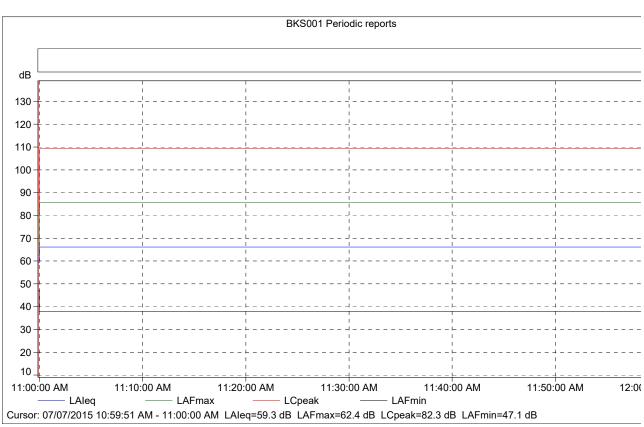


BKS001

	Start	Elapsed	LAleq	LAFmax	LAFmin
	time	time	[dB]	[dB]	[dB]
Value			60.4	60.3	43.6
Time	11:04:50 AM	0:00:01			
Date	07/07/2015				



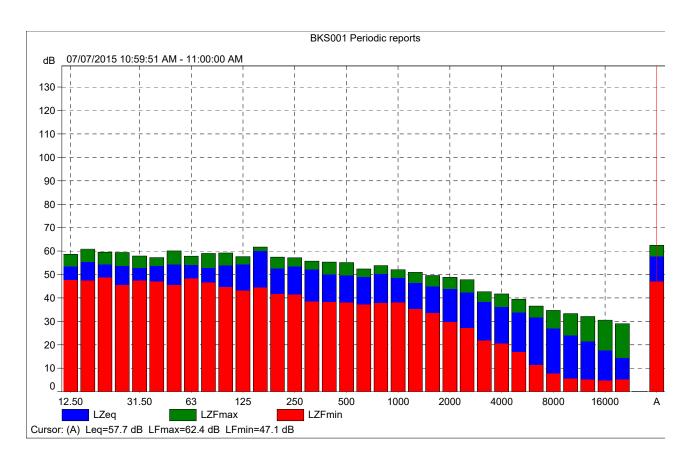




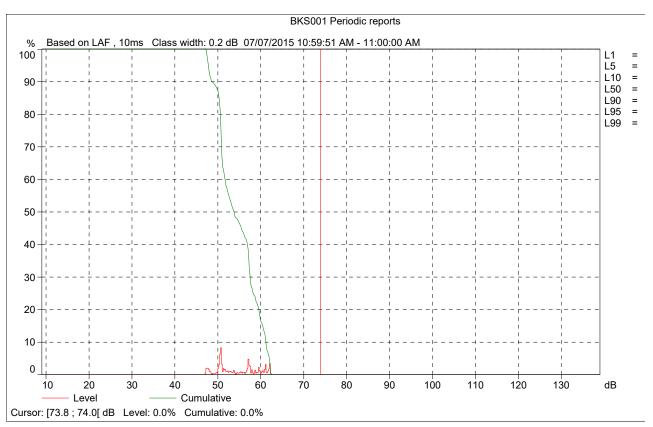


BKS001 Periodic reports

	Start	Elapsed	Overload	LAleq	LAFmax	LAFmin
	time	time	[%]	[dB]	[dB]	[dB]
Value			0.00	59.3	62.4	47.1
Time	10:59:51 AM	0:00:09				
Date	07/07/2015					







Site Number: 2 Recorded By: Adam Furman **Job Number**: 137644 / 146566 **Date:** 7/7/15 Time: 11:14 AM Location: Southwest corner of the intersection of Meadows Pass Road and Lemon Avenue Source of Peak Noise: Vehicles Noise Data Leq (dB) Lmin (dB) Lmax (dB) Peak (dB) 60.1 78.2 38.7 96.4

Equipment							
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note	
	Sound Level Meter	Brüel & Kja	ær 2250	2548189	11/18/2014		
Sound	Microphone	Brüel & Kja	ær 4189	2543364	11/18/2014		
Souria	Preamp	Brüel & Kja	ær ZC 0032	4265	11/18/2014		
	Calibrator	Brüel & Kja	ær 4231	2545667	11/18/2014		
			Weather Dat	a			
	Duration: 10minutes Sky: Overcast						
	Note:	Note: Sensor Height (ft): 5 ft					
Est.	Wind Ave Speed	(mph / m/s)	Temperature (degrees Fahrenheit)		Barometer Pressure (inches)		
1.9		82.7		29.92			

Photo of Measurement Location





Instrument:	2250
Application:	BZ7225 Version 4.4
Start Time:	07/07/2015 11:14:16
End Time:	07/07/2015 11:24:16
Elapsed Time:	00:10:00
Bandwidth:	1/3-octave
Max Input Level:	138.48

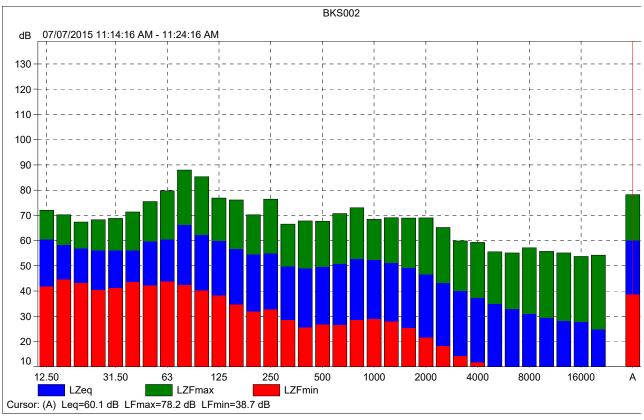
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		С
Spectrum:	FS	Z

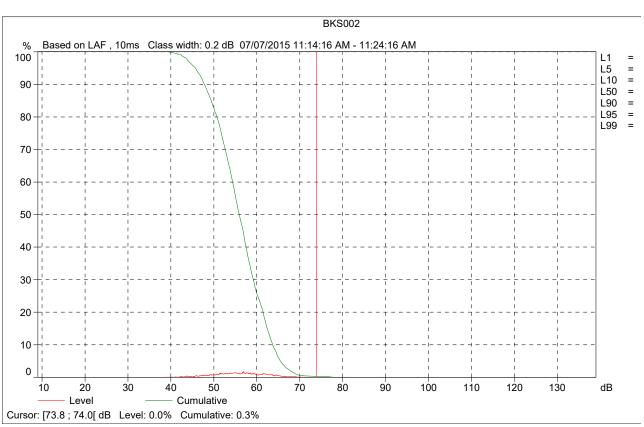
Instrument Serial Number:	2548189
Microphone Serial Number:	2543364
Input:	Top Socket
Windscreen Correction:	None
Sound Field Correction:	Free-field

Calibration Time:	07/07/2015 08:19:37
Calibration Type:	External reference
Sensitivity:	66.4053931832314 mV/Pa

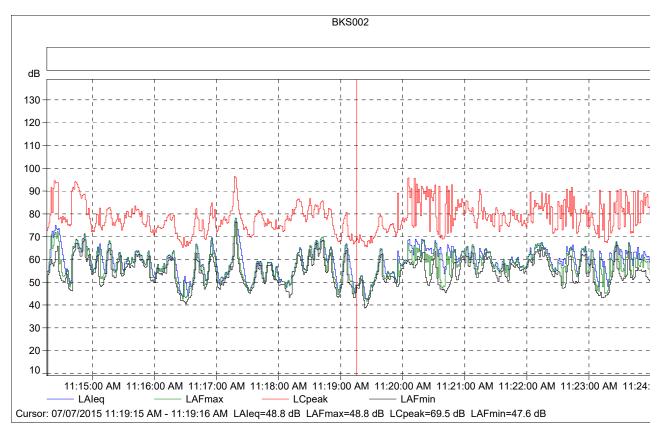
	Start	End	Elapsed	Overload	LAeq	LAFmax	LAFmin
	time	time	time	[%]	[dB]	[dB]	[dB]
Value				0.00	60.1	78.2	38.7
Time	11:14:16 AM	11:24:16 AM	0:10:00				
Date	07/07/2015	07/07/2015					





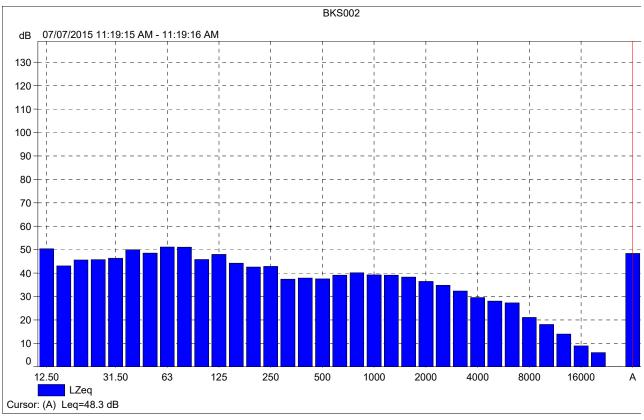


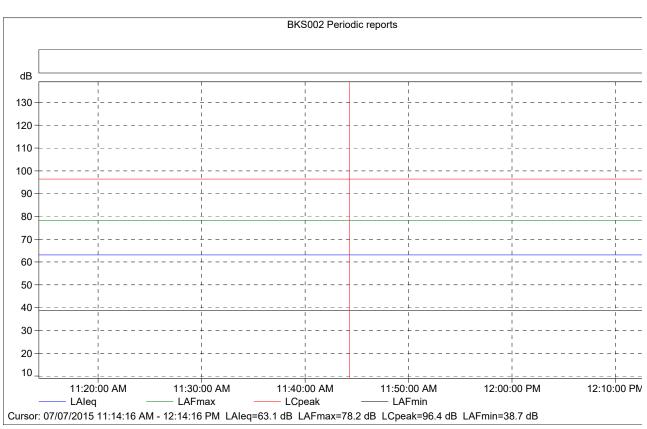




	Start	Elapsed	LAleq	LAFmax	LAFmin
	time	time	[dB]	[dB]	[dB]
Value			48.8	48.8	47.6
Time	11:19:15 AM	0:00:01			
Date	07/07/2015				



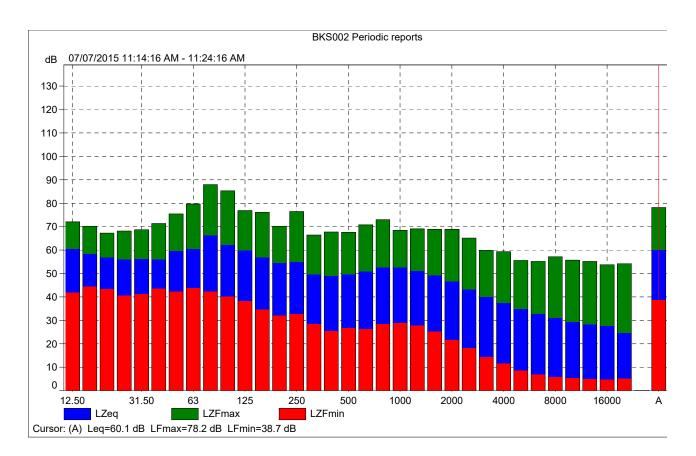




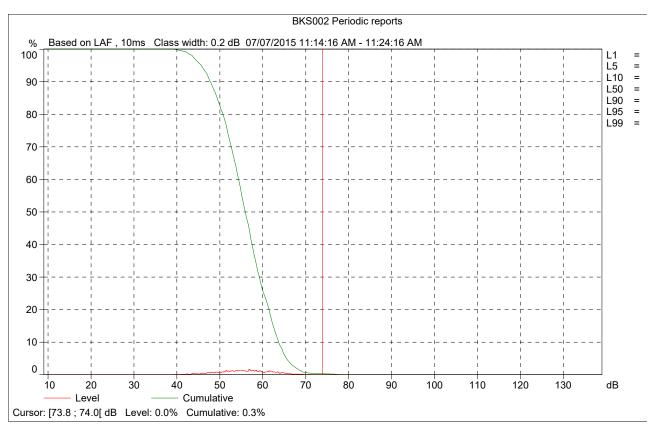


BKS002 Periodic reports

	Start	Elapsed	Overload	LAleq	LAFmax	LAFmin
	time	time	[%]	[dB]	[dB]	[dB]
Value			0.00	63.1	78.2	38.7
Time	11:14:16 AM	0:10:00				
Date	07/07/2015					







Site Number: 3 Recorded By: Adam Furman **Job Number**: 137644 **Date:** 7/7/15 **Time:** 11:30 AM Location: Along Rim Ridge Road, approximately 265 feet east of the project site. Source of Peak Noise: Vehicles Noise Data Leq (dB) Lmin (dB) Lmax (dB) Peak (dB) 49.6 70.5 33.4 95.8

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
	Sound Level Meter	Brüel & Kja	ær 2250	2548189	11/18/2014	
Sound	Microphone	Brüel & Kja	ær 4189	2543364	11/18/2014	
Souria	Preamp	Brüel & Kja	ær ZC 0032	4265	11/18/2014	
	Calibrator	Brüel & Kja	ær 4231	2545667	11/18/2014	
			Weather Data			
	Duration: 10minu	tes		Sky: Sunny		
	Note:			Sensor Height (ft):	5 ft	
Est.	Wind Ave Speed (mph / m/s)		Temperature (degrees Fahrenheit)		Barometer Pressure (inches)	
	2.1		76.0		29.92	

Photo of Measurement Location





Instrument:	2250
Application:	BZ7225 Version 4.4
Start Time:	07/07/2015 11:30:35
End Time:	07/07/2015 11:40:35
Elapsed Time:	00:10:00
Bandwidth:	1/3-octave
Max Input Level:	138.48

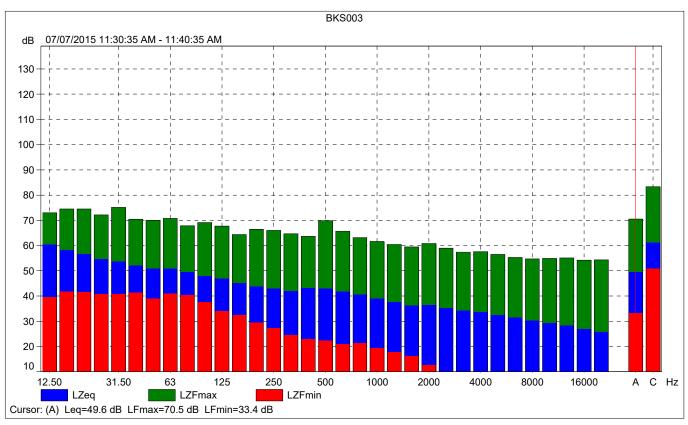
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		С
Spectrum:	FS	Z

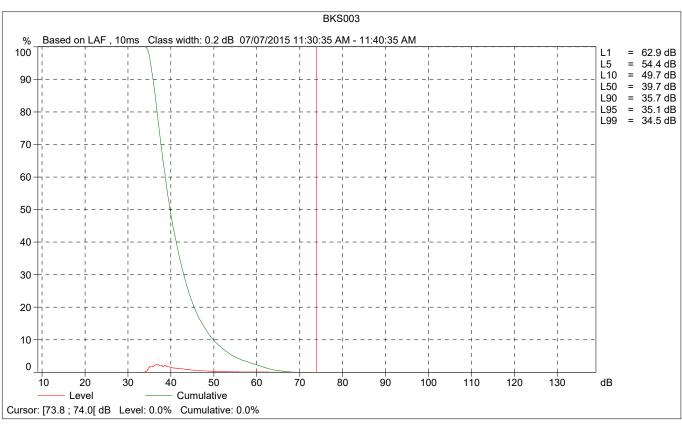
Instrument Serial Number:	2548189
Microphone Serial Number:	2543364
Input:	Top Socket
Windscreen Correction:	None
Sound Field Correction:	Free-field

Calibration Time:	07/07/2015 08:19:37
Calibration Type:	External reference
Sensitivity:	66.4053931832314 mV/Pa

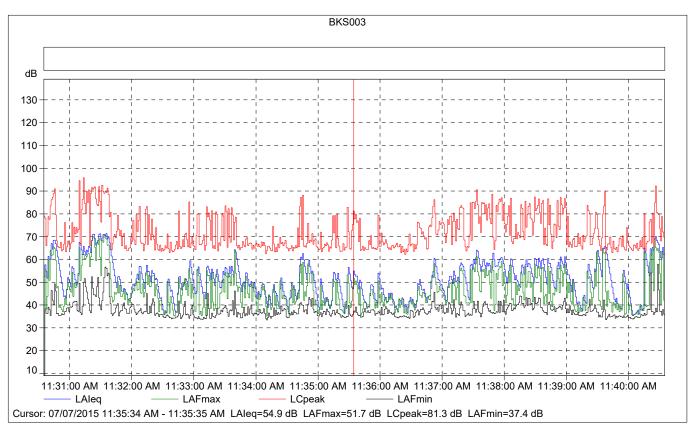
Start	End	Elapsed	Overload	LAeq	LAFmax	LAFmin
time	time	time	[%]	[dB]	[dB]	[dB]
			0.00	49.6	70.5	33.4
11:30:35 AM	11:40:35 AM	0:10:00				
07/07/2015	07/07/2015					
	time 11:30:35 AM	time time 11:30:35 AM 11:40:35 AM	time time time 11:30:35 AM 11:40:35 AM 0:10:00	time time time [%] 11:30:35 AM 11:40:35 AM 0:10:00	time time time [%] [dB] 11:30:35 AM 11:40:35 AM 0:10:00 0.00 49.6	time time time [%] [dB] [dB] 11:30:35 AM 11:40:35 AM 0:10:00 0:10:00 0:10:00





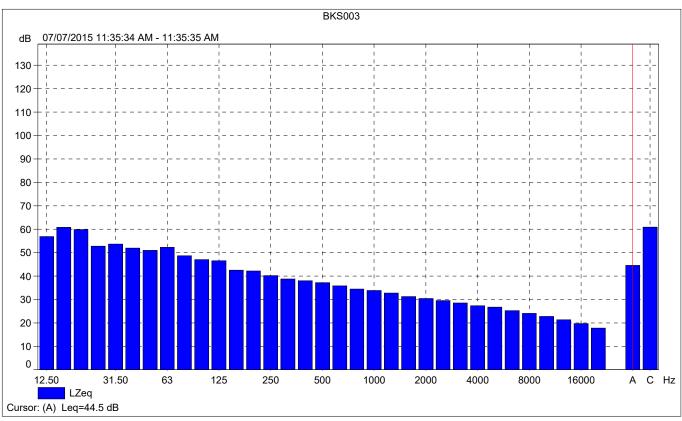


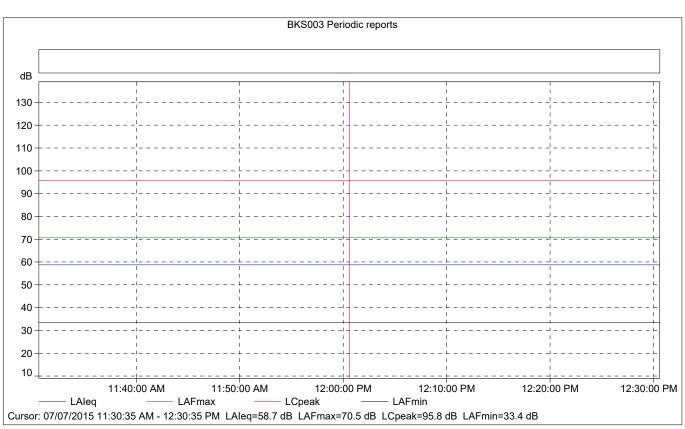




	Start	Elapsed	LAleq	LAFmax	LAFmin
	time	time	[dB]	[dB]	[dB]
Value			54.9	51.7	37.4
Time	11:35:34 AM	0:00:01			
Date	07/07/2015				



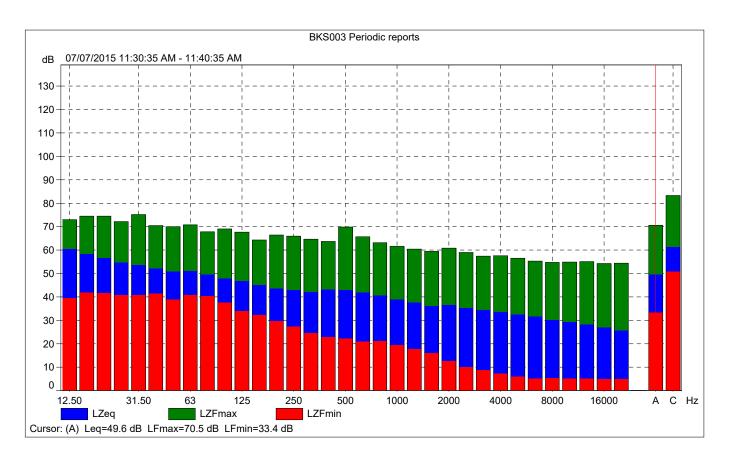




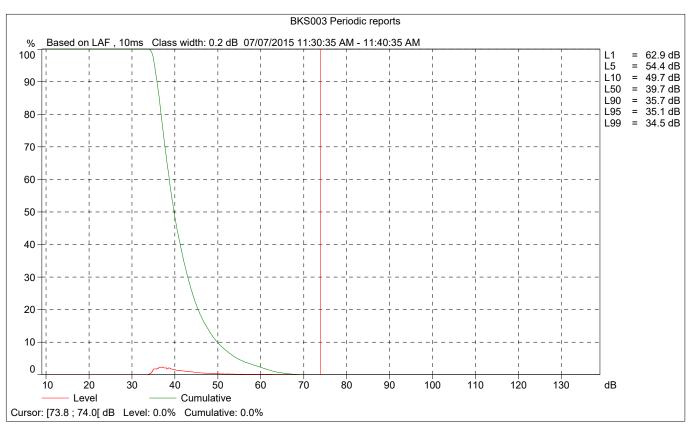


BKS003 Periodic reports

	Start	Elapsed	Overload	LAleq	LAFmax	LAFmin
	time	time	[%]	[dB]	[dB]	[dB]
Value			0.00	58.7	70.5	33.4
Time	11:30:35 AM	0:10:00				
Date	07/07/2015					







Site Number: 4							
Recorded By: Adam Furman	Recorded By: Adam Furman						
Job Number : 137644 / 145566							
Date : 7/7/15							
Time: 12:36 PM							
Location: Along San Vicente	Road within the southwest por	tion of the project site.					
Source of Peak Noise: Veh	icles						
Noise Data							
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)				
50.1	39.6	70.9	93.9				

Equipment							
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note	
	Sound Level Meter	Brüel & Kja	er 2250	2548189	11/18/2014		
Cound	Microphone	Brüel & Kja	er 4189	2543364	11/18/2014		
Sound	Preamp	Brüel & Kja	er ZC 0032	4265	11/18/2014		
	Calibrator	Brüel & Kja	er 4231	2545667	11/18/2014		
			Weather Data				
	Duration: 10minu	tes		Sky: Sunny			
	Note:			Sensor Height (ft): 5 ft			
Est.	Wind Ave Speed	(mph / m/s)	s) Temperature (degrees Fahre		Barometer Pressure (inches		
	1.0		77	77.8		29.92	

Photo of Measurement Location





Instrument:	2250
Application:	BZ7225 Version 4.4
Start Time:	07/07/2015 12:36:47
End Time:	07/07/2015 12:46:47
Elapsed Time:	00:10:00
Bandwidth:	1/3-octave
Max Input Level:	138.48

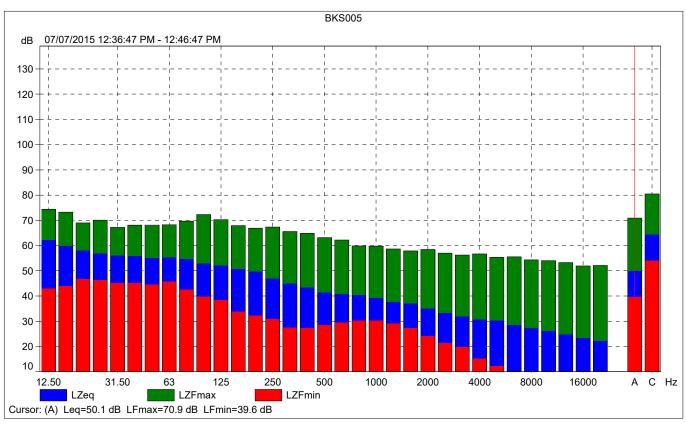
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		С
Spectrum:	FS	Z

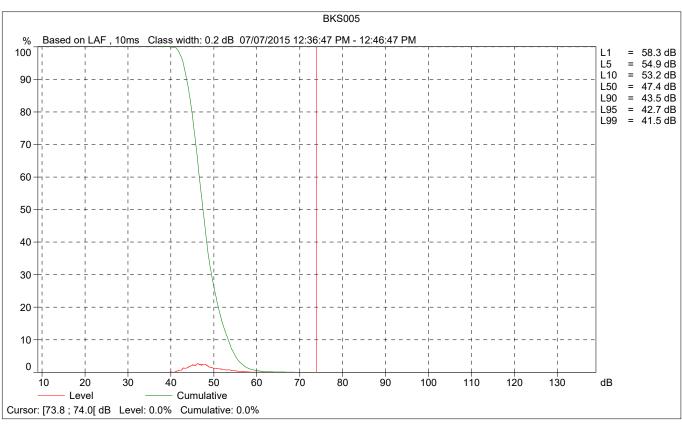
Instrument Serial Number:	2548189
Microphone Serial Number:	2543364
Input:	Top Socket
Windscreen Correction:	None
Sound Field Correction:	Free-field

Calibration Time:	07/07/2015 08:19:37
Calibration Type:	External reference
Sensitivity:	66.4053931832314 mV/Pa

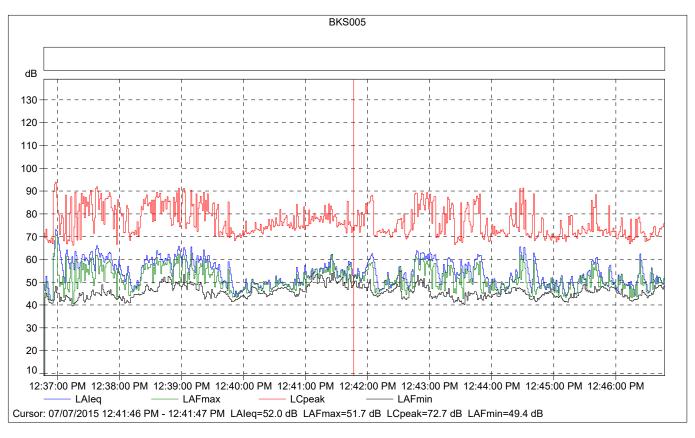
	Start	End	Elapsed	Overload	LAeq	LAFmax	LAFmin
	time	time	time	[%]	[dB]	[dB]	[dB]
Value				0.00	50.1	70.9	39.6
Time	12:36:47 PM	12:46:47 PM	0:10:00				
Date	07/07/2015	07/07/2015					





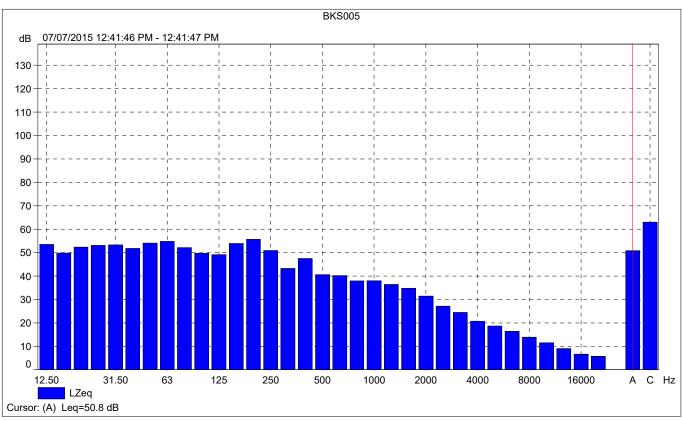


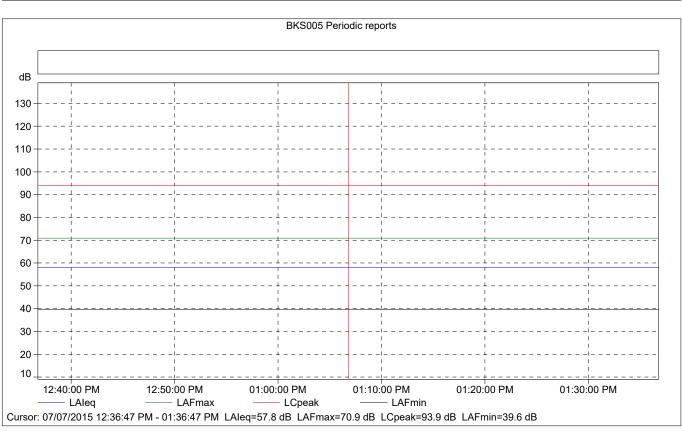




	Start	Elapsed	LAleq	LAFmax	LAFmin
	time	time	[dB]	[dB]	[dB]
Value			52.0	51.7	49.4
Time	12:41:46 PM	0:00:01			
Date	07/07/2015				



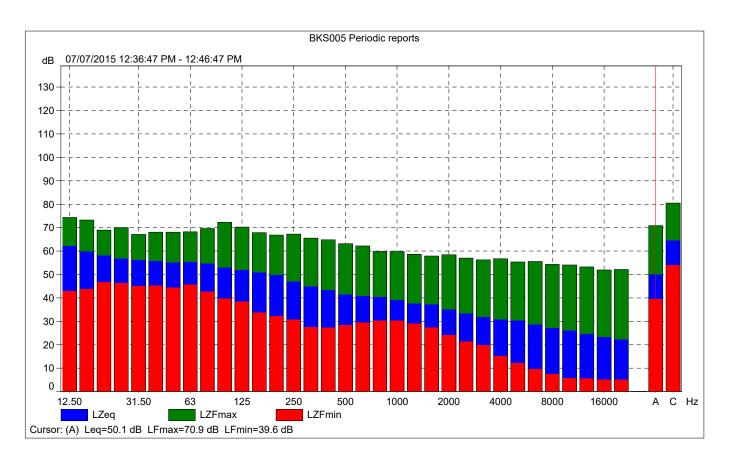




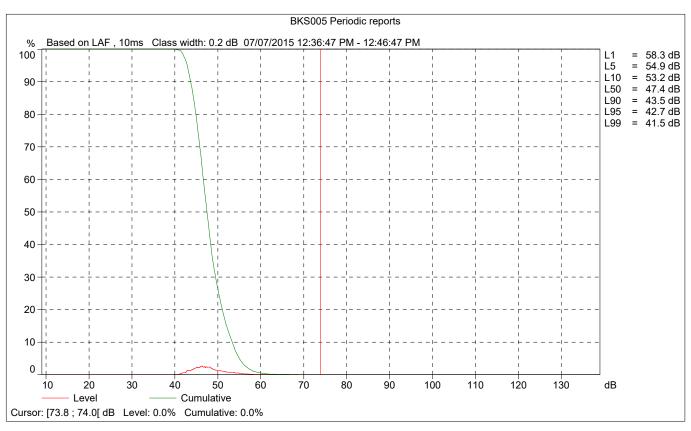


BKS005 Periodic reports

	Start	Elapsed	Overload	LAleq	LAFmax	LAFmin
	time	time	[%]	[dB]	[dB]	[dB]
Value			0.00	57.8	70.9	39.6
Time	12:36:47 PM	0:10:00				
Date	07/07/2015					







INPUT: ROADWAYS							Brooks	ide Res			
Michael Baker Intl.					6 April 2016						
Ryan Chiene					TNM 2.5	I					
INPUT: ROADWAYS							Average i	pavement typ	e shall be u	sed unless	
PROJECT/CONTRACT:	Brookside	Res		l				ghway agenc			
RUN:	Proposed							ent type with	-		
Roadway		Points									
Name		Name	No.	Coordinates	(pavement)		Flow Con	trol		Segment	
				x	, Y	Z	Control	Speed	Percent	Pvmt	On
							Device	Constraint	Vehicles	Туре	Struct?
									Affected		
	ft			ft	ft	ft		mph	%		
Lemon_NB	30.0	point1	1	6,602,307.5	1,829,758.9	575.00				Average	
		point2	2	6,602,232.5	1,829,957.0	577.00				Average	
		point3	3	6,602,221.5	1,830,012.1	577.00				Average	
		point4	4	6,602,216.0	1,830,091.2	580.00				Average	
		point5	5	6,602,222.5	1,830,157.9	580.00				Average	
		point6	6	6,602,246.0	1,830,267.9	580.00				Average	
		point7	7	6,602,250.5	1,830,353.8	593.00				Average	
		point8	8	6,602,242.5	1,830,426.0	606.00				Average	
		point9	9	6,602,228.5	1,830,491.2	607.00				Average	
		point10	10	6,602,204.5	1,830,553.1	607.00				Average	
		point11	11	6,602,173.5	1,830,608.1	608.00				Average	
		point12	12	6,602,146.0	1,830,649.4	609.00				Average	
		point13	13	6,602,099.0	1,830,714.6	609.00				Average	
		point14	14	6,602,074.0	1,830,762.8	609.00				Average	
		point15	15	6,602,041.0	1,830,837.5	610.00				Average	
		point16	16	6,601,953.5	1,831,079.0	614.00				Average	
		point17	17	6,601,881.0	1,831,279.4	610.00				Average	
		point18	18	6,601,827.5	1,831,373.6	610.00				Average	
		point19	19	6,601,761.0						Average	
		point20	20							Average	
		point21		6,601,617.0						Average	
		point22		6,601,530.0						Average	
		point23		6,601,360.5							
Lemon_SB	30.0	point37	37	6,601,359.0						Average	
		point38	38		1,831,566.1					Average	
		point39	39							Average	
		point40	40	6,601,691.5	1,831,494.5	610.00				Average	

NPUT: ROADWAYS						Brooks	ide Res		
		point41	41	6,601,758.5	1,831,442.8	610.00		Average	
		point42	42	6,601,823.0	1,831,367.4	610.00		Average	
		point43	43	6,601,877.5	1,831,272.6	612.00		Average	
		point44	44	6,601,947.0	1,831,075.1	614.00		Average	
		point45	45	6,602,036.0	1,830,831.2	610.00		Average	
		point46	46	6,602,067.5	1,830,756.5	609.00		Average	
		point47	47	6,602,094.5	1,830,706.5	609.00		Average	
		point48	48	6,602,144.0	1,830,640.9	609.00		Average	
		point49	49	6,602,169.5	1,830,600.2	608.00		Average	
		point50	50	6,602,199.0	1,830,545.8	607.00		Average	
		point51	51	6,602,222.5	1,830,486.8	607.00		Average	
		point52	52	6,602,237.0	1,830,418.9	606.00		Average	
		point53	53	6,602,244.0	1,830,350.4	593.00		Average	
		point54	54	6,602,238.5	1,830,268.1	580.00		Average	
		point55	55	6,602,218.5	1,830,161.9	580.00		Average	
		point56	56	6,602,209.5	1,830,091.8	580.00		Average	
		point57	57	6,602,215.0	1,830,008.4	577.00		Average	
		point58	58	6,602,226.0	1,829,952.6	577.00		Average	
		point59	59	6,602,304.5	1,829,753.8	575.00			
_a Puente_EB	30.0	point60	60	6,602,294.5	1,829,830.9	575.00		Average	
		point61	61	6,602,373.0	1,829,869.4	571.00		Average	
		point62	62	6,602,549.5	1,829,952.9	571.00		Average	
		point63	63	6,602,628.0	1,829,985.0	571.00		Average	
		point64	64	6,602,716.5	1,830,013.9	571.00		Average	
		point65	65	6,602,837.0	1,830,050.9	571.00		Average	
		point66	66	6,603,090.5	1,830,127.9	571.00			
_a Puente_WB	30.0	point67	67	6,603,083.5	1,830,132.5	571.00		Average	
		point68	68	6,602,831.5	1,830,054.8	571.00		Average	
		point69	69	6,602,710.0	1,830,017.2	571.00		Average	
		point70	70	6,602,622.5	1,829,988.1	571.00		Average	
		point71	71	6,602,542.5	1,829,956.2	571.00		Average	
		point72	72	6,602,367.0	1,829,872.2	571.00		Average	
		point73	73	6,602,290.5	1,829,835.5	575.00			
Meadow Pass_EB	30.0	point74	74	6,601,571.5	1,831,565.1	610.00		Average	
		point75	75			613.00		Average	
		point76	76	6,601,635.0	1,831,697.2	617.00		Average	
		point77	77	6,601,673.5	1,831,746.2	620.00		Average	
		point78	78	6,601,737.5	1,831,804.9	623.00		Average	
		point79	79	6,601,823.5	1,831,861.2	628.00		Average	
		point80	80	6,602,003.5	1,831,959.9	635.00		Average	

INPUT: ROADWAYS	Brookside Res
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•								
		point81	81	6,602,225.0	1,832,079.6	640.00	Average	
		point82	82	6,602,296.5	1,832,111.6	638.00	Average	
		point83	83	6,602,351.0	1,832,126.5	637.00	Average	
		point84	84	6,602,419.5	1,832,137.4	636.00	Average	
		point85	85	6,602,476.5	1,832,137.1	636.00	Average	
		point86	86	6,602,904.5	1,832,130.8	631.00		
Meadow Pass_WB	30.0	point87	87	6,602,899.0	1,832,140.4	631.00	Average	
		point88	88	6,602,472.5	1,832,147.6	636.00	Average	
		point89	89	6,602,415.5	1,832,146.1	636.00	Average	
		point90	90	6,602,342.5	1,832,133.0	637.00	Average	
		point91	91	6,602,288.5	1,832,117.0	638.00	Average	
		point92	92	6,602,217.0	1,832,084.9	640.00	Average	
		point93	93	6,602,000.0	1,831,965.9	635.00	Average	
		point94	94	6,601,815.0	1,831,864.4	628.00	Average	
		point95	95	6,601,730.5	1,831,811.8	623.00	Average	
		point96	96	6,601,666.0	1,831,753.4	620.00	Average	
		point97	97	6,601,625.5	1,831,699.2	617.00	Average	
		point98	98	6,601,597.5	1,831,648.2	613.00	Average	
		point99	99	6,601,564.0	1,831,572.2	610.00		

INPUT: TRAFFIC FOR Lden									Bro	ooksid	le Res	5											
Michael Baker Intl.											ril 201	16											
Ryan Chiene										TNM	2.5												
INPUT: TRAFFIC FOR Lden																							
PROJECT/CONTRACT:	Brookside	Res																					
RUN:	Proposed																						
Roadway	Points																						
Name	Name	No.	Segment																				
			ADT	Auto				MTru	4			HTru	icks			Bus					rcycle		
								%D	%E			%D	%E	%N	S	%D	% Е	%N	S			%N	S
			veh/24hrs	%	%	%	mph	%	%	%	mph	%	%	%	mph	%	%	%	mph	%	%	%	mph
Lemon_NB	point1	1	9200	97	97	97	40	2	2 2	2 2	40	1	1	1	40) () () (0 0	0	0		0 0
	point2	2	9200	97	97	97	40	2	2 2	2 2	40	1	1	1	40) () () (0 0	0	0	1	0 0
	point3	3	9200	97	97	97	40	2	2 2	2 2	40	1	1	1	40) () () (0 0	0	0	1	0 0
	point4	4	9200	97	97	97	40	2	2 2	2 2	40	1	1	1	40) () () (0 0	0	0		0 0
	point5	5	9200	97	97	97					40	1	1	1	40) () () (0 0	0	0	1	0 0
	point6	6	9200			97	40	2			40	1	1	1	40) () () (0 0	0	0	1	0 0
	point7	7	9200								40	1	1	1	40) () () (0 0	0	0	1	0 0
	point8	3	9200		97						40	1	1	1	40) () () (0 0	0	0		0 0
	point9	9	9200		97						40	1	1	1	40) () () (0 0	0	0	1	0 0
	point10	10			97						40	1	1	1	40) () () (0 0	0	0		0 0
	point11	11			97								1	1	40				0 0	_			0 0
	point12	12			97								1	1	40				0 0				0 0
	point13	13			97								1	1	40				0 0				0 0
	point14	14			97								1	<u> </u>					0				0 0
	point15	15			97								1	ļ .				-	0 0				0 0
	point16	16			97				2 2				1	ļ					0 0	_			0 0
	point17	17			97								1	ļ					0 0				0 0
	point18	18											1	1 -					0 0				0 0
	point19	19			97								1						0 0				0 0
	point20	20									_		1						0 0	_			0 0
	point21	21							2 2				1						0 0				0 0
	point22 point23	22		97	97	97	40	2	2 2	2 2	40	I	1	I	40) (, () (0	0	0	<u> </u>	0 0
Lomon SP		23		97	97	97	40	-) (2 2	40	1	1	1	40) () () (0 0	0		_	0 0
Lemon_SB	point37	37											1		40			-	0 0				0 0
	point38 point39	38				٠.	.0	-	2 2		70		1			′ `	, ,	,) 0		·		0 0
	point40	40							2 2				1						0 0				0 0
	point40	41							2 2				1	ļ					0 0				0 0
	point41	42																	0 0				0 0
	point42	43							2 2										0 0				0 0
	point43	44								2 2									0 0				0 0
	Politica	44	9200	91	31	91	40				40		1		40	′	' '	, (, 0			Ш_	0

INPUT: TRAFFIC FOR Lden									Broo	kside	e Res												
	point45	45	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point46	46	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point47	47	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point48	48	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	C
	point49	49	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	C
	point50	50	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point51	51	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point52	52	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	C
	point53	53	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	C
	point54	54	9200	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point55	55	9200	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point56	56	9200	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point57	57	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point58	58	9200	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point59	59																					
La Puente_EB	point60	60	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point61	61	7000	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point62	62	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point63	63	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point64	64	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point65	65	7000	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point66	66																					
La Puente_WB	point67	67	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point68	68	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point69	69	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point70	70	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point71	71	7000	97	97	97	40	2	2	2	40	1	1	1	40	0		0	0	0	0	0	0
	point72	72	7000	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	point73	73																					
Meadow Pass_EB	point74	74	2400	97	97		30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point75	75	2400	97	97	97	30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point76	76	2400	97	97	97	30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point77	77	2400	97	97	97	30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point78	78	2400	97	97	97	30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point79	79	2400	97	97	97	30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point80	80	2400	97	97	97	30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point81	81	2400	97	97	97	30	2		2	30	1	1	'	30	0		0	0	0	0	0	0
	point82	82	2400	97	97	97	30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point83	83	2400	97	97		30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point84	84	2400	97	97	97	30	2	2	2	30	1	1	1	30	0		0	0	0	0	0	0
	point85	85	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
Manday Daga M/D	point86	86	2400	07	07	0.7	20			_	20	4	4	4	20			0	_	0	0		
Meadow Pass_WB	point87	87	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0

INPUT: TRAFFIC FOR Lden									Brool	ksid	e Res												
	point88	88	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point89	89	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point90	90	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point91	91	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point92	92	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point93	93	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point94	94	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point95	95	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point96	96	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point97	97	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point98	98	2400	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	point99	99																					

INPUT: RECEIVERS		1					В	rookside R	es		
Michael Baker Intl.						6 April 20	16				
Ryan Chiene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	Brook	side Re	es								
RUN:	Propo	sed									
Receiver										1	
Name	No.	#DUs	Coordinates	(ground)		Height	Input Soul	nd Levels a	nd Criteria	l	Active
			X	Y	Z	above	Existing	Impact Cri	teria	NR	in
						Ground	Lden	Lden	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
1	1	1	6,602,265.0	1,832,029.2	612.00	4.92	0.00	66	10.0		3.0 Y
2	2	1	6,602,418.0	1,832,071.2	619.00	4.92	0.00	66	10.0		3.0 Y
3	3	1	6,602,627.5	1,831,839.4	618.00	4.92	0.00	66	10.0		3.0 Y
4	4	1	6,602,363.5	1,831,740.8	618.00	4.92	0.00	66	10.0		3.0 Y
5	5	1	6,602,252.5			4.92	0.00	66	10.0	. 8	3.0 Y
6	6	1	6,602,154.0				0.00				3.0 Y
7	7	1	6,602,060.0	1,831,676.6	606.00	4.92	0.00	66	10.0	8	3.0 Y
8	8		6,602,136.5				0.00				3.0 Y
9	9		6,602,023.0								3.0 Y
10	10	1	6,601,932.0								3.0 Y
11	11	1	6,601,674.5								3.0 Y
12	12		6,601,753.5								3.0 Y
13	13		6,601,833.5								3.0 Y
14	14		6,601,896.5								3.0 Y
15	15		6,601,958.0								3.0 Y
16	16		6,602,057.5								3.0 Y
17	18		6,602,279.0								3.0 Y
18	19		6,602,295.0								3.0 Y
19	20		6,602,310.5								3.0 Y
20	21		6,602,344.5								3.0 Y
21	22		6,602,380.5								3.0 Y
22	23		6,602,403.0								3.0 Y
23	24		6,602,437.0								3.0 Y
24	26	1	6,602,456.5	1,830,549.0	585.00	4.92	0.00	66	10.0	8	3.0 Y

INPUT: RECEIVERS				В	rookside Re	es

25	27	1	6,602,632.5	1,830,434.5	581.00	4.92	0.00	66	10.0	8.0	Υ
26	28	1	6,602,617.0	1,830,322.9	578.00	4.92	0.00	66	10.0	8.0	Υ
27	29	1	6,602,677.0	1,830,214.1	575.00	4.92	0.00	66	10.0	8.0	Υ
28	30	1	6,602,695.5	1,830,093.9	574.00	4.92	0.00	66	10.0	8.0	Υ

INPUT: BARRIERS Brookside Res

					1			DIOOK	side ites								
				6 April	 2016												
Brook	kside R	es															
Propo	osed																
								Points									
Туре	Heigh	ıt	If Wall	If Berm			Add'tnl	Name	No.	Coordinates	(bottom)		Height	Segment			
	Min	Max	\$ per	\$ per	Тор	Run:Rise	\$ per			X	Υ	Z	at	Seg Ht Per	turbs	On	Important
			Unit	Unit	Width		Unit						Point	Incre- #Up	#Dn	Struct?	Reflec-
			Area	Vol.			Length							ment			tions?
	ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft			
W	0.0	99.99	0.00)			0.00	point1	•	6,601,741.	1,831,761.6	610.00	6.00	2.00	4 3	3	
								point2	2	6,601,702.0	1,831,723.9	610.00	6.00	2.00	4 3	3	
								point3	3	6,601,654.0	1,831,659.2	610.00	6.00	2.00	4 3	3	
								point4	4	6,601,624.0	1,831,609.5	610.00	6.00	2.00	4 3	3	
								point5	Ę						4 3	3	
								•	6								
									7						1		
								<u> </u>		<u> </u>						-	
								•								-	
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۱۸/	0.0	n aa aa	0.00	1			0.00	-							1 1	2	
•	0.0	39.98	0.00				0.00										
			 														
										<u> </u>							
	Туре	Type Heigh Min If t W 0.4	Type Height Min Max ft ft W 0.00 99.99	Proposed Type Height If Wall Min Max \$ per Unit Area ft ft \$ \$/sq ft W 0.00 99.99 0.00	Brookside Res Proposed Type Height If Wall If Berm Min Max \$ per \$ per Unit Unit Area Vol. ft ft \$/sq ft \$/cu yd	Type Height If Wall If Berm Min Max \$ per \$ per Unit Unit Width Area Vol. If t If \$\\$/sq ft \$\\$/cu yd If \$\] W 0.00 99.99 0.00	Brookside Res Proposed Type Height If Wall If Berm Min Max \$ per \$ per Top Run:Rise Unit Unit Width Area Vol. ft ft \$ \$/sq ft \$/cu yd ft ft:ft W 0.00 99.99 0.00	TNM 2.5	Brookside Res	Strockside Reserverse	Strockside Res	Type Height If Wall Flore Min Max Sper Min Max Max Min Max Max Min Max Max	Brookside Res Proposed				

RESULTS: SOUND LEVELS						E	Brookside I	Res				
Michael Baker Intl.							6 April 20	16				
Ryan Chiene							TNM 2.5					
DECLUTO COUNT LEVELO							Calculate	d with TNM	2.5			
RESULTS: SOUND LEVELS		B 1	i.i. B.									
PROJECT/CONTRACT:			ide Res									
RUN:		Propos										
BARRIER DESIGN:		INPUI	HEIGHTS							shall be use		
ATMOODUEDIOO		00 1	E 500/ DI							y substantiate		
ATMOSPHERICS:		68 aec	F, 50% RH	 				ot a ditter	ent type with	approval of F	HWA.	
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			Lden	Lden		Increase over		Туре	Calculated	Noise Reduc	tion	
				Calculated	Crit'n	Calculated	Crit'n	Impact	Lden	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1	1		1 0.0	53.5	66	53.5	5 10)	53.4	0.1	3	-7.9
2	2	2	1 0.0	54.9	66	54.9) 10)	54.9	0.0	3	-8.0
3	3	3	1 0.0	49.4	- 66	6 49.4	1 10)	49.4	0.0	8	-8.0
4	4	ļ ·	1 0.0	50.4	- 66	50.4	1 10)	50.4	0.0	8	-8.0
5		5	1 0.0	51.9	66	51.9) 10)	51.3	0.6	8	-7.4
6	6	6	1 0.0	53.4	- 66	53.4	1 10)	52.7	0.7	8	-7.3
7	7		1 0.0	55.0	66	55.0) 10)	54.1	0.9	8	-7.1
8	8	3	1 0.0	53.4	- 66	53.4	1 10)	52.8	0.6	8	-7.4
9	9)	1 0.0	55.6	66	55.6	3 10)	54.7	0.9	8	-7.1
10	10)	1 0.0	58.9	66	58.9) 10)	57.2	1.7		-6.3
11	11		1 0.0	67.8	66	67.8	3 10	Snd Lvl	61.6	6.2		-1.8
12	12	2	1 0.0	68.3	66	68.3	3 10	Snd Lvl	61.5	6.8	3	-1.2
13	13	3	1 0.0	68.1	66	68.	1 10	Snd Lvl	62.2	5.9	3	-2.1
14	14	ŀ	1 0.0	67.5	66	67.5	5 10	Snd Lvl	62.0	5.5	3	-2.5
15	15	5	1 0.0	65.6	66	65.6	3 10		62.0	3.6	3	-4.4
16	16	3	1 0.0	61.1	66	61.1	1 10		59.4	1.7	8	-6.3
17	18	3	1 0.0	56.2	2 66	56.2	2 10		55.3	0.9	3	-7.1
18	19)	1 0.0	57.1	66	57.	1 10		57.2	-0.1	3	-8.1
19	20		1 0.0						57.5			
20	21		1 0.0						57.4			
21	22		1 0.0						57.3			
22	23		1 0.0						57.9			
23	24		1 0.0						57.7			
24	26		1 0.0						58.0			
25	27	7	1 0.0	55.0	66	55.0	10)	54.8	0.2	. 8	-7.8

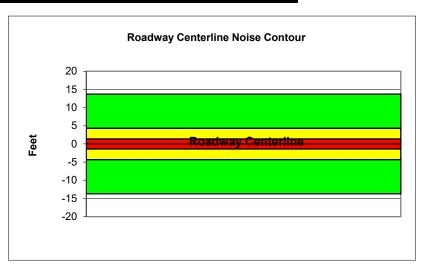
RESULTS: SOUND LEVELS								В	rookside R	es				
26	28	1		0.0		56.4	66	56.4	10		55.9	0.5	8	-7.5
27	29	1		0.0		59.1	66	59.1	10		57.3	1.8	8	-6.2
28	30	1		0.0		65.9	66	65.9	10		60.9	5.0	8	-3.0
Dwelling Units		# DUs	Noise	Red	uction									
			Min		Avg		Max							
			dB		dB		dB							
All Selected		28	-	0.1		1.6	6.8							
All Impacted		4		5.5		6.1	6.8							
All that meet NR Goal		0		0.0		0.0	0.0							

				ninistration R							
Project Name:	Brookside Pro			Scenario: Existing							
Analyst:	· ·				Job #:	146566					
Roadway:											
Road Segment:	North of Amar	Road									
	PROJECT DA	ATA	SITE DATA								
Centerline Dist to I	Barrier	0		Road Grade:		0					
Barrier (0=wall, 1=	berm):	0		Average Daily	y Traffic:	1600					
Receiver Barrier D	ist:	0		Peak Hour Tr	affic:	160					
Centerline Dist. To	Observer:	100		Vehicle Spee	d:	25					
Barrier Near Lane	CL Dist:	0		Centerline Se	eparation:	39					
Barrier Far lane Cl	L Dist:	0			NC	ISE INPUT	S				
Pad Elevation:		0.5		Site condition	is HARD S I	TE					
Road Elevation:		0		FLEET MIX							
Observer Height (a	above grade):	0		Туре	Day	Evening	Night	Daily			
Barrier Height:	,	0		Auto	0.775			0.9742			
Rt View: 90	0 Lf	t View:	-90	Med. Truck	0.848	0.049	0.103	0.0184			
NOISE S	OURCE ELEVA	ATIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074			
Autos:		0									
Medium Trucks:		2.3									
Heavy Trucks:		8									

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:	37.6	46.4	44.6	38.5	47.2	47.8			
Medium Trucks:	49.2	41.2	34.8	33.2	41.7	41.9			
Heavy Trucks:	55.4	43.5	34.4	35.6	46.0	46.1			
Vehicle Noise:	58.1	49.6	45.6	41.8	50.3	50.7			

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:								
Medium Trucks:								
Heavy Trucks:								
Vehicle Noise:								

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	14						
65 dBA	4						
70 dBA	1						
Mitigated							
60 dBA							
65 dBA							
70 dBA							



Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Existing Analyst: Erin Coffey Job #: 146566 Roadway: Lemon Avenue Road Segment: Amar Road to Meadow Pass Road PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 15,000 Receiver Barrier Dist: Peak Hour Traffic: 1500 0 Centerline Dist. To Observer: Vehicle Speed: 40 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 73 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type 0.9742 Barrier Height: 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.108 0.0074 Autos: Medium Trucks: 2.3

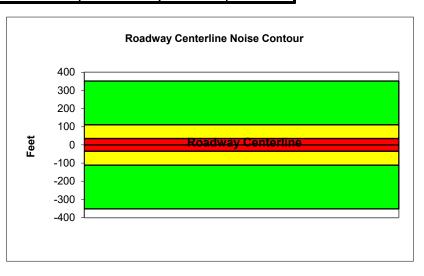
UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:	52.7	61.5	59.7	53.6	62.3	62.9			
Medium Trucks:	61.7	53.6	47.2	45.7	54.1	54.4			
Heavy Trucks:	66.5	54.6	45.5	46.8	56.5	56.6			
Vehicle Noise:	68.9	63.1	60.2	55.2	63.8	64.3			

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	352						
65 dBA	111						
70 dBA	35						
Mitigated							
60 dBA							
65 dBA							
70 dBA							

Heavy Trucks:



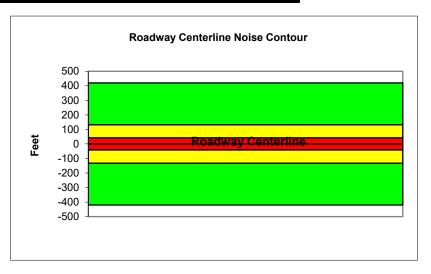
Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Existing Analyst: Erin Coffey Job #: 146566 Roadway: Lemon Avenue Meadow Pass Road to La Puente Road Road Segment: PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 17,900 Receiver Barrier Dist: Peak Hour Traffic: 1790 0 Centerline Dist. To Observer: Vehicle Speed: 40 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 38 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type 0.9742 Barrier Height: 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.108 0.0074 Autos: Medium Trucks: 2.3

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	54.0	62.8	61.0	54.9	63.5	64.1		
Medium Trucks:	62.9	54.9	48.5	46.9	55.4	55.6		
Heavy Trucks:	67.8	55.8	46.8	48.0	57.7	57.9		
Vehicle Noise:	70.2	64.3	61.4	56.5	65.1	65.5		

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)									
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	420						
65 dBA	133						
70 dBA	42						
Mitigated							
60 dBA							
65 dBA							
70 dBA							



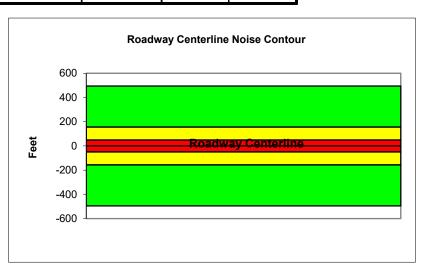
Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Existing Analyst: Erin Coffey Job #: 146566 Roadway: Lemon Avenue Road Segment: La Puente Road to Valley Boulevard PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 21,100 Receiver Barrier Dist: Peak Hour Traffic: 2110 0 Centerline Dist. To Observer: Vehicle Speed: 100 40 Barrier Near Lane CL Dist: 0 Centerline Separation: 41 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 0.108 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.0074 Autos: Medium Trucks: 2.3

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	54.7	63.4	61.6	55.6	64.2	64.8		
Medium Trucks:	63.6	55.5	49.2	47.6	56.1	56.3		
Heavy Trucks:	68.5	56.5	47.5	48.7	58.4	58.5		
Vehicle Noise:	70.8	65.0	62.1	57.1	65.7	66.2		

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)									
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	495						
65 dBA	157						
70 dBA	50						
Mitigated							
60 dBA							
65 dBA							
70 dBA							

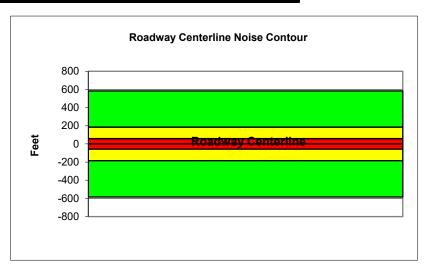


		Federal Highw	ay Adr	ninistration F	RD-77-108			
		Traffic Noise F	Predict	ion Model (C	ALVENO)			
Project Name:	Brookside P	roject			Scenario:	Existing		
Analyst:	Erin Coffey				Job #:	146566		
Roadway:	Lemon Aver	nue						
Road Segment:	South of Val	lley Boulevard						
	PROJECT I	DATA			5	SITE DATA		
Centerline Dist to	Barrier	0		Road Grade:		0		
Barrier (0=wall, 1=	: berm):	0		Average Dail	y Traffic:	24,900		
Receiver Barrier D)ist:	0		Peak Hour Traffic: 2490				
Centerline Dist. To	Observer:	100		Vehicle Spee	Vehicle Speed:			
Barrier Near Lane	CL Dist:	0		Centerline Se	eparation:	39		
Barrier Far lane C	L Dist:	0			NO	ISE INPUT	S	
Pad Elevation:		0.5		Site condition	is HARD SI	TE		
Road Elevation:		0			F	LEET MIX		
Observer Height (a	above grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:	-	0		Auto 0.775		0.129	0.096	0.9742
Rt View: 9	0	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE SOURCE ELEVATIONS (Feet)				Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0						
Medium Trucks:		2.3						

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	55.4	64.2	62.4	56.3	65.0	65.6		
Medium Trucks:	64.4	56.3	49.9	48.3	56.8	57.1		
Heavy Trucks:	69.2	57.3	48.2	49.4	59.1	59.3		
Vehicle Noise:	71.6	65.8	62.8	57.9	66.5	67.0		

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)									
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	584						
65 dBA	185						
70 dBA	58						
Mitigated							
60 dBA							
65 dBA							
70 dBA							

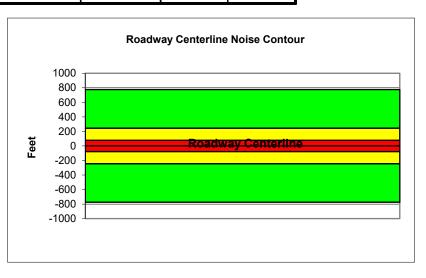


Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Existing Analyst: Erin Coffey Job #: 146566 Roadway: **Amar Road** Road Segment: West of Lemon Avenue PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 24,900 Receiver Barrier Dist: Peak Hour Traffic: 2490 0 Centerline Dist. To Observer: Vehicle Speed: 100 45 Barrier Near Lane CL Dist: 0 Centerline Separation: 32 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 **FLEET MIX** Road Elevation: 0 Observer Height (above grade): 0 Day Evening Night Daily Type 0.9742 Barrier Height: 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 0.108 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.0074 Autos: Medium Trucks: 2.3 Heavy Trucks: 8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	57.0	65.8	64.0	57.9	66.5	67.2		
Medium Trucks:	65.3	57.2	50.8	49.2	57.7	58.0		
Heavy Trucks:	69.8	57.8	48.8	50.0	59.6	59.7		
Vehicle Noise:	72.1	67.1	64.3	59.2	67.8	68.3		

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)									
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR						
775						
245						
77						

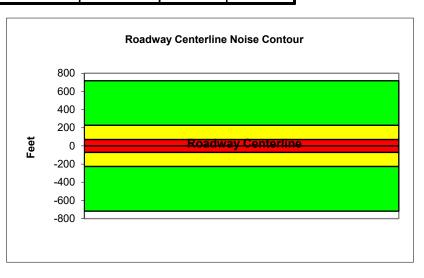


Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Existing Analyst: Erin Coffey Job #: 146566 Roadway: **Amar Road** Road Segment: West of Lemon Avenue PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 23,100 Receiver Barrier Dist: Peak Hour Traffic: 2310 0 Centerline Dist. To Observer: Vehicle Speed: 100 45 Barrier Near Lane CL Dist: 0 Centerline Separation: 32 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 0.108 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.0074 Autos: Medium Trucks: 2.3 Heavy Trucks: 8

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:	56.7	65.4	63.7	57.6	66.2	66.8	
Medium Trucks:	64.9	56.9	50.5	48.9	57.4	57.6	
Heavy Trucks:	69.5	57.5	48.5	49.7	59.2	59.4	
Vehicle Noise:	71.8	66.7	64.0	58.9	67.5	68.0	

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	718					
65 dBA	227					
70 dBA	72					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

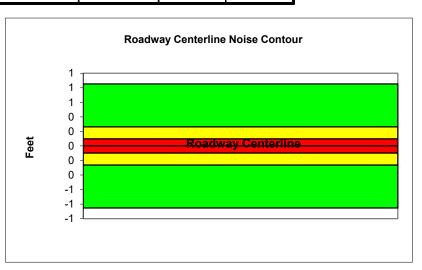


		Federal Highw Traffic Noise F						
Project Name:	Brookside Pro	oject		-	Scenario:	Existing		
Analyst:	Erin Coffey				Job #:	146566		
Roadway:	Meadow Pass	s Road						
Road Segment:	West of Lemo	on Avenue						
	PROJECT D	ATA			S	ITE DATA		
Centerline Dist to E	Barrier	0		Road Grade:		0		
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	100		
Receiver Barrier Di	st:	0		Peak Hour Ti	raffic:	10		
Centerline Dist. To	Observer:	100		Vehicle Spee	ed:	25		
Barrier Near Lane	CL Dist:	0		Centerline Se	eparation:	14		
Barrier Far lane CL	. Dist:	0			NO	ISE INPUT	S	
Pad Elevation:		0.5		Site condition	ns HARD SI	TE		
Road Elevation:		0		FLEET MIX				
Observer Height (a	bove grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90) Li	ft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE S	OURCE ELEV	ATIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0						
Medium Trucks:		2.3						
Heavy Trucks:		8						

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:	26.0	34.8	33.0	26.9	35.6	36.2	
Medium Trucks:	37.6	29.6	23.2	21.6	30.1	30.3	
Heavy Trucks:	43.8	31.9	22.8	24.0	34.4	34.5	
Vehicle Noise:	46.5	38.0	34.0	30.1	38.7	39.1	

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	1					
65 dBA	0					
70 dBA	0					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

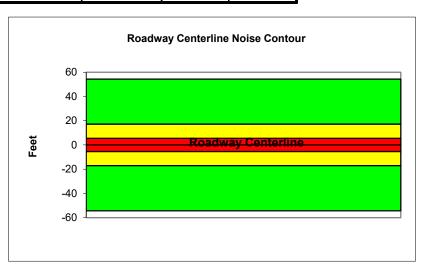


	Feder	al Highway Adn	ninistration R	RD-77-108			
		c Noise Predicti					
Project Name: B	Brookside Project			Scenario:	Existing		
Analyst: E	Frin Coffey			Job #:	146566		
Roadway: N	leadow Pass Road						
Road Segment: L	emon Avenue to Col	t Lane					
F	PROJECT DATA			S	ITE DATA		
Centerline Dist to Bar	rier	0	Road Grade:		0		
Barrier (0=wall, 1= be	erm):	0	Average Daily	y Traffic:	4,400		
Receiver Barrier Dist:	•	0	Peak Hour Tr	affic:	440		
Centerline Dist. To O	bserver: 10	0	Vehicle Spee	d:	30		
Barrier Near Lane CL	. Dist:	0	Centerline Se	eparation:	22		
Barrier Far lane CL D	ist:	0		NO	ISE INPUT	S	
Pad Elevation:	0.	5	Site condition	is HARD S I	TE		
Road Elevation:		0		F	LEET MIX		
Observer Height (abo	ove grade):	0	Туре	Day	Evening	Night	Daily
Barrier Height:		0	Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE SOL	JRCE ELEVATIONS	(Feet)	Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0					
Medium Trucks:	2.	3					

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:	44.6	53.3	51.6	45.5	54.1	54.7	
Medium Trucks:	55.2	47.1	40.7	39.1	47.6	47.9	
Heavy Trucks:	60.8	48.9	39.8	41.0	51.2	51.3	
Vehicle Noise:	63.3	55.8	52.3	48.0	56.5	56.9	

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR					
Unmitigated					
60 dBA	54				
65 dBA	17				
70 dBA	5				
Mitigated					
60 dBA					
65 dBA					
70 dBA					

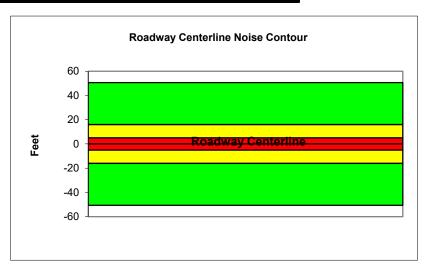


			ninistration Fion Model (C				
Project Name:	Brookside Project		-	Scenario:	Existing		
Analyst:	Erin Coffey			Job #:	146566		
Roadway:	Meadow Pass Road						
Road Segment:	East of Colt Lane						
	PROJECT DATA			9	ITE DATA		
Centerline Dist to B	arrier 0		Road Grade:		0		
Barrier (0=wall, 1=	berm): 0		Average Dail	y Traffic:	4,100		
Receiver Barrier Di	st: 0		Peak Hour Ti	affic:	410		
Centerline Dist. To	Observer: 100		Vehicle Spee	d:	30		
Barrier Near Lane (CL Dist: 0		Centerline Se	eparation:	25		
Barrier Far lane CL	Dist: 0			NO	ISE INPUT	S	
Pad Elevation:	0.5		Site condition	is HARD SI	TE		
Road Elevation:	0			F	LEET MIX		
Observer Height (a	bove grade): 0		Туре	Day	Evening	Night	Daily
Barrier Height:	0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE SO	OURCE ELEVATIONS (Fe	eet)	Heavy Truck	0.865	0.027	0.108	0.0074
Autos:	0					-	
Medium Trucks:	2.3						
Heavy Trucks:	8						

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	44.2	53.0	51.2	45.1	53.8	54.4		
Medium Trucks:	54.8	46.7	40.4	38.8	47.3	47.5		
Heavy Trucks:	60.4	48.5	39.5	40.7	50.8	50.9		
Vehicle Noise:	63.0	55.5	51.9	47.6	56.1	56.6		

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOIS	CENTERLINE NOISE CONTOUR						
Unmitigated							
60 dBA	51						
65 dBA	16						
70 dBA	5						
Mitigated							
60 dBA							
65 dBA							
70 dBA							

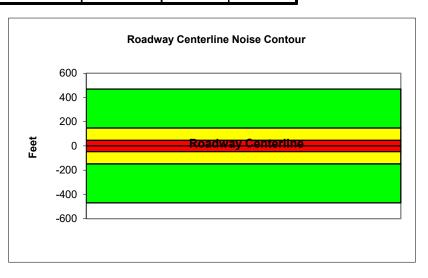


		Federal Highwa Traffic Noise P						
Project Name:	Brookside Pro			·	Scenario:	Existing		
Analyst:	Erin Coffey	•			Job #:	146566		
Roadway:	La Puente Ro	ad						
Road Segment:	West of Lemo	n Avenue						
	PROJECT DA	ATA			5	ITE DATA		
Centerline Dist to E	Barrier	0		Road Grade:		0		
Barrier (0=wall, 1=	berm):	0		Average Daily	y Traffic:	15,100		
Receiver Barrier Di	ist:	0		Peak Hour Tr	affic:	1510		
Centerline Dist. To	Observer:	100		Vehicle Spee	d:	45		
Barrier Near Lane	CL Dist:	0		Centerline Se	eparation:	31		
Barrier Far lane CL	. Dist:	0			NO	ISE INPUT	S	
Pad Elevation:		0.5		Site condition	is HARD S I	TE		
Road Elevation:		0		FLEET MIX				
Observer Height (a	bove grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90) Lf	t View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE S	OURCE ELEV	ATIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0						
Medium Trucks:		2.3						
Heavy Trucks:		8						

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:	54.8	63.6	61.8	55.7	64.4	65.0	
Medium Trucks:	63.1	55.0	48.7	47.1	55.6	55.8	
Heavy Trucks:	67.6	55.7	46.6	47.9	57.4	57.5	
Vehicle Noise:	70.0	64.9	62.2	57.0	65.6	66.1	

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	470					
65 dBA	148					
70 dBA	47					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

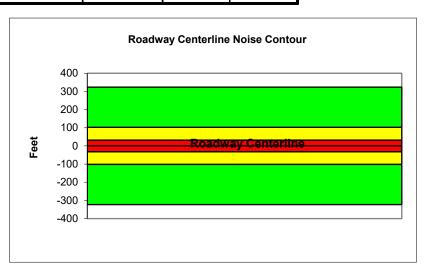


		ral Highway Adr ic Noise Predict					
Project Name:	Brookside Project		-	Scenario:	Existing		
Analyst:	Erin Coffey			Job #:	146566		
Roadway:	La Puente Road						
Road Segment:	East of Lemon Aven	ue					
	PROJECT DATA			S	SITE DATA		
Centerline Dist to E	Barrier	0	Road Grade:		0		
Barrier (0=wall, 1=	berm):	0	Average Dail	y Traffic:	13,800		
Receiver Barrier D	st:	0	Peak Hour T	raffic:	1380		
Centerline Dist. To	Observer: 1	00	Vehicle Spee	d:	40		
Barrier Near Lane	CL Dist:	0	Centerline Se	eparation:	31		
Barrier Far lane CL	. Dist:	0		NO	ISE INPUT	S	
Pad Elevation:	().5	Site condition	is HARD SI	TE		
Road Elevation:		0			LEET MIX		
Observer Height (a	bove grade):	0	Туре	Day	Evening	Night	Daily
Barrier Height:		0	Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE S	OURCE ELEVATION	S (Feet)	Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0				7	
Medium Trucks:	2	2.3					
Heavy Trucks:		8					

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	53.0	61.7	60.0	53.9	62.5	63.1		
Medium Trucks:	61.9	53.9	47.5	45.9	54.4	54.6		
Heavy Trucks:	66.8	54.8	45.8	47.0	56.7	56.8		
Vehicle Noise:	69.1	63.3	60.4	55.5	64.0	64.5		

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	323					
65 dBA	102					
70 dBA	32					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

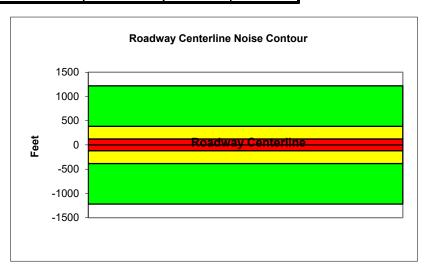


		ral Highway Adn c Noise Predict					
Project Name:	Brookside Project		-	Scenario:	Existing		
Analyst:	Erin Coffey			Job #:	146566		
Roadway:	Valley Boulevard						
Road Segment:	West of Lemon Aven	ue					
	PROJECT DATA			S	ITE DATA		
Centerline Dist to E	Barrier	0	Road Grade:		0		
Barrier (0=wall, 1=	berm):	0	Average Dail	y Traffic:	30,200		
Receiver Barrier Di	st:	0	Peak Hour Ti	raffic:	3020		
Centerline Dist. To	Observer: 10	0	Vehicle Spee	ed:	50		
Barrier Near Lane	CL Dist:	0	Centerline Se	eparation:	46		
Barrier Far lane CL	. Dist:	0		NO	ISE INPUT	S	
Pad Elevation:	0.	.5	Site condition	ns HARD SI	TE		
Road Elevation:		0		F	LEET MIX		
Observer Height (a	bove grade):	0	Туре	Day	Evening	Night	Daily
Barrier Height:		0	Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE S	OURCE ELEVATIONS	(Feet)	Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0		-			
Medium Trucks:	2.	.3					
Heavy Trucks:		8					

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:	58.9	67.7	65.9	59.8	68.5	69.1			
Medium Trucks:	66.6	58.5	52.1	50.6	59.1	59.3			
Heavy Trucks:	70.8	58.9	49.8	51.1	60.4	60.6			
Vehicle Noise:	73.1	68.8	66.2	60.9	69.5	70.0			

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	1220						
65 dBA	386						
70 dBA	122						
Mitigated							
60 dBA							
65 dBA							
70 dBA							

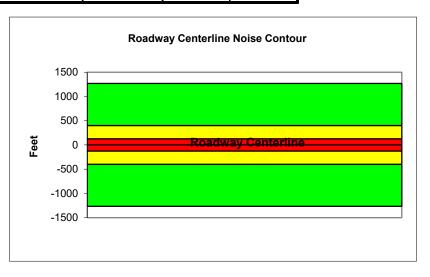


		ral Highway Adn ic Noise Predicti					
Project Name:	Brookside Project		•	Scenario:	Existing		
Analyst:	Erin Coffey			Job #:	146566		
Roadway:	Valley Boulevard						
Road Segment:	East of Lemon Avenu	ıe					
	PROJECT DATA			5	SITE DATA		
Centerline Dist to E	Barrier	0	Road Grade:		0		
Barrier (0=wall, 1=	berm):	0	Average Dail	y Traffic:	31,400		
Receiver Barrier Di	ist:	0	Peak Hour Ti	raffic:	3140		
Centerline Dist. To	Observer: 10	00	Vehicle Spee	ed:	50		
Barrier Near Lane	CL Dist:	0	Centerline Se	eparation:	46		
Barrier Far lane CL	. Dist:	0		NO	ISE INPUT	S	
Pad Elevation:	0	.5	Site condition	ns HARD SI	TE		
Road Elevation:		0		F	LEET MIX		
Observer Height (a	bove grade):	0	Туре	Day	Evening	Night	Daily
Barrier Height:		0	Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE S	OURCE ELEVATIONS	S (Feet)	Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0		-		,	-
Medium Trucks:	2	3					
Heavy Trucks:		8					

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:	59.1	67.9	66.1	60.0	68.7	69.3	
Medium Trucks:	66.8	58.7	52.3	50.7	59.2	59.5	
Heavy Trucks:	71.0	59.1	50.0	51.2	60.6	60.7	
Vehicle Noise:	73.3	69.0	66.4	61.1	69.7	70.2	

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOIS	CENTERLINE NOISE CONTOUR							
Unmitigated								
60 dBA	1268							
65 dBA	401							
70 dBA	127							
Mitigated								
60 dBA								
65 dBA								
70 dBA								

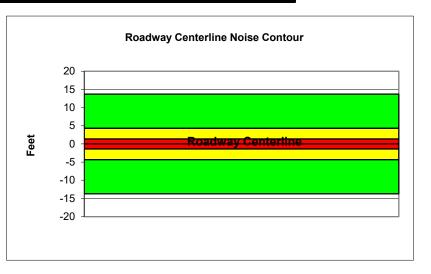


				ninistration R					
Project Name:	Brookside Projec		rieulet	ion Model (C	Scenario:	Future			
Analyst:	Erin Coffey	-			Job #:	146566			
Roadway:	Lemon Avenue								
Road Segment:	North of Amar Ro	ad							
	PROJECT DATA	1			5	SITE DATA			
Centerline Dist to I	Barrier	0		Road Grade:		0			
Barrier (0=wall, 1=	berm):	0		Average Daily	y Traffic:	1600			
Receiver Barrier D	ist:	0		Peak Hour Tr	affic:	160			
Centerline Dist. To	Observer:	100		Vehicle Spee	d:	25			
Barrier Near Lane	CL Dist:	0		Centerline Se	eparation:	39			
Barrier Far lane Cl	∟ Dist:	0		NOISE INPUTS					
Pad Elevation:		0.5		Site condition	is HARD S I	TE			
Road Elevation:		0		FLEET MIX					
Observer Height (a	above grade):	0		Туре	Day	Evening	Night	Daily	
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742	
Rt View: 90	Lft Vi	ew:	-90	Med. Truck	0.848	0.049	0.103	0.0184	
NOISE S	OURCE ELEVATION	ONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074	
Autos:		0							
Medium Trucks:		2.3							
Heavy Trucks:		8							

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	37.6	46.4	44.6	38.5	47.2	47.8		
Medium Trucks:	49.2	41.2	34.8	33.2	41.7	41.9		
Heavy Trucks:	55.4	43.5	34.4	35.6	46.0	46.1		
Vehicle Noise:	58.1	49.6	45.6	41.8	50.3	50.7		

MITIGAT	MITIGATED NOISE LEVELS (With topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	14					
65 dBA	4					
70 dBA	1					
Mitigated						
60 dBA						
65 dBA						
70 dBA						



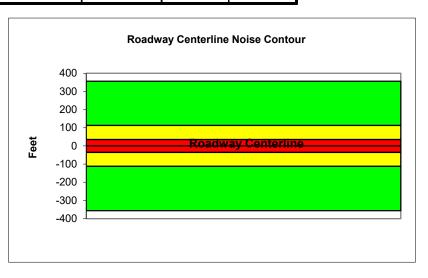
Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Analyst: Erin Coffey Job #: 146566 Roadway: Lemon Avenue Road Segment: Amar Road to Meadow Pass Road PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 15200 Receiver Barrier Dist: Peak Hour Traffic: 1520 0 Centerline Dist. To Observer: Vehicle Speed: 40 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 73 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.108 0.0074 Autos: Medium Trucks: 2.3

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	52.8	61.6	59.8	53.7	62.3	62.9		
Medium Trucks:	61.7	53.7	47.3	45.7	54.2	54.4		
Heavy Trucks:	66.6	54.6	45.6	46.8	56.5	56.6		
Vehicle Noise:	69.0	63.1	60.2	55.3	63.9	64.3		

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)									
Vehicle Type	icle Type Peak Leq Leq Day Leq Evening Leq Night Ldn								
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	356						
65 dBA	113						
70 dBA	36						
Mitigated							
60 dBA							
65 dBA							
70 dBA							



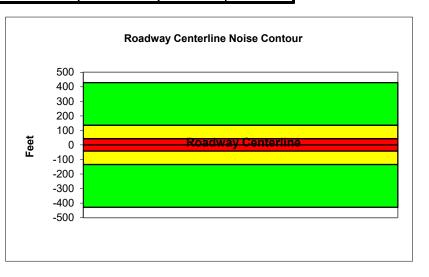
Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Existing Analyst: Erin Coffey Job #: 146566 Roadway: Lemon Avenue Meadow Pass Road to La Puente Road Road Segment: PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 18,300 Receiver Barrier Dist: Peak Hour Traffic: 1830 0 Centerline Dist. To Observer: Vehicle Speed: 40 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 38 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 **FLEET MIX** Road Elevation: 0 Observer Height (above grade): 0 Day Evening Night Daily Type 0.9742 Barrier Height: 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 0.108 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.0074 Autos: Medium Trucks: 2.3

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	54.1	62.9	61.1	55.0	63.6	64.2		
Medium Trucks:	63.0	55.0	48.6	47.0	55.5	55.7		
Heavy Trucks:	67.9	55.9	46.9	48.1	57.8	57.9		
Vehicle Noise:	70.3	64.4	61.5	56.6	65.1	65.6		

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)									
Vehicle Type	icle Type Peak Leq Leq Day Leq Evening Leq Night Ldn								
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR							
428							
136							
43							



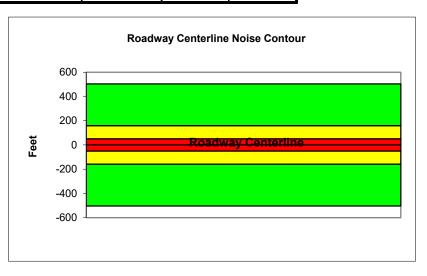
Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Analyst: Erin Coffey Job #: 146566 Roadway: Lemon Avenue Road Segment: La Puente Road to Valley Boulevard PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 21,500 Receiver Barrier Dist: Peak Hour Traffic: 2150 0 Centerline Dist. To Observer: Vehicle Speed: 100 40 Barrier Near Lane CL Dist: 0 Centerline Separation: 41 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 0.108 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.0074 Autos: Medium Trucks: 2.3

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	54.7	63.5	61.7	55.6	64.3	64.9		
Medium Trucks:	63.7	55.6	49.2	47.7	56.2	56.4		
Heavy Trucks:	68.5	56.6	47.5	48.8	58.5	58.6		
Vehicle Noise:	70.9	65.1	62.2	57.2	65.8	66.3		

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)									
Vehicle Type	Type Peak Leq Leq Day Leq Evening Leq Night Ldn								
Autos:									
Medium Trucks:									
Heavy Trucks:									
Vehicle Noise:									

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	504						
65 dBA	159						
70 dBA	50						
Mitigated							
60 dBA							
65 dBA							
70 dBA							

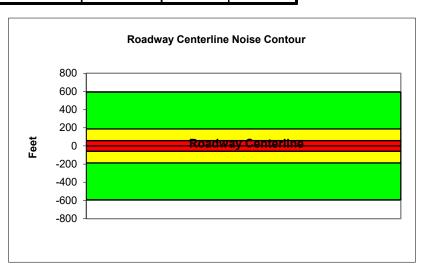


		Federal Highwa Traffic Noise P							
Project Name:	Brookside Proj			·	Scenario:	Future			
Analyst:	Erin Coffey				Job #:	146566			
Roadway:	Lemon Avenue)							
Road Segment:	South of Valley	/ Boulevard							
	PROJECT DA	TA			5	ITE DATA			
Centerline Dist to E	Barrier	0		Road Grade:		0			
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	25,300			
Receiver Barrier Di	ist:	0		Peak Hour Traffic:		2530			
Centerline Dist. To	Observer:	100		Vehicle Speed: 4		40			
Barrier Near Lane	CL Dist:	0		Centerline Separation:		39			
Barrier Far lane CL	. Dist:	0		NOISE INPUTS					
Pad Elevation:		0.5		Site conditions HARD SITE					
Road Elevation:		0			F	LEET MIX			
Observer Height (a	bove grade):	0		Туре	Day	Evening	Night	Daily	
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742	
Rt View: 90) Lft	View:	-90	Med. Truck	0.848	0.049	0.103	0.0184	
NOISE S	OURCE ELEVA	TIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074	
Autos:		0							
Medium Trucks:		2.3							
Heavy Trucks:		8							

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	55.5	64.3	62.5	56.4	65.0	65.6		
Medium Trucks:	64.4	56.4	50.0	48.4	56.9	57.1		
Heavy Trucks:	69.3	57.3	48.3	49.5	59.2	59.3		
Vehicle Noise:	71.6	65.8	62.9	58.0	66.5	67.0		

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)								
Vehicle Type	nicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn							
Autos:								
Medium Trucks:								
Heavy Trucks:								
Vehicle Noise:								

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	592					
65 dBA	187					
70 dBA	59					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

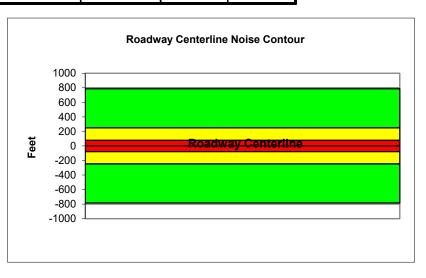


Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Analyst: Erin Coffey Job #: 146566 Roadway: **Amar Road** Road Segment: West of Lemon Avenue PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 25,300 Receiver Barrier Dist: Peak Hour Traffic: 2530 0 Centerline Dist. To Observer: Vehicle Speed: 100 45 Barrier Near Lane CL Dist: 0 Centerline Separation: 32 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type 0.9742 Barrier Height: 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.108 0.0074 Autos: Medium Trucks: 2.3 Heavy Trucks: 8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	ehicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn							
Autos:	57.1	65.8	64.0	58.0	66.6	67.2		
Medium Trucks:	65.3	57.3	50.9	49.3	57.8	58.0		
Heavy Trucks:	69.9	57.9	48.9	50.1	59.6	59.8		
Vehicle Noise:	72.2	67.1	64.4	59.3	67.9	68.4		

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)								
Vehicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn CNE								
Autos:								
Medium Trucks:								
Heavy Trucks:								
Vehicle Noise:								

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	786					
65 dBA	249					
70 dBA	79					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

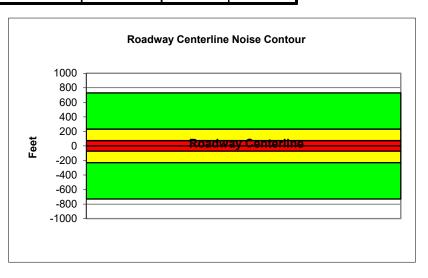


Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Analyst: Erin Coffey Job #: 146566 Roadway: Amar Road Road Segment: East of Lemon Avenue PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 23,500 Receiver Barrier Dist: Peak Hour Traffic: 2350 0 Centerline Dist. To Observer: Vehicle Speed: 100 45 Barrier Near Lane CL Dist: 0 Centerline Separation: 32 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.108 0.0074 Autos: Medium Trucks: 2.3 Heavy Trucks: 8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	hicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn							
Autos:	56.7	65.5	63.7	57.6	66.3	66.9		
Medium Trucks:	65.0	56.9	50.6	49.0	57.5	57.7		
Heavy Trucks:	69.5	57.6	48.5	49.8	59.3	59.4		
Vehicle Noise:	71.9	66.8	64.1	58.9	67.5	68.0		

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)								
Vehicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn CNE								
Autos:								
Medium Trucks:								
Heavy Trucks:								
Vehicle Noise:								

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	730					
65 dBA	231					
70 dBA	73					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

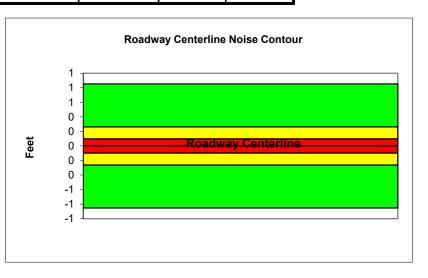


	Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)								
Project Name:	Brookside Project		•	Scenario:	Future				
Analyst:	Erin Coffey			Job #:	146566				
Roadway:	Meadow Pass Road	b							
Road Segment:	West of Lemon Ave	enue							
	PROJECT DATA			5	SITE DATA				
Centerline Dist to B	arrier	0	Road Grade:		0				
Barrier (0=wall, 1=	berm):	0	Average Dail	y Traffic:	100				
Receiver Barrier Di	st:	0	Peak Hour T	raffic:	10				
Centerline Dist. To	Observer:	100	Vehicle Speed:		25				
Barrier Near Lane (CL Dist:	0	Centerline Se	eparation:	14				
Barrier Far lane CL	Dist:	0		NC	ISE INPUT	S			
Pad Elevation:		0.5	Site condition	ns HARD S I	TE				
Road Elevation:		0		F	LEET MIX				
Observer Height (a	bove grade):	0	Туре	Day	Evening	Night	Daily		
Barrier Height:		0	Auto	0.775	0.129	0.096	0.9742		
Rt View: 90	Lft View	v: -9 0	Med. Truck	0.848	0.049	0.103	0.0184		
NOISE SO	NOISE SOURCE ELEVATIONS (Feet)			0.865	0.027	0.108	0.0074		
Autos:		0		-	-	,	-		
Medium Trucks:		2.3							
Heavy Trucks:		8							

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)								
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL		
Autos:	26.0	34.8	33.0	26.9	35.6	36.2		
Medium Trucks:	37.6	29.6	23.2	21.6	30.1	30.3		
Heavy Trucks:	43.8	31.9	22.8	24.0	34.4	34.5		
Vehicle Noise:	46.5	38.0	34.0	30.1	38.7	39.1		

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)								
Vehicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn CNE								
Autos:								
Medium Trucks:								
Heavy Trucks:								
Vehicle Noise:								

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	1					
65 dBA	0					
70 dBA	0					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

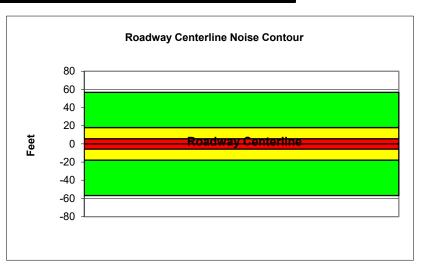


	Federal Highway Administration RD-77-108								
		Traffic Noise F	Predict	ion Model (C	ALVENO)				
Project Name:	Brookside F	Project			Scenario:	Future			
Analyst:	Erin Coffey				Job #:	146566			
Roadway:	Meadow Pa	ass Road							
Road Segment:	Lemon Ave	nue to Colt Lane							
	PROJECT	DATA			5	SITE DATA			
Centerline Dist to	Barrier	0		Road Grade:		0			
Barrier (0=wall, 1=	= berm):	0		Average Dail	y Traffic:	4,600			
Receiver Barrier [Dist:	0		Peak Hour Traffic: 460					
Centerline Dist. T	o Observer:	100		Vehicle Speed: 30					
Barrier Near Lane	CL Dist:	0		Centerline Separation:		22			
Barrier Far lane C	L Dist:	0		NOISE INPUTS					
Pad Elevation:		0.5		Site condition	is HARD S I	TE			
Road Elevation:		0			F	LEET MIX			
Observer Height ((above grade)	. 0		Туре	Day	Evening	Night	Daily	
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742	
Rt View: 9	0	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184	
NOISE S	SOURCE ELE	VATIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074	
Autos:		0							
Medium Trucks:		2.3							

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:	44.8	53.5	51.7	45.7	54.3	54.9				
Medium Trucks:	55.4	47.3	40.9	39.3	47.8	48.1				
Heavy Trucks:	61.0	49.1	40.0	41.2	51.4	51.5				
Vehicle Noise:	63.5	56.0	52.5	48.1	56.7	57.1				

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	57					
65 dBA	18					
70 dBA	6					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

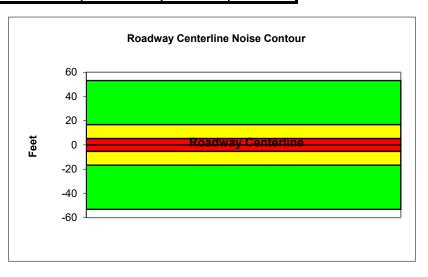


	Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)								
Project Name:	Brookside Project		-	Scenario:	Future				
Analyst:	Erin Coffey			Job #:	146566				
Roadway:	Meadow Pass Road	i							
Road Segment:	East of Colt Lane								
	PROJECT DATA			S	ITE DATA				
Centerline Dist to E	Barrier	0	Road Grade:		0				
Barrier (0=wall, 1=	berm):	0	Average Dail	y Traffic:	4,300				
Receiver Barrier Di	st:	0	Peak Hour T	raffic:	430				
Centerline Dist. To	Observer:	100	Vehicle Spee	Vehicle Speed: 30					
Barrier Near Lane	CL Dist:	0	Centerline Separation: 25						
Barrier Far lane CL	. Dist:	0	NOISE INPUTS						
Pad Elevation:		0.5	Site condition	ns HARD SI	TE				
Road Elevation:		0			LEET MIX				
Observer Height (a	bove grade):	0	Туре	Day	Evening	Night	Daily		
Barrier Height:		0	Auto	0.775	0.129	0.096	0.9742		
Rt View: 90	Lft View	r: -90	Med. Truck	0.848	0.049	0.103	0.0184		
NOISE S	OURCE ELEVATION	IS (Feet)	Heavy Truck	0.865	0.027	0.108	0.0074		
Autos:		0		•					
Medium Trucks:		2.3							
Heavy Trucks:		8							

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn											
Autos:	44.4	53.2	51.4	45.3	54.0	54.6					
Medium Trucks:	55.0	46.9	40.6	39.0	47.5	47.7					
Heavy Trucks:	60.7	48.7	39.7	40.9	51.0	51.1					
Vehicle Noise:	63.2	55.7	52.1	47.8	56.3	56.8					

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	53					
65 dBA	17					
70 dBA	5					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

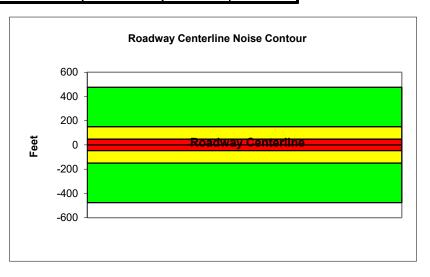


	Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)									
Project Name:	Brookside Proje	ct		·	Scenario:	Future				
Analyst:	Erin Coffey				Job #:	146566				
Roadway:	La Puente Road	d								
Road Segment:	West of Lemon	Avenue								
	PROJECT DAT	Ά			S	ITE DATA				
Centerline Dist to E	Barrier	0		Road Grade:		0				
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	15,300				
Receiver Barrier Di	st:	0		Peak Hour Tr	affic:	1530				
Centerline Dist. To	Observer:	100		Vehicle Speed:		45				
Barrier Near Lane	CL Dist:	0		Centerline Separation: 31						
Barrier Far lane CL	. Dist:	0		NOISE INPUTS						
Pad Elevation:		0.5		Site condition	is HARD SI	TE				
Road Elevation:		0			F	LEET MIX				
Observer Height (a	bove grade):	0		Туре	Day	Evening	Night	Daily		
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742		
Rt View: 90	Lft \	/iew:	-90	Med. Truck	0.848	0.049	0.103	0.0184		
NOISE S	OURCE ELEVAT	IONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074		
Autos:		0								
Medium Trucks:		2.3								
Heavy Trucks:		8								

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:	54.9	63.7	61.9	55.8	64.4	65.1				
Medium Trucks:	63.2	55.1	48.7	47.1	55.6	55.9				
Heavy Trucks:	67.7	55.7	46.7	47.9	57.5	57.6				
Vehicle Noise:	70.0	65.0	62.2	57.1	65.7	66.2				

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	476					
65 dBA	151					
70 dBA	48					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

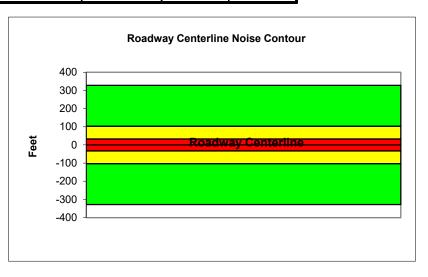


	Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)									
Project Name:	Brookside Proj	ect		-	Scenario:	Future				
Analyst:	Erin Coffey				Job #:	146566				
Roadway:	La Puente Roa	nd								
Road Segment:	East of Lemon	Avenue								
	PROJECT DA	TA			S	ITE DATA				
Centerline Dist to E	Barrier	0		Road Grade:		0				
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	14,000				
Receiver Barrier Di	ist:	0		Peak Hour Ti	raffic:	1400				
Centerline Dist. To	Observer:	100		Vehicle Speed: 40						
Barrier Near Lane	CL Dist:	0		Centerline Separation: 31						
Barrier Far lane CL	Dist:	0			NO	ISE INPUT	S			
Pad Elevation:		0.5		Site condition	is HARD SI	TE				
Road Elevation:		0			F	LEET MIX				
Observer Height (a	bove grade):	0		Туре	Day	Evening	Night	Daily		
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742		
Rt View: 90) Lft	View:	-90	Med. Truck	0.848	0.049	0.103	0.0184		
NOISE S	OURCE ELEVA	TIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074		
Autos:		0								
Medium Trucks:		2.3								
Heavy Trucks:		8								

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:	53.0	61.8	60.0	53.9	62.6	63.2				
Medium Trucks:	62.0	53.9	47.5	46.0	54.4	54.7				
Heavy Trucks:	66.8	54.9	45.8	47.1	56.8	56.9				
Vehicle Noise:	69.2	63.4	60.5	55.5	64.1	64.6				

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOIS	SE CONTOUR
Unmitigated	
60 dBA	328
65 dBA	104
70 dBA	33
Mitigated	
60 dBA	
65 dBA	
70 dBA	

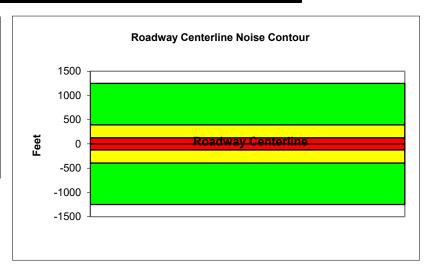


	Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)									
Project Name:	Brookside Proje	ect		·	Scenario:	Future				
Analyst:	Erin Coffey				Job #:	146566				
Roadway:	Valley Boulevar	d								
Road Segment:	West of Lemon	Avenue								
	PROJECT DAT	ΓΑ			S	ITE DATA				
Centerline Dist to E	Barrier	0		Road Grade:		0				
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	31,000				
Receiver Barrier Di	ist:	0		Peak Hour Tr	affic:	3100				
Centerline Dist. To	Observer:	100		Vehicle Speed:		50				
Barrier Near Lane	CL Dist:	0		Centerline Separation: 46						
Barrier Far lane CL	Dist:	0		NOISE INPUTS						
Pad Elevation:		0.5		Site condition	is HARD SI	TE				
Road Elevation:		0			F	LEET MIX				
Observer Height (a	bove grade):	0		Туре	Day	Evening	Night	Daily		
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742		
Rt View: 90	Lft '	View:	-90	Med. Truck	0.848	0.049	0.103	0.0184		
NOISE S	OURCE ELEVAT	TIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074		
Autos:		0								
Medium Trucks:		2.3								
Heavy Trucks:		8								

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)									
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:	59.0	67.8	66.0	59.9	68.6	69.2			
Medium Trucks:	66.7	58.6	52.3	50.7	59.2	59.4			
Heavy Trucks:	70.9	59.0	49.9	51.2	60.6	60.7			
Vehicle Noise:	73.3	68.9	66.3	61.0	69.6	70.2			

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn CN										
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOIS	SE CONTOUR
Unmitigated	
60 dBA	1251
65 dBA	396
70 dBA	125
Mitigated	
60 dBA	
65 dBA	
70 dBA	

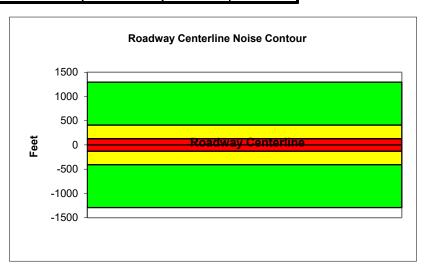


	Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)								
Project Name:	Brookside Project		-	Scenario:	Future				
Analyst:	Erin Coffey			Job #:	146566				
Roadway:	Valley Boulevard								
Road Segment:	East of Lemon Avenue	9							
	PROJECT DATA			9	ITE DATA				
Centerline Dist to E	Barrier ()	Road Grade:		0				
Barrier (0=wall, 1=	berm):)	Average Dail	y Traffic:	32,100				
Receiver Barrier Di	st: ()	Peak Hour T	raffic:	3210				
Centerline Dist. To	Observer: 100)	Vehicle Speed:		50				
Barrier Near Lane	CL Dist: ()	Centerline Separation: 46						
Barrier Far lane CL	Dist:)	NOISE INPUTS						
Pad Elevation:	0.8	5	Site condition	is HARD SI	TE				
Road Elevation:	()			LEET MIX				
Observer Height (a	bove grade):)	Туре	Day	Evening	Night	Daily		
Barrier Height:	()	Auto	0.775	0.129	0.096	0.9742		
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184		
NOISE S	NOISE SOURCE ELEVATIONS (Feet)			0.865	0.027	0.108	0.0074		
Autos:	()				•	•		
Medium Trucks:	2.3	3							
Heavy Trucks:	8	3							

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:	59.2	68.0	66.2	60.1	68.7	69.4				
Medium Trucks:	66.9	58.8	52.4	50.8	59.3	59.6				
Heavy Trucks:	71.1	59.2	50.1	51.3	60.7	60.8				
Vehicle Noise:	73.4	69.1	66.5	61.2	69.8	70.3				

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOIS	SE CONTOUR
Unmitigated	
60 dBA	1295
65 dBA	409
70 dBA	129
Mitigated	
60 dBA	
65 dBA	
70 dBA	

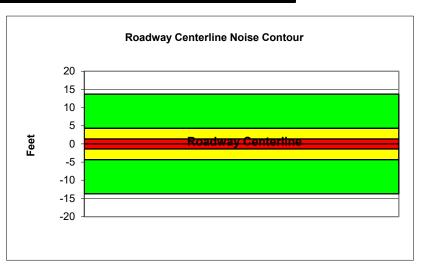


Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)								
Project Name:	Brookside Proje	ect			Scenario:	Future Plus	s Project	
Analyst:	Erin Coffey				Job #:	146566		
Roadway:	Lemon Avenue	•						
Road Segment:	North of Amar	Road						
	PROJECT DA	TA			S	SITE DATA		
Centerline Dist to E	Barrier	0		Road Grade:		0		
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	1600		
Receiver Barrier Di	ist:	0		Peak Hour Ti	raffic:	160		
Centerline Dist. To	Observer:	100		Vehicle Spee	d:	25		
Barrier Near Lane	CL Dist:	0		Centerline Se	eparation:	39		
Barrier Far lane CL	. Dist:	0			NO	ISE INPUT	S	
Pad Elevation:		0.5		Site condition	is HARD SI	TE		
Road Elevation:		0			F	LEET MIX		
Observer Height (a	ibove grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lft	View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE S	OURCE ELEVA	TIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0						
Medium Trucks:		2.3						
Heavy Trucks:		8						

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)									
Vehicle Type	e Peak Leq Leq Day Leq Evening Leq Night Ldn		Ldn	CNEL					
Autos:	37.6	46.4	44.6	38.5	47.2	47.8			
Medium Trucks:	49.2	41.2	34.8	33.2	41.7	41.9			
Heavy Trucks:	55.4	43.5	34.4	35.6	46.0	46.1			
Vehicle Noise:	58.1	49.6	45.6	41.8	50.3	50.7			

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	14						
65 dBA	4						
70 dBA	1						
Mitigated							
60 dBA							
65 dBA							
70 dBA							



Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)

Project Name: Brookside Project Scenario: Future Plus Project

Analyst: Erin Coffey Job #: 146566

Roadway: Lemon Avenue

Road Segment: Amar Road to Meadow Pass Road

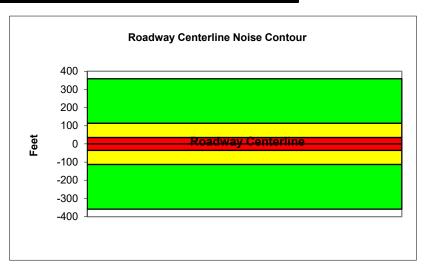
PROJECT DATA				5	SITE DATA		
Centerline Dist to Barrier	0		Road Grade:		0		
Barrier (0=wall, 1= berm):	0		Average Dail	y Traffic:	15300		
Receiver Barrier Dist:	0		Peak Hour Ti	raffic:	1530		
Centerline Dist. To Observer:	100		Vehicle Spee	ed:	40		
Barrier Near Lane CL Dist:	0		Centerline Se	eparation:	73		
Barrier Far lane CL Dist:	0			NO	ISE INPUT	S	
Pad Elevation:	0.5		Site condition	ns HARD SI	TE		
Road Elevation:	0			F	LEET MIX		
Observer Height (above grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:	0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90 Lf	t View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE SOURCE ELEVA	NOISE SOURCE ELEVATIONS (Feet)				0.027	0.108	0.0074

Autos: 0
Medium Trucks: 2.3
Heavy Trucks: 8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)									
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:	52.8	61.6	59.8	53.7	62.4	63.0			
Medium Trucks:	61.8	53.7	47.3	45.7	54.2	54.5			
Heavy Trucks:	66.6	54.7	45.6	46.8	56.6	56.7			
Vehicle Noise:	69.0	63.2	60.2	55.3	63.9	64.4			

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	359						
65 dBA	114						
70 dBA	36						
Mitigated							
60 dBA							
65 dBA							
70 dBA							



Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)

Project Name: Brookside Project Scenario: Future Plus Project

Analyst: Erin Coffey Job #: 146566

Roadway: Lemon Avenue

Road Segment: Meadow Pass Road to La Puente Road

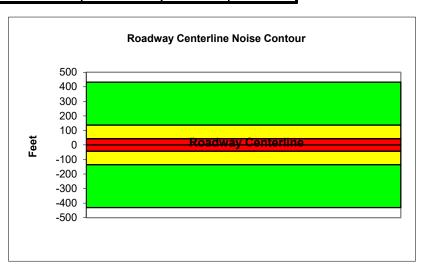
PROJECT DATA			SITE DATA				
Centerline Dist to Barrier	0		Road Grade:		0		
Barrier (0=wall, 1= berm):	0		Average Dail	y Traffic:	18,400		
Receiver Barrier Dist:	0		Peak Hour Tr	affic:	1840		
Centerline Dist. To Observer:	100		Vehicle Spee	d:	40		
Barrier Near Lane CL Dist:	0		Centerline Se	eparation:	38		
Barrier Far lane CL Dist:	0			NO	ISE INPUT	S	
Pad Elevation:	0.5		Site condition	is HARD S I	TE		
Road Elevation:	0			F	LEET MIX		
Observer Height (above grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:	0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE SOURCE ELE	NOISE SOURCE ELEVATIONS (Feet)					0.108	0.0074

Autos: 0
Medium Trucks: 2.3
Heavy Trucks: 8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)									
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL			
Autos:	54.1	62.9	61.1	55.0	63.7	64.3			
Medium Trucks:	63.1	55.0	48.6	47.0	55.5	55.8			
Heavy Trucks:	67.9	56.0	46.9	48.1	57.8	58.0			
Vehicle Noise:	70.3	64.5	61.5	56.6	65.2	65.7			

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	431						
65 dBA	136						
70 dBA	43						
Mitigated							
60 dBA							
65 dBA							
70 dBA							



Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)

Project Name: Brookside Project Scenario: Future Plus Project

Analyst: Erin Coffey Job #: 146566

Roadway: Lemon Avenue

Road Segment: La Puente Road to Valley Boulevard

PROJECT DATA

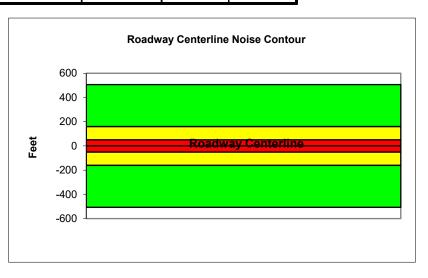
PROJECT DATA SITE DATA									
PROJECTI	SITE DATA								
Centerline Dist to Barrier	0		Road Grade: 0						
Barrier (0=wall, 1= berm):	0		Average Dail	y Traffic:	21,600				
Receiver Barrier Dist:	0		Peak Hour Ti	raffic:	2160				
Centerline Dist. To Observer:	100		Vehicle Spee	d:	40				
Barrier Near Lane CL Dist:	0		Centerline Separation:		41				
Barrier Far lane CL Dist:	0			NC	ISE INPUT	S			
Pad Elevation:	0.5		Site condition	is HARD S I	TE				
Road Elevation:	0			F	LEET MIX				
Observer Height (above grade):	0		Туре	Day	Evening	Night	Daily		
Barrier Height:	0		Auto	0.775	0.129	0.096	0.9742		
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184		
NOISE SOURCE ELE		Heavy Truck	0.865	0.027	0.108	0.0074			

Autos: 0
Medium Trucks: 2.3
Heavy Trucks: 8

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)					
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	54.8	63.5	61.7	55.7	64.3	64.9
Medium Trucks:	63.7	55.6	49.3	47.7	56.2	56.4
Heavy Trucks:	68.6	56.6	47.6	48.8	58.5	58.6
Vehicle Noise:	70.9	65.1	62.2	57.2	65.8	66.3

MITIGATED NOISE LEVELS (With topographic or barrier attenuation))
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR					
Unmitigated					
60 dBA	507				
65 dBA	160				
70 dBA	51				
Mitigated					
60 dBA					
65 dBA					
70 dBA					



Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Plus Project Analyst: Erin Coffey Job #:

Roadway: Lemon Avenue

south of Valley Boulevard Road Segment:

PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 25,300 Receiver Barrier Dist: Peak Hour Traffic: 2530 0 Centerline Dist. To Observer: Vehicle Speed: 40 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 39 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX**

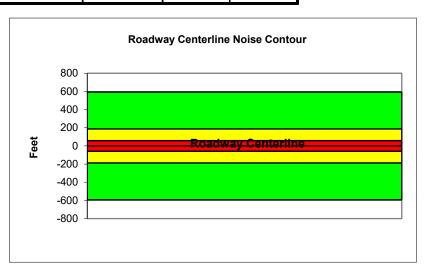
Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.108 0.0074

Autos: Medium Trucks: 2.3 Heavy Trucks: 8

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)					
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	55.5	64.3	62.5	56.4	65.0	65.6
Medium Trucks:	64.4	56.4	50.0	48.4	56.9	57.1
Heavy Trucks:	69.3	57.3	48.3	49.5	59.2	59.3
Vehicle Noise:	71.6	65.8	62.9	58.0	66.5	67.0

MITIGATED NOISE LEVELS (With topographic or barrier attenuation))
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR					
Unmitigated					
60 dBA	592				
65 dBA	187				
70 dBA	59				
Mitigated					
60 dBA					
65 dBA					
70 dBA					



146566

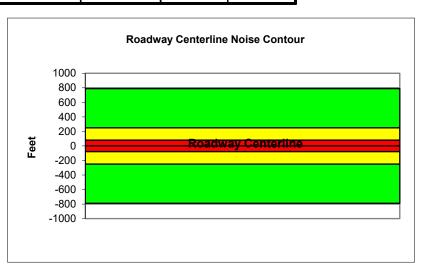
Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Plus Project Analyst: Erin Coffey Job #: 146566 Roadway: **Amar Road** Road Segment: West of Lemon Avenue PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 25,400 Receiver Barrier Dist: Peak Hour Traffic: 2540 0 Centerline Dist. To Observer: Vehicle Speed: 100 45 Barrier Near Lane CL Dist: 0 Centerline Separation: 32 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type 0.9742 Barrier Height: 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.108 0.0074 Autos: Medium Trucks: 2.3

UNMITIG	UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)					
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.1	65.9	64.1	58.0	66.6	67.2
Medium Trucks:	65.4	57.3	50.9	49.3	57.8	58.0
Heavy Trucks:	69.9	57.9	48.9	50.1	59.6	59.8
Vehicle Noise:	72.2	67.2	64.4	59.3	67.9	68.4

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation))
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR					
Unmitigated					
60 dBA	789				
65 dBA	250				
70 dBA	79				
Mitigated					
60 dBA					
65 dBA					
70 dBA					



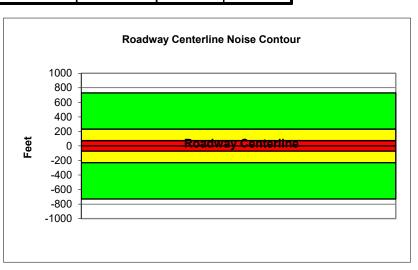
Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Plus Project Analyst: Erin Coffey Job #: 146566 Roadway: Amar Road Road Segment: East of Lemon Avenue PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 23,500 Receiver Barrier Dist: Peak Hour Traffic: 2350 0 Centerline Dist. To Observer: Vehicle Speed: 100 45 Barrier Near Lane CL Dist: 0 Centerline Separation: 32 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type 0.9742 Barrier Height: 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.108 0.0074 Autos: Medium Trucks: 2.3

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)						າ)
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	56.7	65.5	63.7	57.6	66.3	66.9
Medium Trucks:	65.0	56.9	50.6	49.0	57.5	57.7
Heavy Trucks:	69.5	57.6	48.5	49.8	59.3	59.4
Vehicle Noise:	71.9	66.8	64.1	58.9	67.5	68.0

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR					
Unmitigated					
60 dBA	730				
65 dBA	231				
70 dBA	73				
Mitigated					
60 dBA					
65 dBA					
70 dBA					

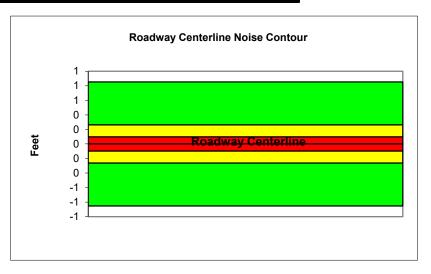


		Federal Highw Traffic Noise F						
Project Name:	Brookside Pro	ject		Scenario: Future Plus Project				
Analyst:	Erin Coffey				Job #:	146566		
Roadway:	Meadow Pass	Road						
Road Segment:	West of Lemo	n Avenue						
	PROJECT DA	ATA			5	SITE DATA		
Centerline Dist to Ba	ırrier	0		Road Grade:		0		
Barrier (0=wall, 1= b	erm):	0		Average Dail	y Traffic:	100		
Receiver Barrier Dist	t:	0		Peak Hour Ti	raffic:	10		
Centerline Dist. To C	Observer:	100		Vehicle Spee	d:	25		
Barrier Near Lane Cl	L Dist:	0		Centerline Se	eparation:	14		
Barrier Far lane CL [Dist:	0			NO	ISE INPUT	S	
Pad Elevation:		0.5		Site condition	is HARD SI	TE		
Road Elevation:		0		FLEET MIX				
Observer Height (ab	ove grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lf	t View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE SO	URCE ELEV	ATIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0				•		
Medium Trucks:		2.3						
Heavy Trucks:		8						

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	26.0	34.8	33.0	26.9	35.6	36.2
Medium Trucks:	37.6	29.6	23.2	21.6	30.1	30.3
Heavy Trucks:	43.8	31.9	22.8	24.0	34.4	34.5
Vehicle Noise:	46.5	38.0	34.0	30.1	38.7	39.1

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	1					
65 dBA	0					
70 dBA	0					
Mitigated						
60 dBA						
65 dBA						
70 dBA						



Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Plus Project Analyst: Erin Coffey Job #:

Roadway: Meadow Pass Road

Road Segment: Lemon Avenue to Colt Lane

PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 4,800 Receiver Barrier Dist: Peak Hour Traffic: 480 0 Centerline Dist. To Observer: Vehicle Speed: 30 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 22 **NOISE INPUTS** Barrier Far lane CL Dist: 0

Pad Elevation: 0.5 Road Elevation: 0

Observer Height (above grade): 0 Barrier Height: 0 Rt View: 90 Lft View:

NOISE SOURCE ELEVATIONS (Feet)

FLEET MIX Day Evening Night Daily Type 0.9742 Auto 0.775 0.129 0.096 0.049 -90 Med. Truck 0.848 0.103 0.0184 0.108 Heavy Truck 0.865 0.027 0.0074

Site conditions HARD SITE

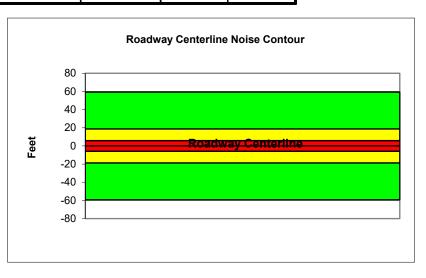
146566

Autos: Medium Trucks: 2.3 Heavy Trucks: 8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	44.9	53.7	51.9	45.8	54.5	55.1
Medium Trucks:	55.5	47.5	41.1	39.5	48.0	48.2
Heavy Trucks:	61.2	49.2	40.2	41.4	51.5	51.7
Vehicle Noise:	63.7	56.2	52.7	48.3	56.9	57.3

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	59					
65 dBA	19					
70 dBA	6					
Mitigated						
60 dBA						
65 dBA						
70 dBA						

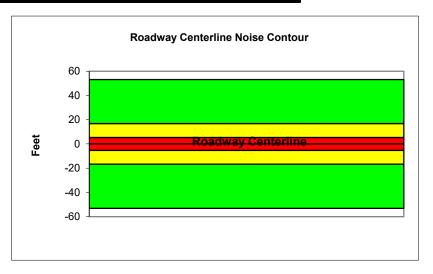


		Federal Highw Traffic Noise F						
Project Name:	Brookside Pro	ject			Scenario:	Future Plus	s Project	
Analyst:	Erin Coffey				Job #:	146566		
Roadway:	Meadow Pass	Road						
Road Segment:	East of Colt La	ane						
	PROJECT DA	ATA			S	SITE DATA		
Centerline Dist to B	Barrier	0		Road Grade:		0		
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	4,300		
Receiver Barrier Di	st:	0		Peak Hour Ti	raffic:	430		
Centerline Dist. To	Observer:	100		Vehicle Spee	ed:	30		
Barrier Near Lane	CL Dist:	0		Centerline Se	eparation:	25		
Barrier Far lane CL	. Dist:	0			NO	ISE INPUT	S	
Pad Elevation:		0.5		Site condition	ns HARD SI	TE		
Road Elevation:		0		FLEET MIX				
Observer Height (a	bove grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lf	t View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE S	OURCE ELEV	ATIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074
Autos:		0						
Medium Trucks:		2.3						
Heavy Trucks:		8						

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:	44.4	53.2	51.4	45.3	54.0	54.6	
Medium Trucks:	55.0	46.9	40.6	39.0	47.5	47.7	
Heavy Trucks:	60.7	48.7	39.7	40.9	51.0	51.1	
Vehicle Noise:	63.2	55.7	52.1	47.8	56.3	56.8	

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)							
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL	
Autos:							
Medium Trucks:							
Heavy Trucks:							
Vehicle Noise:							

CENTERLINE NOISE CONTOUR						
Unmitigated						
60 dBA	53					
65 dBA	17					
70 dBA	5					
Mitigated						
60 dBA						
65 dBA						
70 dBA						



Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Plus Project Analyst: Erin Coffey Job #: 146566 Roadway: La Puente Road Road Segment: West of Lemon Avenue PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 15,300 Receiver Barrier Dist: Peak Hour Traffic: 1530 0 Centerline Dist. To Observer: Vehicle Speed: 45 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 31 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 0.049 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.103 0.0184 0.108 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.0074 Autos: Medium Trucks: 2.3

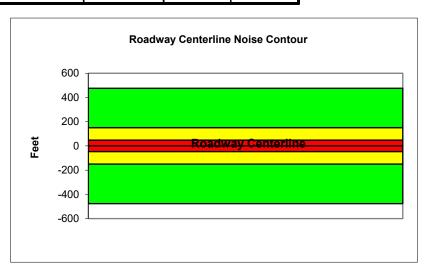
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:	54.9	63.7	61.9	55.8	64.4	65.1				
Medium Trucks:	63.2	55.1	48.7	47.1	55.6	55.9				
Heavy Trucks:	67.7	55.7	46.7	47.9	57.5	57.6				
Vehicle Noise:	70.0	65.0	62.2	57.1	65.7	66.2				

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)											
Vehicle Type	Peak Leq Leq Day Leq Evening Leq Night Ldn C										
Autos:											
Medium Trucks:											
Heavy Trucks:											
Vehicle Noise:											

CENTERLINE NOISE CONTOUR							
476							
151							
48							

Heavy Trucks:



Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Plus Project Analyst: Erin Coffey Job #: 146566 Roadway: La Puente Road Road Segment: East of Lemon Avenue PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 14,000 Receiver Barrier Dist: Peak Hour Traffic: 1400 0 Centerline Dist. To Observer: Vehicle Speed: 40 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 31 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.049 0.103 0.0184 0.108 **NOISE SOURCE ELEVATIONS (Feet)** Heavy Truck 0.865 0.027 0.0074 Autos: Medium Trucks: 2.3

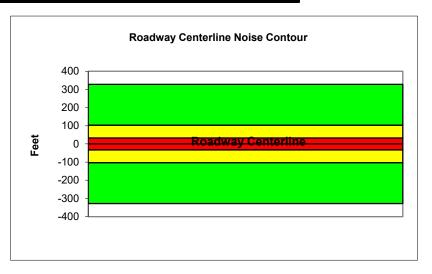
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:	53.0	61.8	60.0	53.9	62.6	63.2				
Medium Trucks:	62.0	53.9	47.5	46.0	54.4	54.7				
Heavy Trucks:	66.8	54.9	45.8	47.1	56.8	56.9				
Vehicle Noise:	69.2	63.4	60.5	55.5	64.1	64.6				

8

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	hicle Type Peak Leq Leq Day Leq Evening Leq Night Ldn Cl									
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOISE CONTOUR								
Unmitigated								
60 dBA	328							
65 dBA	104							
70 dBA	33							
Mitigated								
60 dBA								
65 dBA								
70 dBA								

Heavy Trucks:

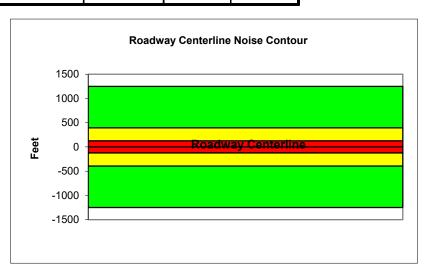


Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)										
Project Name:	Brookside Project				Scenario:	Future Plus	s Project			
Analyst:	Erin Coffey				Job #:	146566				
Roadway:	Valley Boulevard									
Road Segment:	West of Lemon Av	/enue								
	PROJECT DATA				S	SITE DATA				
Centerline Dist to E	Barrier	0		Road Grade:		0				
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	31,000				
Receiver Barrier Di	st:	0		Peak Hour Ti	affic:	3100				
Centerline Dist. To	Observer:	100		Vehicle Speed: 50						
Barrier Near Lane	CL Dist:	0		Centerline Separation: 46						
Barrier Far lane CL	. Dist:	0		NOISE INPUTS						
Pad Elevation:		0.5		Site condition	is HARD S I	TE				
Road Elevation:		0			F	LEET MIX				
Observer Height (a	bove grade):	0		Туре	Day	Evening	Night	Daily		
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742		
Rt View: 90	Lft Vie	eW:	-90	Med. Truck	0.848	0.049	0.103	0.0184		
NOISE SOURCE ELEVATIONS (Feet)			Heavy Truck	0.865	0.027	0.108	0.0074			
Autos:		0								
Medium Trucks:		2.3								
Heavy Trucks:		8								

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:	59.0	67.8	66.0	59.9	68.6	69.2				
Medium Trucks:	66.7	58.6	52.3	50.7	59.2	59.4				
Heavy Trucks:	70.9	59.0	49.9	51.2	60.6	60.7				
Vehicle Noise:	73.3	68.9	66.3	61.0	69.6	70.2				

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)										
Vehicle Type	Type Peak Leq Leq Day Leq Evening Leq Night Ldn CNEI									
Autos:										
Medium Trucks:										
Heavy Trucks:										
Vehicle Noise:										

CENTERLINE NOISE CONTOUR							
Unmitigated							
60 dBA	1251						
65 dBA	396						
70 dBA	125						
Mitigated							
60 dBA							
65 dBA							
70 dBA							

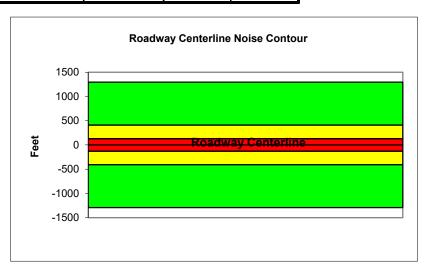


	Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)										
Project Name:	Brookside Proje	ect		-	Scenario:	Future Plus	s Project				
Analyst:	Erin Coffey				Job #:	146566					
Roadway:	Valley Boulevar	d									
Road Segment:	East of Lemon	Avenue									
	PROJECT DAT	ΓΑ			S	SITE DATA					
Centerline Dist to E	Barrier	0		Road Grade:		0					
Barrier (0=wall, 1=	berm):	0		Average Dail	y Traffic:	32,100					
Receiver Barrier Di	ist:	0		Peak Hour Ti	raffic:	3210					
Centerline Dist. To	Observer:	100		Vehicle Spee	d:	50					
Barrier Near Lane	CL Dist:	0		Centerline Se	eparation:	46					
Barrier Far lane CL	Dist:	0		NOISE INPUTS							
Pad Elevation:		0.5		Site condition	is HARD SI	TE					
Road Elevation:		0			F	LEET MIX					
Observer Height (a	ibove grade):	0		Туре	Day	Evening	Night	Daily			
Barrier Height:		0		Auto	0.775	0.129	0.096	0.9742			
Rt View: 90	Lft '	View:	-90	Med. Truck	0.848	0.049	0.103	0.0184			
NOISE S	OURCE ELEVAT	TIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074			
Autos:		0									
Medium Trucks:		2.3									
Heavy Trucks:		8									

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)										
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL				
Autos:	59.2	68.0	66.2	60.1	68.7	69.4				
Medium Trucks:	66.9	58.8	52.4	50.8	59.3	59.6				
Heavy Trucks:	71.1	59.2	50.1	51.3	60.7	60.8				
Vehicle Noise:	73.4	69.1	66.5	61.2	69.8	70.3				

MITIGAT	TED NOISE I	LEVELS (W	ith topograph	ic or barrier a	attenuation)
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR					
Unmitigated					
60 dBA	1295				
65 dBA	409				
70 dBA	129				
Mitigated					
60 dBA					
65 dBA					
70 dBA					



Federal Highway Administration RD-77-108 **Traffic Noise Prediction Model (CALVENO)** Project Name: Brookside Project Scenario: Future Plus Project Analyst: Erin Coffey Job #: 146566 Roadway: **Project Driveway** Road Segment: South of Meadow Pass Road PROJECT DATA SITE DATA Centerline Dist to Barrier 0 Road Grade: 0 Barrier (0=wall, 1= berm): 0 Average Daily Traffic: 300 Receiver Barrier Dist: Peak Hour Traffic: 30 0 Centerline Dist. To Observer: Vehicle Speed: 25 100 Barrier Near Lane CL Dist: 0 Centerline Separation: 36 **NOISE INPUTS** Barrier Far lane CL Dist: 0 Site conditions HARD SITE Pad Elevation: 0.5 Road Elevation: 0 **FLEET MIX** Observer Height (above grade): 0 Day Evening Night Daily Type Barrier Height: 0.9742 0 Auto 0.775 0.129 0.096 0.049 Rt View: 90 Lft View: -90 Med. Truck 0.848 0.103 0.0184

Heavy Truck

0.865

0.027

0.108

0.0074

	•	
Medium Trucks:	2.3	
Heavy Trucks:	8	

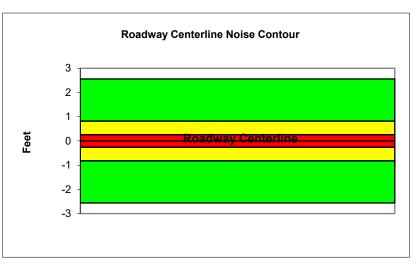
NOISE SOURCE ELEVATIONS (Feet)

Autos:

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	30.4	39.2	37.4	31.3	39.9	40.5
Medium Trucks:	42.0	34.0	27.6	26.0	34.5	34.7
Heavy Trucks:	48.2	36.2	27.2	28.4	38.8	38.9
Vehicle Noise:	50.8	42.4	38.4	34.5	43.1	43.4

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR				
Unmitigated				
60 dBA	3			
65 dBA	1			
70 dBA	0			
Mitigated				
60 dBA				
65 dBA				
70 dBA				



Federal Highway Administration RD-77-108 Traffic Noise Prediction Model (CALVENO)

Project Name: Brookside Project Scenario: Future Plus Project

Analyst: Erin Coffey Job #: 146566

Roadway: Valley Boulevard

Road Segment: East of Lemon Avenue - Onsite

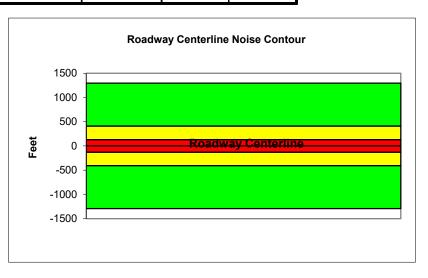
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PROJECT	DATA		SITE DATA				
Centerline Dist to Barrier	0		Road Grade:		0		
Barrier (0=wall, 1= berm):	0		Average Dail	y Traffic:	32,100		
Receiver Barrier Dist:	0		Peak Hour Ti	raffic:	3210		
Centerline Dist. To Observer:	4224		Vehicle Spee	d:	50		
Barrier Near Lane CL Dist:	0		Centerline Se	eparation:	46		
Barrier Far lane CL Dist:	0			NO	ISE INPUT	S	
Pad Elevation:	0.5		Site condition	is HARD S I	TE		
Road Elevation:	0			F	LEET MIX		
Observer Height (above grade):	0		Туре	Day	Evening	Night	Daily
Barrier Height:	0		Auto	0.775	0.129	0.096	0.9742
Rt View: 90	Lft View:	-90	Med. Truck	0.848	0.049	0.103	0.0184
NOISE SOURCE ELE	VATIONS (Feet)		Heavy Truck	0.865	0.027	0.108	0.0074

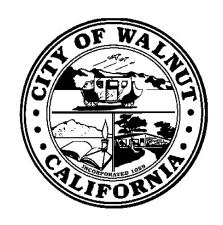
Autos: 0
Medium Trucks: 2.3
Heavy Trucks: 8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)						
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	43.7	52.5	50.7	44.6	53.3	53.9
Medium Trucks:	51.4	43.3	37.0	35.4	43.9	44.1
Heavy Trucks:	55.6	43.7	34.6	35.9	45.3	45.4
Vehicle Noise:	57.9	53.6	51.0	45.7	54.3	54.8

MITIGAT	ED NOISE	LEVELS (W	ith topograph	ic or barrier a	attenuation)
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR					
Unmitigated					
60 dBA	1294				
65 dBA	409				
70 dBA	129				
Mitigated					
60 dBA					
65 dBA					
70 dBA					





APPENDIX O Traffic Impact Analysis



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THE BROOKSIDE PROJECT (TENTATIVE TRACT NO. 72798) IN WALNUT TRAFFIC IMPACT ANALYSIS

City of Walnut, California

November 20, 2015

Prepared for Alpine Pointe Development LLC 18217 Gale Avenue, Suite A City of Industry, California 91748

Prepared by Michael Baker International

Prepared Under the Supervision of: Tom Huang, TE 949-855-5754

JN: 146566/137644

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1.0 INTRODUCTION

This study analyzes the forecast traffic conditions and impacts associated with the Brookside Project (Tentative Tract No. 72798) in Walnut. The project site is located west of Lemon Avenue between Meadow Pass Road and La Puente Road in the City of Walnut. Exhibit 1 shows the regional project site location.



Exhibit 1 - Regional Study Area

1.1 Proposed Project

The proposed project consists of 28 single-family detached residential dwelling units. The proposed project will replace the non-operational Brookside Equestrian Center, located at 800 Meadows Pass Road. The proposed project is anticipated to be completed and operational in approximately two years in 2017.



Exhibit 2 shows the project site plan. The project will replace most of the existing facilities for the non-operational Brookside Equestrian Center except for a few historical buildings to remain. Access to the project site will realigned to a stop-controlled driveway on Meadow Pass Road located at the easterly project boundary approximately 100 feet east of Colt Lane.

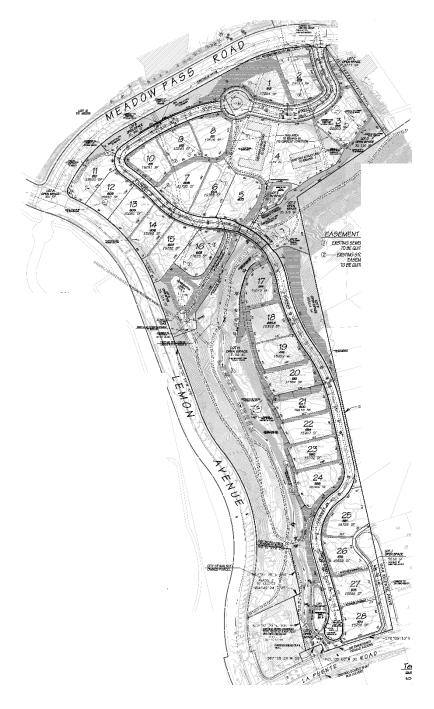


Exhibit 2 – Project Site Plan

1.2 Study Area

Exhibit 3 shows the study area that includes 4 intersections located within City of Walnut.

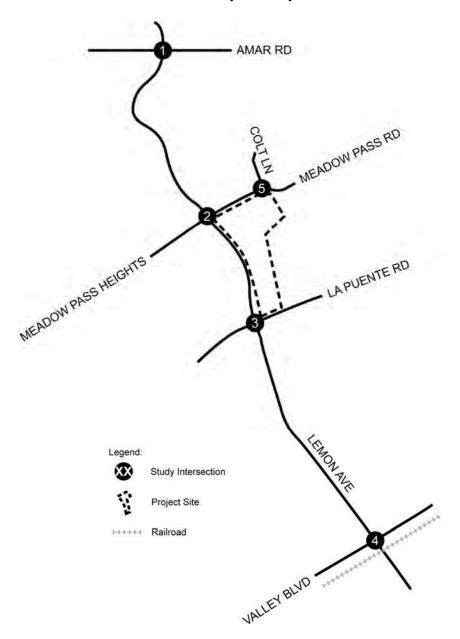


Exhibit 3 - Project Study Area

In coordination with City staff, the following five (5) intersections have been identified for analysis in this traffic study:

- 1. Lemon Avenue at Amar Road;
- 2. Lemon Avenue at Meadow Pass Road;
- 3. Lemon Avenue at La Puente Road;



- 4. Lemon Avenue at Valley Boulevard; and
- 5. Colt Lane Project Driveway at Meadow Pass Road.

1.3 Analysis Scenarios

The study intersections are analyzed for the following study scenarios:

- Existing conditions;
- Existing plus Ambient Growth (E+A) conditions;
- Existing plus Ambient Growth with Project (E+A+P) conditions; and
- Existing plus Ambient Growth plus Cumulative with Project (E+A+C+P) conditions.

1.4 Analysis Time Period

Traffic studies usually analyze the time periods of typical weekday morning (AM) and afternoon (PM) peak hour conditions. Since the project site is located adjacent to the existing St. Lorenzo Ruiz Catholic Church, Sunday Mid-Day (MD) conditions is also include this analysis to evaluate the project's impact during the weekends while the church is holding worship activities. The study area intersections are analyzed for the following time periods:

- Weekday AM Peak Hour Peak hour within 7:00 PM and 9:00 PM
- Weekday PM Peak Hour Peak hour within 4:00 PM and 6:00 PM
- Sunday Mid-Day Peak Hour Peak hour within 10:00 AM and 12:00 PM



2.0 ANALYSIS METHODOLOGY

This section describes the intersection analysis, performance criteria, thresholds of significance, and traffic volume forecast methodologies utilized in this traffic analysis.

2.1 Intersection Analysis Methodology

Level of service (LOS) is commonly used as a qualitative description of intersection operation and is based on the capacity of the intersection and the volume of traffic using the intersection. Level of service (LOS) is commonly used as a qualitative description of intersection operation and is based on the capacity of the intersection and the volume of traffic using the intersection. The Intersection Capacity Utilization (ICU) analysis methodology is utilized to determine the operating LOS of the signalized intersections. For unsignalized intersections, the Highway Capacity Manual (HCM) analysis methodology is utilized to determine the operating.

2.1.1 Intersection Capacity Utilization (ICU) Method for Signalized Intersection

The signalized intersections are analyzed using the Intersection Capacity Utilization (ICU) method. The ICU technique estimates the volume-to-capacity (V/C) ratio for an intersection based on the individual V/C ratios for the conflicting traffic movements. The ICU value represents the percent signal green time or capacity of the intersection movements. It should be noted that the ICU method assumes uniform traffic distribution per intersection approach lane and optimal signal timing.

The ICU value translates to a LOS estimate, which is a relative measure of the intersection performance. The grade scales of LOS have been defined with the corresponding ICU value range as shown in Table 1. The ICU value is the sum of the critical volume-to-capacity ratios at an intersection; it is not intended to be indicative of the LOS of each of the individual turning movements.

Table 1 – Level of Service for Signalized Intersection

Level of	Intersection Capacity Utilization (ICU)										
Service	Volume/Capacity (V/C)	Description									
Α	≤ 0.600	Excellent									
В	> 0.601 ≤ 0.700	Very Good									
С	> 0.700 to ≤ 0.800	Good									
D	> 0.800 to ≤ 0.900	Fair									
E	> 0.900 to ≤ 1.000	Poor									
F	> 1.000	Failure									



2.1.2 Highway Capacity Manual (HCM) Method for Unsignalized Intersection

The 2000 HCM analysis methodology describes the operation of an intersection using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on the corresponding ranges of stopped delay experienced per vehicle for signalized and unsignalized intersections shown in Table 2.

Table 2 – Level of Service for Unsignalized Intersections

Level of	Highway Capacity Manual (HCM)										
Service	Delay (seconds/vehicle)	Description									
Α	≤ 10.0	Little or no delay									
В	> 10.0 to ≤ 15.0	Short traffic delay									
С	> 15.0 to ≤ 25.0	Average traffic delay									
D	> 25.0 to ≤ 35.0	Long traffic delay									
E	> 35.0 to ≤ 50.0	Very long traffic delay									
F	> 50.0	Severe congestion									

Source: 2000 Highway Capacity Manual (HCM)

Level of service is based on the average stopped delay per vehicle for all movements of signalized intersections and all-way stop-controlled intersections; for one-way or two-way stop-controlled intersections, LOS is based on the worst stop-controlled approach.

2.2 Peak Hour Performance Criteria

The City of Walnut General Plan Circulation Element does not identify a target LOS for peak hour intersection operation.

2.3 Traffic Impact Thresholds of Significance

To determine whether the addition of project-generated trips results in a significant impact at a signalized intersection, and thus requires mitigation, the City of Walnut uses the thresholds of significance established in *Traffic Impact Analysis Report Guidelines (County of Los Angeles, January 1, 1997)*. Table 3 identifies the City of Walnut thresholds of significance for signalized intersections.

Table 3 – Intersection Threshold of Significance

Pre	-Project Conditions	Project-Related
LOS	V/C Ratio	V/C Increase
С	0.71 – 0.80	0.04 or more
D	0.81 – 0.90	0.02 or more
E/F	0.91 or more	0.01 or more

Source: *Traffic Impact Analysis Report Guidelines*, County of Los Angeles, January 1, 1997.



3.0 EXISTING CONDITIONS

This section describes the existing conditions of the study area including the existing roadway description, intersection geometry and traffic volumes.

3.1 Roadway Description

Exhibit 4 illustrates the existing intersection controls and lane geometry for the study area. The characteristics of the roadway system in the vicinity of the project site are described below:

Lemon Avenue is a four-lane divided roadway with a raised median trending in a north-south direction. The posted speed limit on Lemon Avenue, within the project vicinity, is 35 miles per hour north and 40 miles per hour south of Meadow Pass Road. On-street parking is prohibited.

Amar Road is a four-lane divided roadway with a raised median trending in an east-west direction. The posted speed limit on Amar Road is 45 miles per hour within the project vicinity. On-street parking is prohibited.

Meadow Pass Road is a two-lane divided roadway with a two way left turn lane (TWLTL) east of Lemon Avenue, trending in an east-west direction. The street changes name to Meadow Pass Heights west of Lemon Avenue and is a two-lane undivided roadway. The posted speed limit on Meadow Pass Road is 30 miles per hour west of Lemon Avenue, within the project vicinity. Onstreet parking is permitted east of Lemon Avenue.

La Puente Road is a four-lane roadway trending in an east-west direction. The street is undivided west and divided with painted median east of Lemon Avenue. The posted speed limit on La Puente Road, within the project vicinity, is 45 miles per hour west of Lemon Avenue and 40 miles per hour east of Lemon Avenue. On-street parking is prohibited.

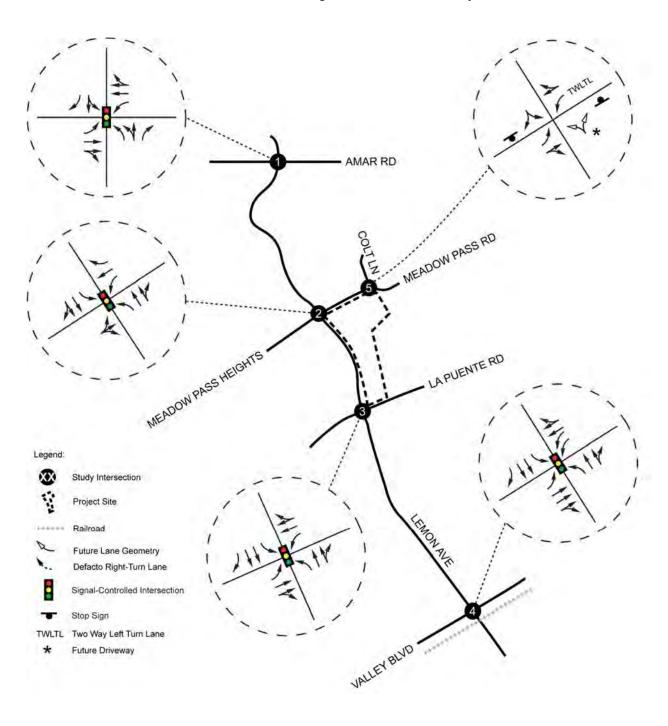
Valley Boulevard is a five-lane divided roadway (three-eastbound, two-westbound) with a raised median trending in an east-west direction. The posted speed limit on Valley Boulevard is 50 miles per hour within the project vicinity. On-street parking is prohibited.

3.2 Existing Conditions Traffic Volumes

To determine the existing operation of the study intersections, weekday morning (AM), weekday afternoon (PM) and Sunday Mid-Day (MD) peak hour intersection movement counts were collected in September of 2015 when school is session. Weekday AM peak period intersection counts were collected from 7:00 AM to 9:00 AM, weekday PM peak period intersection counts were collected from 4:00 PM to 6:00 PM, and Sunday Mid-Day peak period intersection counts were collected from 10:00 AM to 12:00 PM. The counts used in this analysis were taken from the highest hour within the peak period counted. Exhibit 5 shows existing conditions weekday AM, weekday PM and Sunday MD peak hour volumes at the study intersections. Traffic count data sheets are included in Appendix A of this report.



Exhibit 4 – Existing Intersection Geometry



				Lemon Ave	enue /	Amar Road			
	20 y 35 y 28 y	Lemon Ave	€ 12€ 843∠ 79	15 7 24 → 14 2	Lemon Ave	K 27← 716∠ 98	12 18 Y 15 Y	Lemon Ave	€ 413∠ 52
	Amar Rd	1	Amar Rd	Amar Rd	1	Amar Rd	Amar Rd	1	Amar Rd
	5 ∄ 954 → 293 ¥	Lemon Ave	7 124 ↑ 31 C 263	19 ∄ 905 → 167 ¥	Lemon Ave	7 166↑ 37C 255	17 ∄ 376 → 81 ¥	Lemon Ave	7 49 ↑ 15 ೯ 73
			Lemon A	venue / Meadow F	ass F	Road / Meadow Pas	s Heights		
	771 ¥ ¥ ¥	Lemon Ave	₹ 79₹ 2£ 133	24 7 459 → 2 2	Lemon Ave	★ 42★ 0∠ 112	288 y 1	Lemon Ave	K 83← 0८ 180
	Meadow Pass Ht	2	Meadow Pass Rd	Meadow Pass Ht	2	Meadow Pass Rd	Meadow Pass Ht	2	Meadow Pass Rd
	1 7 2 -> 8 2	Lemon Ave	7 180 ↑ 580	0 7 0 → 3 2	Lemon Ave	7 192 ↑ 721 ೯ 2	2 7 0 > 6 3	Lemon Ave	7 202 ↑ 165 ०
				Lemon Avenu	ie / La	a Puente Road	•	·	
	253 7 557 → 96 ਪ	Lemon Ave	尽 205← 297⋭ 201	137 7 351 → 84 2	Lemon Ave	€ 122€ 223€ 85	95 7 264 → 72 2	Lemon Ave	尽 70← 130止 92
	La Puente Rd	3	La Puente Rd	La Puente Rd	3	La Puente Rd	La Puente Rd	3	La Puente Rd
AMAR RD	146 オ 381 → 231 ¥	Lemon Ave	7 92 ↑ 411 ► 164	104 才 407 → 138 ¥	Lemon Ave	↑ 666 ↑ 306	74 オ 163 → 114 ¥	Lemon Ave	7 63 ↑ 220 ► 109
0				Lemon Avenu	ie / Va	alley Boulevard			
PASS PO PASS RD	98 y 706 y 226 y	Lemon Ave	₹ 52₹ 1109₹ 216	110 7 526 > 151 2	Lemon Ave	₹ 157₹ 717₹ 342	60 y 322 → 129 y	Lemon Ave	R 35← 255⋭ 69
PASS 2	Valley Blvd	4	Valley Blvd	Valley Blvd	4	Valley Blvd	Valley Blvd	4	Valley Blvd
<i>[i, i,</i>	111 万 549 → 189 ¥	Lemon Ave	7 144 ↑ 446 K 153	197 オ 1075 → 215 ¥	Lemon Ave	7 214 ↑ 617 ೯ 162	102 オ 225 → 0 ソ	Lemon Ave	7 52 ↑ 237 ► 52
TERU 3				Meadow Pas	ss Ro	ad / Colt Lane			
ARUENTE RO	3 U U U	Colt Ln	★ 3★ 166★ 0	3 y 1 y 2	Colt Ln	€ 4€ 143€ 0	1 0 1 V 4 3	Colt Ln	K 2← 143⋭ 0
EN RE	Meadow Pass Rd 3 7 257 →	5	Meadow Pass Rd	Meadow Pass Rd 3 7 195 →	5	Meadow Pass Rd	Meadow Pass Rd 1 7 108 →	5	Meadow Pass Rd
12k	0 4			0 4			u 0		
Scale VALLEY BLYC									

WEEKDAY AM PEAK HOUR WEEKDAY PM PEAK HOUR



SUNDAY MD PEAK HOUR



3.3 Existing Conditions Peak Hour Intersection Level of Service

Table 4 summarizes the intersection LOS analysis results for existing weekday AM, weekday PM and Sunday Mid-Day peak hour conditions. Appendix B includes the existing conditions intersection operations analysis worksheets. As shown in Table 4, all study area intersections are operating at LOS D or better.



Table 4
Existing Conditions Intersection Analysis Summary

	Intersection			Existing Conditoins									
	mersection		AM I	Peak	PM I	Peak	MD Peak						
No.	Name	Type ¹	ICU ²	LOS	ICU ²	LOS	ICU ²	LOS					
	Signalized Intersections												
1	Lemon Ave / Amar Rd	TS	0.742	С	0.670	В	0.334	А					
2	Lemon Ave / Meadow Pass Rd	TS	0.543 A		0.498	Α	0.481	Α					
3	Lemon Ave / La Puente Rd	TS	0.844	D	0.709	С	0.464	А					
4	Lemon Ave / Valley Blvd	TS	0.880	D	0.839	D	0.388	А					
			Unsignal	lized Intersect	ion								
5	Colt Ln / Meadow Pass Rd	CSS: sb	11.3	В	10.4	В	9.8	А					

Note

- ¹ Intersection Type: TS = Traffic Signal; CS = Cross-Street Stop; sb = Southbound Stop
- Signalized: Intersection Capacity Utilization (ICU) Analysis Method, Volume/Capacity (V/C) Ratio Unsignalized: 2000 Highway Capacity Manual (HCM) Analysis Method, Average Delay in Seconds.

4.0 PROJECT TRAFFIC

This section presents the methodology behind the project traffic generation, distribution and assignment. The proposed project consists of 28 single-family detached residential dwelling units. The proposed project will replace the non-operational Brookside Equestrian Center, located at 800 Meadows Pass Road. The project will replace most of the existing facilities for the non-operational Brookside Equestrian Center except for a few historical buildings to remain. Access to the project site will realigned to a stop-controlled driveway on Meadow Pass Road located at the easterly project boundary approximately 100 feet east of Colt Lane. The proposed project is anticipated to be completed and operational in approximately two years in 2017.

4.1 Project Site Traffic Generation

To calculate trips forecast to be generated by the proposed project, trip generation rates published in the *Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Edition, 2012)* were utilized. Table 5 summarizes the forecast project traffic generation.

Table 5 – Project Traffic Generation

	Trip Rates													
	Project	WD	WD AM Peak PM Peak WE							N	MD Peak			
No.	Land Use	Code ¹	Unit ²	Daily	Total	ln%	Out%	Total	ln%	Out%	Daily	Total	ln%	Out%
1	Single-Family Detached Housing	ITE 210	DU	9.52	0.75	25%	75%	1.00	63%	37%	8.62	0.86	53%	47%

	Traffic Generation													
	Project	WD	Р	M Peak		WE	N	/ID Peal	K					
No.	Land Use	Quantity ²	Daily	Total	ln	Out	Total	ln	Out	Daily	Total	In	Out	
1	Single-Family Detached Housing	28 DU	267	21	5	16	28	18	10	241	24	13	11	

Note

- Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012
- DU = dw elling unit

As shown in Table 5, the proposed project is forecasted to generate approximately 267 daily trips with 21 AM peak hour trips and 28 PM peak hour trips during a typical weekday conditions. On Sundays, the proposed project is forecast to generate approximately 24 MD peak hour trips.

4.2 Project Trip Distribution

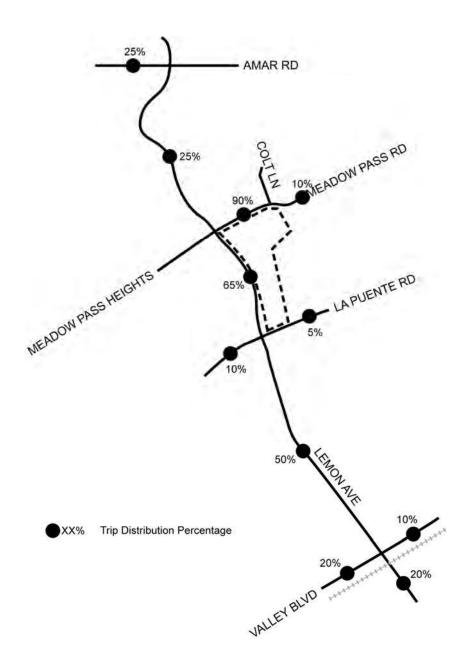
Exhibit 6 shows the forecast trip distribution of the proposed project based on review of existing traffic data, land uses, and the roadway network in the project vicinity.

4.3 Project Traffic Assignment

Exhibit 7 shows the corresponding assignment of project-generated weekday AM, weekday PM peak hour and Sunday MD peak hour trips assuming the trip distribution patterns illustrated in Exhibit 6.



Exhibit 6 – Project Trip Distribution



			1	Lemon Ave	enue /	Amar Road	· · · · · · · · · · · · · · · · · · ·		_
	0 V V Y	Lemon Ave	€ 0	0 V V Y	Lemon Ave	€ 0 € 0	v ↓ y	Lemon Ave	₹ 0
	Amar Rd	1	Amar Rd	Amar Rd	1	Amar Rd	Amar Rd	1	Amar Rd
	0 → 1 ਪ	Lemon Ave	7 0 0 4 4 0 0 A	0 → 5 ¥	Lemon Ave	K ↑ 7 3	0 → 3 2	Lemon Ave	T 0
			Lemon A	Avenue / Meadow F	ass R	oad / Meadow Pass	Heights		
	1 7 0 4 0 2	Lemon Ave	€ 0∠ 10	5 4 0 4	Lemon Ave		0 ₹ ¾	Lemon Ave	⊼ 3 ← 0 ∠ 7
	Meadow Pass Ht	2	Meadow Pass Rd	Meadow Pass Ht	2	Meadow Pass Rd	Meadow Pass Ht	2	Meadow Pass Rd
	0 7 0 → 0 U	Lemon Ave	F	0 7 0 > 0 2	Lemon Ave	F 0	0 7 0 > 0 2	Lemon Ave	R 7 7 8
					ie / La	Puente Road			
	1 N N N N N N N N N N N N N N N N N N N	Lemon Ave	€ 0 € 0	1 ¥ 5 ¥ 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Lemon Ave		1 6 1 ¥ ¥	Lemon Ave	K 1 ← 0 ∠ 0
2.00	La Puente Rd	3	La Puente Rd	La Puente Rd	3	La Puente Rd	La Puente Rd	3	La Puente Rd
R RD	1 7 0 > 0 2	Lemon Ave	κ ↑ 7 0	2 7 0 > 0 2	Lemon Ave	₹ ↑ 7	1 7 0 → 0 3	Lemon Ave	F 7 0
C				Lemon Avenu	ie / Va	lley Boulevard			
NEADON 5 PASS RD	3 2 2 4 4	Lemon Ave	K 1 ← 0 ⊬ 0	1 y 2 y 2	Lemon Ave	₹ 2 ← 0 ⋭ 0	2 V V	Lemon Ave	K 1 ← 0 Ľ 0
2	Valley Blvd	4	Valley Blvd	Valley Blvd	4	Valley Blvd	Valley Blvd	4	Valley Blvd
	1 7 0 > 0 u	Lemon Ave	↑	4 7 0 → 0 3	Lemon Ave	7 7 0 4 0	3 7 0 → 0 2	Lemon Ave	₹ ↑ 7
TERO 3				Meadow Pas	ss Roa	ad / Colt Lane			
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\	Meadow Pass Rd	5	Meadow Pass Rd	Meadow Pass Rd	5	Meadow Pass Rd	Meadow Pass Rd	5	Meadow Pass Rd
THAN RE	0 7 0 → 5 ¥	Proj Dwy	F 14	0 7 0 > 16 1	Proj Dwy	K ↑ 7 9 0 1	0 7 0 > 12 Y	Proj Dwy	R 10
VALLEY BLYD									

WEEKDAY AM PEAK HOUR WEEKDAY PM PEAK HOUR

Exhibit 7 Project-Only Intersection Volumes

SUNDAY MD PEAK HOUR



5.0 FUTURE TRAFFIC FORECAST

This section presents the future traffic forecast with the addition of trips generated by the proposed project on the existing conditions including the background ambient growth. Future conditions with other cumulative developments are also considered. The following future conditions are presented:

- Existing conditions;
- Existing plus Ambient Growth (E+A) conditions;
- Existing plus Ambient Growth with Project (E+A+P) conditions; and
- Existing plus Ambient Growth plus Cumulative with Project (E+A+C+P) conditions.

4.1 Ambient Growth Rate

A background ambient growth rate of 0.5% per year is used to account for the growth of existing traffic when the project is anticipated to open in two years in Year 2017. An annual growth rate of 0.5% for two years from Year 2015 to 2017 is a total of 1%. The annual growth rate is derived from the general traffic volume growth factors published in the *Los Angeles County 2010 Congestion Management Program* for the West Covina area (Regional Statistical Area 26), which includes the City of Walnut. Appendix C shows the. It should be noted this is a conservative assumption since the growth rate will be applied to all movements at the study intersections.

4.2 Cumulative Development Traffic

City of Walnut has provided a list of nine (9) cumulative developments to be included in the traffic analysis and their general locations are shown in Exhibit 8. Table 6 summarizes the traffic generated by the identified cumulative developments. As shown in Table 6, the cumulative developments are forecasted to generate approximately 1,927 daily trips with 133 AM peak hour trips, 184 PM peak hour trips during a typical weekday. On Sundays, the cumulative developments are forecasted to generate 175 MD peak hour trips.

4.3 Existing Plus Ambient Growth Traffic

Exhibit 9 shows Existing plus Ambient Growth (E+A) conditions weekday AM, weekday PM and Sunday Mid-Day (MD) peak hour intersection traffic volumes.

4.4 Existing Plus Ambient Growth With Project Traffic

Exhibit 10 shows Existing plus Ambient Growth with Project (E+A+P) conditions weekday AM, weekday PM and Sunday MD peak hour intersection traffic volumes.

4.5 Existing Plus Ambient Growth Plus Cumulative With Project Traffic

Exhibit 11 shows Existing plus Ambient Growth plus Cumulative with Project (E+A+C+P) conditions weekday AM, weekday PM and Sunday MD peak hour intersection traffic volumes.



Exhibit 8 – Cumulative Development Location Map

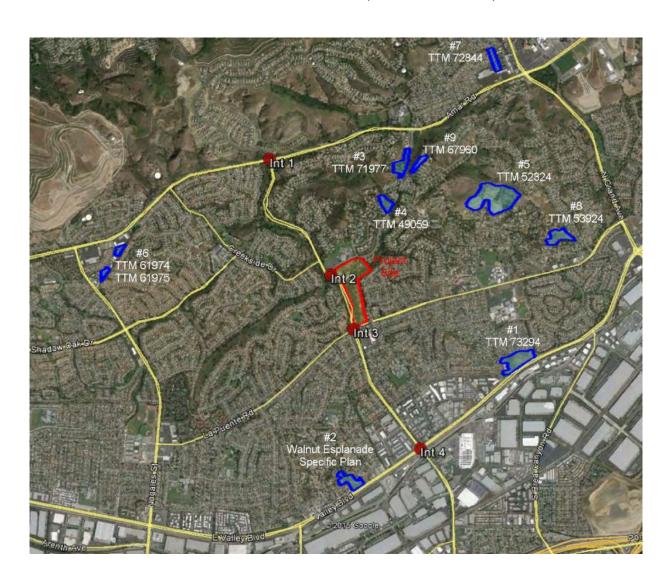


Table 6 – Cumulative Development Traffic Generation

	Trip Rates													
	Cumulative Development				AM Peak			PM Peak			WE	MD Peak		
No.	Land Use	Code ¹	Unit²	Daily	aily Total		Out%	Total	ln%	Out%	Daily	Total	ln%	Out%
1	Single-Family Detached Housing	ITE 210	DU	9.52	0.75	25%	75%	1.00	63%	37%	8.62	0.86	53%	47%
3	Condominium/ Townhouse	ITE 230	DU	5.81	0.44	17%	83%	0.52	67%	33%	4.84	0.45	49%	51%
5	Senior Adult Housing - Attached	ITE 252	DU	3.44	0.20	34%	66%	0.25	54%	46%	2.84	0.41	49%	51%
13	Shopping Center	ITE 820	TSF	42.70	0.96	62%	38%	3.71	48%	52%	25.24	3.12	49%	51%

	Traffic Generation													
	Cum	nulative Development		WD	Α	M Peak	[Р	M Peak		WE	N	/ID Peal	k
No.	Name	Land Use	Quantity ²	Daily	Total	ln	Out	Total	ln	Out	Daily	Total	In	Out
		Single-Family Detached Housing	37 DU	352	28	7	21	37	23	14	319	32	17	15
1	TTM 73294	Condominium/ Townhouse	61 DU	354	27	4	23	31	21	10	295	27	13	14
Subto		Subtotal Trips - C	umulative #1	706	55	11	44	68	44	24	614	59	30	29
2	Walnut Esplanade SP	Single-Family Detached Housing	13 DU	124	9	2	7	13	8	5	112	11	6	5
3	TTM 71977	Single-Family Detached Housing	13 DU	124	9	2	7	13	8	5	112	11	6	5
4	TTM 49059	Single-Family Detached Housing	6 DU	57	4	1	3	6	4	2	52	5	3	2
5	TTM 52324	Single-Family Detached Housing	10 DU	95	8	2	6	10	6	4	86	9	5	4
	TTM	Senior Adult Housing - Attached	86 DU	296	17	6	11	22	12	10	244	35	17	18
6	61974 & 61975	Shopping Center	3.810 TSF	163	3	2	1	14	7	7	96	12	6	6
	01010	Subtotal Trips - C	umulative #6	459	20	8	12	36	19	17	340	47	23	24
7	TTM 72844	Single-Family Detached Housing	25 DU	238	19	5	14	25	16	9	216	22	12	10
8	TTM 53924	Single-Family Detached Housing	6 DU	57	4	1	3	6	4	2	52	5	3	2
9	9 TTM Single-Family 7 DU 67960 Detached Housing		7 DU	67	5	1	4	7	4	3	60	6	3	3
		TOTAL CUMUL	1,927	133	33	100	184	113	71	1,644	175	91	84	

Note



¹ Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012

² DU = dw elling unit; TSF = thousand square feet

				Lemon Ave	enue /	Amar Road			
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	5 🗷] [R 1	19 🛪	<u>ا</u>	K 1	17 🗷	Fe	R 1
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	87 3 779 4	on A	← 2	24 4 464 4	on A	← 0	87 7 291 →	on A	← 0
	K 1 7	é	∠ 134	K 1 7	é	L 113	K 1 7	е	∠ 182
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		_	R 207		_	R 123		_	R 71
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2				Lemon Avenu	ue / Va	alley Boulevard			
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WEEKDAY AM PEAK HOUR WEEKDAY PM PEAK HOUR





SUNDAY MD PEAK HOUR

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		5 ∄ 964 → 297 ¥	1 Lemon Ave	★ 31	7 125	F	19 7 914 → 174 ¥	1 Lemon Ave		↑ 7 168	,	Amar Rd 17 7 380 → 85 ¥	1 Lemon Ave	K 77	
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	Meado	2 → 8 ¥	2 Lemon Ave	Meadow Pas	s Rd 7 185	Mead	0 7 0 → 3 ¥	2 Lemon Ave		Pass Rd 7 206	Mea	dow Pass Ht 2	2 Lemon Ave	Meadow C	Pass Rd 7 212
			<u> </u>			L	emon Aver	nue / La	a Puente l	Road					
	الا 99	257 4 571 4	Lemon Ave	尽 207← 300止 203		86 ¥	139 ¥	Lemon Ave	€ 22∠ 86	25	74 Y	97 4 273 →	Lemon Ave	₹ 72₹ 13≰ 93	1
)	La Pı	uente Rd	3	La Puente	Rd	La	Puente Rd	3	La Pu	ente Rd	La	Puente Rd	3	La Pue	ente Rd
AMAR RD		148 ∄ 385 → 233 ¥	Lemon Ave	↑ 418 ೯ 166	86 🗷		107 オ 411 → 139 ¥	Lemon Ave	K 309	7 179		76 ∄ 165 → 115 ¥	Lemon Ave	K 110	7 64
						L	emon Aver	ue / Va	alley Boul	evard					
MEADON & PASS RD	231 Y	101 y	Lemon Ave	★ 54★ 1120★ 218		155 🗷	112 4 533 \	Lemon Ave		24	132 🗷	62 y 327 y	Lemon Ave	₹ 36₹ 25₹ 70	8
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MEARECHTS I		113 オ 554 → 191 ¥	Lemon Ave	↑ 451 ೯ 155	7 145		203 7 1086 → 217 ¥	Lemon Ave	K 164	↑ 627		106 オ 227 → 0 ¥	Lemon Ave	K 53	7 53
ENTE RO			ı				Meadow Pa	ass Ro		ane					
ARUENTE	Ľ	ω ψ ψ	Colt Ln	K 3← 168∠ 1			° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	Colt Ln	← 14			0 <u>7</u>		K 2 ← 14 止 1	
THO A RELEASE	Meado	w Pass Rd 3 7 260 → 5 ¥	5 Proj Dwy	Meadow Pas	is Rd	Mead	3 7 197 → 16 ¥	5 Proj Dwy	K	Pass Rd	Mead	1 7 109 → 12 ¥	5 Proj Dwy		Pass Rd
Not to Scale VALLEY BUND		neret .													

WEEKDAY AM PEAK HOUR

WEEKDAY PM PEAK HOUR

SUNDAY MD PEAK HOUR

Exhibit 10 Existing Plus Ambient Growth With Project Intersection Volumes



	88	Lemon Ave 1 Lemon Ave	 K 12 ★ 858 ★ 84 Amar Rd K ↑ 7 270 	Amar Rd 19 7 923 → 174 ¥	Lemon Ave 1 Lemon Ave	 C 27 ← 729 ∠ 101 Amar Rd C ↑ 7 261 	35	Lemon Ave 1 Lemon Ave	 K 10 ← 424 ∠ 56 Amar Rd K ↑ 7 7 7 7 5 5
	1 783 88 88	Lemon Ave 2 Lemon Ave	Lemon A	Avenue / Meadow P 2	Sas Lemon Ave 2 Lemon Ave	Road / Meadow Pass	## Heights 1	Lemon Ave 2 Lemon Ave	 € 0 ∠ 194 Meadow Pass Rd € ↑ 7 0
AMAR RD	99 581 257 ¥ La Puente Rd 148 148 385 → 233 ¥	Lemon Ave 3 Lemon Ave	 C 208 C 300 C 204 La Puente Rd C ↑ 7 C 421 	Lemon Avenu 86	Lemon Ave 3 Lemon Ave	a Puente Road ■ 124 ■ 225 ■ 86 La Puente Rd ■ 7 309 309 Example 186 ■ 866 ■	74 L 280 y 3 L a Puente Rd 76 7 165 3 115 3	Lemon Ave 3 Lemon Ave	 K 72 ← 131 ∠ 93 La Puente Rd K ↑ 7 110 237
NEADOW PASS RO	238 2 Valley Blvd	Lemon Ave 4	★ 54★ 1138★ 222Valley Blvd	Lemon Avenu		R 161 ← 736 ∠ 347 Valley Blvd	137 4 Valley Blvd	Lemon Ave 4	尽 36← 271止 73Valley Blvd
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LAPARENTE RUS	3 7 262 → 5 ¥	Colt Ln 5 Proj Dwy	 K 3 ← 174 ∠ 1 Meadow Pass Rd K ↑ 7 14 	0 3 3 Meadow Pass Rd 3 7 204 → 16 31	Colt Ln 5 Proj Dwy	 K 4 ← 148 ∠ 2 Meadow Pass Rd K ↑ ७ C ↑ □ 		Colt Ln 5 Proj Dwy	 € 148 ₤ 1 Meadow Pass Rd ♠ ७ ♠ ०
Not to Scale VALLEY BLUE									Exhibit 11

WEEKDAY AM PEAK HOUR

WEEKDAY PM PEAK HOUR

Lemon Avenue / Amar Road

SUNDAY MD PEAK HOUR

Exhibit 11 **Existing Plus Ambient Growth Plus Cumulative With Project Intersection Volumes**



5.0 FUTURE TRAFFIC ANALYSIS

This section presents the intersection operations analysis for the following future traffic scenarios, based on existing and proposed geometry:

- Existing plus Ambient Growth (E+A) conditions;
- Existing plus Ambient Growth with Project (E+A+P) conditions; and
- Existing plus Ambient Growth plus Cumulative with Project (E+A+C+P) conditions.

5.1 Existing Plus Ambient Growth Intersection Analysis

Table 7 summarizes the weekday AM, weekday PM and Sunday Mid-Day (MD) peak hour intersection operations analysis results for Existing Plus Ambient Growth (E+A) conditions, based on existing geometry. Appendix D includes the E+A conditions intersection operations analysis worksheets. As shown in Table 7, all study area intersections are projected to operate at LOS D or better.

5.2 Existing Plus Ambient Growth With Project Intersection Analysis

Table 7 summarizes the weekday AM, weekday PM and Sunday Mid-Day (MD) peak hour intersection operations analysis results for Existing Plus Ambient Growth With Project (E+A+P) conditions, based on existing geometry. Appendix E includes the E+A+P conditions intersection operations analysis worksheets. As shown in Table 7, all study intersections are projected to operate at LOS D or better.

Table 7 shows that the project will not contribute to a significant project impact at the study intersections for Existing Plus Ambient Growth With Project (E+A+P) conditions based on City's threshold criteria. No additional E+A+P off-site roadway improvements are needed for the project.

5.3 Existing Plus Ambient Growth Plus Cumulative With Project Intersection Analysis

Table 8 summarizes the weekday AM, weekday PM and Sunday Mid-Day (MD) peak hour intersection operations analysis results for Existing Plus Ambient Growth Plus Cumulative With Project (E+A+C+P) conditions, based on existing geometry. Appendix F includes the E+A+C+P conditions intersection operations analysis worksheets. As shown in Table 8, all study intersections are projected to operate at LOS D or better.

Table 8 shows that there will not significant cumulative impact at the study intersections for Existing Plus Ambient Growth Plus Cumulative With Project (E+A+C+P) conditions based on City's threshold criteria. No additional E+A+C+P off-site roadway improvements are needed.



Table 7 Existing Plus Ambient Growth With Project Conditions Intersection Analysis Summary

	Intersection		E>	kisting	(1 Plus Ar Condi	nbien	t Growt	n	E>	_	(2 Plus Aı Project	nbien		n		Sign	(3) nificant et Impac	t
			AM F	Peak	PM F	eak	MD F	eak	AM F	eak	PM F	eak	MD F	eak	1	Increase	е	Drainat
No.	Name	Type¹	ICU/ HCM²	LOS	ICU/ HCM²	LOS	ICU/ HCM²	LOS	ICU/ HCM²	LOS	ICU/ HCM²	LOS	ICU/ HCM²	LOS	AM	PM	MD	Project Impact ³
						S	Signalize	ed Inte	ersection	าร								
1	Lemon Ave / Amar Rd	TS	0.749	С	0.676	В	0.336	Α	0.751	С	0.677	В	0.337	Α	0.002	0.001	0.001	No
2	Lemon Ave / Meadow Pass Rd	TS	0.548	Α	0.502	Α	0.485	Α	0.557	Α	0.514	Α	0.500	Α	0.009	0.012	0.015	No
3	Lemon Ave / La Puente Rd	TS	0.851	D	0.715	С	0.467	Α	0.853	D	0.719	С	0.470	Α	0.002	0.004	0.003	No
4	Lemon Ave / Valley Blvd	TS	0.887	D	0.847	D	0.391	Α	0.889	D	0.852	D	0.395	Α	0.002	0.005	0.004	No
						U	nsignali	zed In	tersecti	on								
5	Colt Ln - Project Dwy / Meadow Pass Rd	CSS: nb/sb	11.4	В	10.4	В	9.8	Α	14.3	В	11.3	В	10.8	В	2.9	0.9	1.0	No

Note

- 1 Intersection Type: TS = Traffic Signal; CS = Cross-Street Stop; nb = Northbound Stop; sb = Southbound Stop
- Signalized: Intersection Capacity Utilization (ICU) Analysis Method, Volume/Capacity (V/C) Ratio Unsignalized: 2000 Highway Capacity Manual (HCM) Analysis Method, Average Delay in Seconds.
- ³ See Table 3 for significant impact threshold.

Table 8 Existing Plus Ambient Growth Plus Cumulative With Project Conditions Intersection Analysis Summary

	Intersection		E>	kisting	(1 Plus Ar Condi	mbien	t Growt	h		•	(2 us Amb With P	ient G			C	Sign	(3) iificant ive Imp	act
			AM F	Peak	PM P	Peak	MD F	Peak	AM F	eak	PM P	eak	MD F	eak		Increase	е	Cumu-
No.	Name	Type¹	ICU/ HCM²	LOS	ICU/ HCM²	LOS	ICU/ HCM²	LOS	ICU/ HCM²	LOS	ICU/ HCM²	LOS	ICU/ HCM²	LOS	AM	PM	MD	lative Impact ³
						5	Signalize	ed Inte	ersection	าร								
1	Lemon Ave / Amar Rd	TS	0.749	С	0.676	В	0.336	Α	0.755	С	0.685	В	0.344	Α	0.006	0.009	0.008	No
2	Lemon Ave / Meadow Pass Rd	TS	0.548	Α	0.502	Α	0.485	Α	0.563	Α	0.521	Α	0.508	Α	0.015	0.019	0.023	No
3	Lemon Ave / La Puente Rd	TS	0.851	D	0.715	С	0.467	Α	0.855	D	0.723	С	0.472	Α	0.004	0.008	0.005	No
4	Lemon Ave / Valley Blvd	TS	0.887	D	0.847	D	0.391	Α	0.898	D	0.863	D	0.405	Α	0.011	0.016	0.014	No
						U	nsignali	ized Ir	tersecti	on								
5	Colt Ln - Project Dwy / Meadow Pass Rd	CSS: nb/sb	11.4	В	10.4	В	9.8	Α	14.5	В	11.4	В	10.9	В	3.1	1.0	1.1	No

<u>Note</u>

- 1 Intersection Type: TS = Traffic Signal; CS = Cross-Street Stop; nb = Northbound Stop; sb = Southbound Stop
- Signalized: Intersection Capacity Utilization (ICU) Analysis Method, Volume/Capacity (V/C) Ratio Unsignalized: 2000 Highway Capacity Manual (HCM) Analysis Method, Average Delay in Seconds.
- See Table 3 for significant impact threshold.

6.0 CONGESTION MANAGEMENT PROGRAM (CMP) ANALYSIS

This section analyzes on-site parking, pedestrian circulation and access, vehicular circulation and access, including

According to the 2010 Congestion Management Program (CMP) published by Los Angeles County Metropolitan Transportation Authority, those proposed projects which meet the following criteria must be evaluated:

- All CMP arterial monitoring intersections, including monitored freeway on- or off-ramp intersections, where the proposed project will add 50 or more trips during either the AM or PM weekday peak hours (of adjacent street traffic).
- Mainline freeway monitoring locations where the project will add 150 or more trips, in either direction, during either the AM or PM weekday peak hours.

The proposed project is not forecasted to add 50 or more trips to a CMP arterial monitoring intersection, nor is the project forecasted to add 150 or more trips to a mainline freeway monitoring location during either the AM or PM weekday peak hours; therefore, no CMP traffic impact analysis is required for the proposed project.



7.0 OTHER MODAL ACCESS

This section assess the other modal access (pedestrian, bicycle and transit) for the project site.

7.1 Pedestrian Circulation

There are crosswalks at the two signalized intersections on Lemon Avenue at Meadow Pass Road and on Lemon Avenue at La Puente Road.

There are existing sidewalks on the east side of Lemon Avenue adjacent to the project site, but no sidewalk exists on the west side of Lemon Avenue. There are sidewalks on both sides of La Puente Road adjacent to the project site. On Meadow Pass Road adjacent to the project site, there are no sidewalks on the south side of the street adjacent to the project site, but there are equestrian trails and pedestrian sidewalks on the opposite (north) side of Meadow Pass Road.

There are adequate pedestrian access features in the vicinity of the project site. The proposed project will provide sidewalks on both sides of the project access road so that there will be continuous path as connecting with the sidewalk on the north side of Meadow Pass Road.

7.2 Bicycle Circulation

There are Class II (on-street) bike lanes on Amar Road and La Puente Road. Designated bike lanes do not exist on Lemon Avenue, Meadow Pass Road and Valley Boulevard. There are some existing unpaved trails that will remain on the east side of Lemon Avenue adjacent to the site project, and the bicycles from the project site may utilize these unpaved trails to connect with the bike lanes on La Puente Road. Otherwise, the bicycles traveling on the project access road from the project site may share the road with motor vehicles on Meadow Pass Road and Lemon Avenue until they reach La Puente Road and Amar Road.

7.3 Transit Access

The closest bus stop to the project site is located at the southwest corner of Lemon Avenue and La Puente Road approximately 0.6 miles from the project driveway. Bus routes nearby the project site includes the following:

- La Puente Road Foothill Transit Bus Route 289;
- Amar Road Foothill Transit Bus Route 486 which is operated by Foothill Transit; and
- Valley Boulevard County of Los Angeles Metropolitan Transportation Authority (Metro) Bus Route 190/194.



8.0 ON-SITE VEHICULAR CIRCULATION

This section assess the on-site circulation for the project site.

8.1 Project Access Control

Vehicular access to the project site will be provided at a northbound stop-controlled full access driveway on Meadow Pass Road located at the easterly project boundary approximately 100 feet east of Colt Lane. Based on the intersection operations analysis (shown in Tables 7 and 8), the project driveway is projected to operate at Level of Service B or better, based on the proposed intersection control and lane configuration. There are existing two-way left turn lane (TWLTL) on Meadow Pass Road, and it is recommended that a 100-foot westbound left turn pocket be provided to facilitate the westbound left turn movement into the project driveway.

8.2 Project Driveway Sight Distance

The corner sight distance has been assessed for the primary project access on Meadow Pass Road which has a posted limit of 30 miles per hour (mph). In accordance with the criteria contained in the *Highway Design Manual, Section 405.1 (May 2012)* published by California Department of Transportation (Caltrans), a minimum corner sight distance of 330 feet should be provided between a exiting vehicle from a driveway and the approaching vehicle on the arterial for a design speed of 30 mph. The purpose of the corner sight distance is to provide adequate time for a vehicle exiting the proposed project driveway to turn left or right without requiring through traffic on Meadow Pass Road to slow down significantly to avoid a collision.

From the perspective of the driver exiting the proposed project driveway looking west toward the eastbound traffic, the 330 feet of corner sight distance occurs at a point in the approaching travel lane slightly west of the existing easterly driveway for the St. Lorenzo Ruiz church. An unobstructed line of sight to this point can be achieved by maintaining landscaping low enough to provide a clear line of sight, which may require removal of existing vegetation within the area between the sight line and the curb line. The area to be kept clear of obstructions is defined as the clear sight triangle. Exhibit 12 shows the line of sight and the clear sight triangle for the exiting vehicles looking west toward the eastbound traffic.

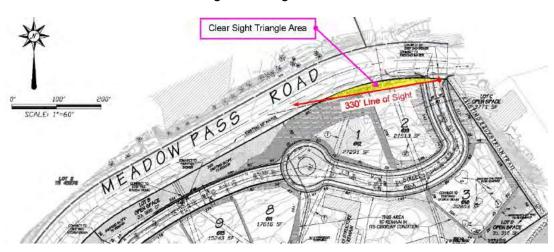


Exhibit 12 - Line of Sight Looking West on Meadow Pass Road



From the perspective of the driver exiting the proposed project driveway looking east toward the westbound traffic, the 330 feet of corner sight distance occurs at a point on the approaching travel lane near the third property east of the project site. The line of sight to this point is contained within the roadway curb-to-curb; therefore, adequate line of sight will be provided since there is no raised median for potential obstructions.

Based on the review of the main project access, it appears that adequate corner sight distance can be provided for vehicles exiting the project site with some restrictions to the landscaping within the clear sight triangle west of the proposed project driveway as shown in Exhibit 12.

9.0 CONCLUSIONS

The Brookside Project (Tentative Tract No. 72798) is located west of Lemon Avenue between Meadow Pass Road and La Puente Road in the City of Walnut. The proposed project consists of 28 single-family detached residential dwelling units. The proposed project will replace the non-operational Brookside Equestrian Center, located at 800 Meadows Pass Road. The proposed project is anticipated to be completed and operational in approximately two years in 2017.

The proposed project is forecasted to generate approximately 267 daily trips with 21 AM peak hour trips and 28 PM peak hour trips during a typical weekday conditions. On Sundays, the proposed project is forecast to generate approximately 24 mid-day peak hour trips.

For all traffic conditions, all existing study intersections are operating at LOS D or better. The results of the intersection operations analysis indicate that the proposed project will not significantly impact any of the study intersections. Without significant project impacts, no off-site mitigation measures are required.

The proposed project is not forecasted to add 50 or more trips to a CMP arterial monitoring intersection, nor is the project forecasted to add 150 or more trips to a mainline freeway monitoring location during either the AM or PM weekday peak hours; therefore, no CMP traffic impact analysis is required for the proposed project.

There are adequate pedestrian access features in the vicinity of the project site. The proposed project will provide sidewalks on both sides of the project access road so that there will be continuous path as connecting with the sidewalk on the north side of Meadow Pass Road.

There are some existing unpaved trails that will remain on the east side of Lemon Avenue adjacent to the site project, and the bicycles from the project site may utilize these unpaved trails to connect with the Class II bike lanes on La Puente Road. Otherwise, the bicycles traveling on the project access road from the project site may share the road with motor vehicles on Meadow Pass Road and Lemon Avenue until they reach La Puente Road and Amar Road.

The closest bus stop to the project site is located at the southwest corner of Lemon Avenue and La Puente Road approximately 0.6 miles from the project driveway. Additional bus routes are available on La Puente Road, Amar Road and Valley Boulevard.

Vehicular access to the project site will be provided at a northbound stop-controlled full access driveway on Meadow Pass Road located at the easterly project boundary approximately 100 feet east of Colt Lane. Based on the intersection operations analysis, the project driveway is projected to operate at Level of Service B or better, based on the proposed intersection control and lane configuration. There are existing two-way left turn lane (TWLTL) on Meadow Pass Road, and it is recommended that a 100-foot westbound left turn pocket be provided to facilitate the westbound left turn movement into the project driveway.

Based on the review of the main project access, it appears that adequate corner sight distance can be provided for vehicles exiting the project site with some restrictions to the landscaping within the clear sight triangle west of the proposed project driveway as shown in Exhibit 12. From the perspective of the driver exiting the proposed project driveway looking west toward the eastbound traffic, the required 330 feet of corner sight distance occurs at a point in the approaching travel



lane slightly west of the existing easterly driveway for the St. Lorenzo Ruiz church. An unobstructed line of sight to this point can be achieved by maintaining landscaping low enough to provide a clear line of sight, which may require removal of existing vegetation within the area between the sight line and the curb line.







Location ID:

 North/South:
 Lemon Avenue
 Date:
 09/09/15

 East/West:
 Amar Road
 City:
 Walnut, CA

		Southboun	d		Westbound	1	ı	Northboun	d		Eastbound	1	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	Totals.
7:00	2	4	2	6	258	8	15	6	28	67	189	1	586
7:15	5	7	4	2	246	15	21	4	56	70	233	0	663
7:30	6	9	8	4	237	23	35	15	78	83	269	0	767
7:45	9	11	0	5	159	19	28	9	61	82	249	3	635
8:00	8	8	8	1	201	22	40	3	68	58	203	2	622
8:15	10	9	14	3	179	35	47	5	62	47	198	3	612
8:30	7	10	8	10	247	54	17	7	36	36	145	6	583
8:45	17	10	4	5	163	31	14	1	32	48	161	2	488

r	T . 137 1				2.5	4.000	207	247		104	404	1647		4056
ı	Total Volume:	64	68	48	36	1690	207	217	50	421	491	1647	17	4956
ı	Approach %	36%	38%	27%	2%	87%	11%	32%	7%	61%	23%	76%	1%	

Peak Hr Begin:	7:15												
PHV	28	35	20	12	843	79	124	31	263	293	954	5	2687
PHF		0.865			0.884			0.816			0.889		0.876

Turning Movement Count Report PM

Location ID:

 North/South:
 Lemon Avenue
 Date:
 09/09/15

 East/West:
 Amar Road
 City:
 Walnut, CA

		Southbound	1		Westbound	1	ı	Northboun	d		Eastbouna	'	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	Т	L	R	T	L	TOtals.
16:00	6	8	2	5	142	22	31	2	45	34	178	8	483
16:15	1	4	2	2	143	28	28	8	35	24	205	7	487
16:30	6	2	9	4	183	27	21	8	36	40	192	3	531
16:45	7	6	7	4	160	31	29	8	51	39	212	9	563
17:00	2	4	2	4	183	28	32	7	61	40	229	5	597
17:15	5	8	3	10	179	21	39	9	48	44	220	3	589
17:30	4	6	5	4	185	27	59	14	71	44	241	4	664
17:45	3	6	5	9	169	22	36	7	75	39	215	7	593

Total Volume:	34	44	35	42	1344	206	275	63	422	304	1692	46	4507
Approach %	30%	39%	31%	3%	84%	13%	36%	8%	56%	15%	83%	2%	

	Peak Hr Begin:	17:00												
ſ	PHV	14	24	15	27	716	98	166	37	255	167	905	19	2443
	PHF		0.828			0.973			0.795			0.944		0.920

Turning Movement Count Report AM

Location ID: 1

 North/South:
 Lemon Avenue
 Date:
 09/13/15

 East/West:
 Amar Road
 City:
 Walnut, CA

	• 1	Southbound	d		Westbound	d	1	Vorthboun	d		Eastbouna		
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	Т	L	R	T	L	R	T	L	R	T	L	TOtals.
10:00	4	5	2	3	61	14	19	2	24	18	93	6	251
10:15	4	7	3	2	69	10	12	4	19	38	76	0	244
10:30	2	8	5	3	64	10	11	2	20	36	100	5	266
10:45	3	7	3	3	102	9	9	3	7	22	93	0	261
11:00	4	10	2	3	95	16	20	0	13	19	89	3	274
11:15	3	3	3	3	114	13	9	5	11	21	94	5	284
11:30	5	3	4	2	111	17	6	4	15	15	91	4	277
11:45	3	2	3	2	93	6	14	6	34	26	102	5	296

Total Volume:	28	45	25	21	709	95	100	26	143	195	738	28	2153
Approach %	29%	46%	26%	3%	86%	12%	37%	10%	53%	20%	77%	3%	

Peak Hr Begin:	11:00												
PHV	15	18	12	10	413	52	49	15	73	81	376	17	1131
PHF		0.703			0.913			0.634			0.891		0.955

Location ID:

 North/South:
 Lemon Avenue
 Date:
 09/09/15

 East/West:
 Meadow Pass Road
 City:
 Walnut, CA

			Southbound	d	,	Westbound	1	1	Northboun	d		Eastbouna	1	
		1	2	3	4	5	6	7	8	9	10	11	12	Totals:
I	Movements:	R	Т	L	R	Т	L	R	T	L	R	Т	L	TOtals.
ſ	7:00	0	137	30	7	0	15	22	70	1	2	1	0	285
ı	7:15	1	191	63	28	0	25	47	111	1	6	1	0	474
ı	7:30	0	203	12	35	1	54	60	168	2	0	0	0	535
ı	7:45	0	213	6	7	1	29	34	146	3	1	1	0	441
ı	8:00	0	164	5	9	0	25	39	155	0	1	0	1	399
ı	8:15	0	144	2	8	0	55	63	131	1	0	1	1	406
ı	8:30	2	186	7	4	0	63	28	68	1	3	0	2	364
L	8:45	1	142	4	8	0	25	32	68	1	2	0	0	283

1											45			
	Total Volume:	4	1380	129	106	2	291	325	917	10	15	4	4	3187
	Approach %	0%	91%	9%	27%	1%	73%	26%	73%	1%	65%	17%	17%	

Peak Hr Begin:	7:15												
PHV	1	771	86	79	2	133	180	580	6	8	2	1	1849
PHF		0.841			0.594			0.833			0.393		0.864

Turning Movement Count Report PM

Location ID:

 North/South:
 Lemon Avenue
 Date:
 09/09/15

 East/West:
 Meadow Pass Road
 City:
 Walnut, CA

	,	Southboun	d		Westbound	d	1	Vorthbound	d		Eastbouna	1	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	Totals.
16:00	0	92	7	7	0	21	35	113	1	0	0	1	277
16:15	0	87	6	5	1	27	39	124	2	2	0	0	293
16:30	1	114	6	8	1	27	34	127	1	2	0	0	321
16:45	0	113	8	8	0	24	49	130	0	1	0	0	333
17:00	0	117	7	8	0	16	50	164	0	1	0	0	363
17:15	0	121	6	16	0	20	49	169	1	0	0	0	382
17:30	0	124	5	9	0	41	50	190	0	0	0	0	419
17:45	2	97	6	9	0	35	43	198	1	2	0	0	393

Total Volume:	3	865	51	70	2	211	349	1215	6	8	0	1	2781
Approach %	0%	94%	6%	25%	1%	75%	22%	77%	0%	89%	0%	11%	

Peak Hr Begin:	17:00												
PHV	2	459	24	42	0	112	192	721	2	3	0	0	1557
PHF		0.940			0.770			0.945			0.375		0.929

Turning Movement Count Report AM

Location ID: 2

 North/South:
 Lemon Avenue
 Date:
 09/13/15

 East/West:
 Meadow Pass Road
 City:
 Walnut, CA

		-	Soutnboun	a		vvestbound	7	,	vortnboun	а		Eastbound	1	
		1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Mov	vements:	R	T	L	R	T	L	R	T	L	R	T	L	TOtals.
:	10:00	0	61	19	59	0	119	34	31	0	2	0	1	326
:	10:15	0	68	31	15	0	27	91	42	0	1	0	0	275
:	10:30	1	84	17	5	0	16	53	44	0	2	0	1	223
:	10:45	0	75	19	4	0	18	24	48	0	1	0	0	189
	11:00	0	82	8	4	0	20	19	52	0	1	0	1	187
:	11:15	0	69	10	5	0	18	21	40	0	5	0	0	168
1	11:30	0	68	14	11	0	31	30	57	1	0	0	0	212
1	11:45	0	48	47	82	0	88	74	55	2	1	1	1	399

Total Volume:	1	555	165	185	0	337	346	369	3	13	1	4	1979
Approach %	0%	77%	23%	35%	0%	65%	48%	51%	0%	72%	6%	22%	

Peak Hr Begin:	10:00												
PHV	1	288	86	83	0	180	202	165	0	6	0	2	1013
PHF		0.919			0.369			0.690			0.667		0.777

Location ID:

 North/South:
 Lemon Avenue
 Date:
 09/09/15

 East/West:
 La Puente Road
 City:
 Walnut, CA

		Southbound	d	'	Westbound	1	1	Vorthboun	d		Eastbouna	1	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	Т	L	R	Т	L	R	T	L	R	Т	L	TOtals.
7:00	5	89	55	22	37	21	33	49	27	34	86	23	481
7:15	11	114	76	57	96	57	35	75	28	62	150	29	790
7:30	37	153	95	76	96	63	21	115	44	57	91	40	888
7:45	27	165	48	42	61	48	11	101	51	55	66	41	716
8:00	21	125	34	30	44	33	25	120	41	57	74	36	640
8:15	31	140	32	24	47	27	32	125	35	44	72	44	653
8:30	38	172	33	15	35	32	13	66	26	39	60	15	544
8:45	15	131	31	22	52	31	17	65	22	42	48	19	495

Total Volume:	185	1089	404	288	468	312	187	716	274	390	647	247	5207
Approach %	11%	65%	24%	27%	44%	29%	16%	61%	23%	30%	50%	19%	

Peak Hr Begin:	7:15												
PHV	96	557	253	205	297	201	92	411	164	231	381	146	3034
PHF		0.795			0.748			0.897			0.786		0.854

Turning Movement Count Report PM

Location ID:

 North/South:
 Lemon Avenue
 Date:
 09/09/15

 East/West:
 La Puente Road
 City:
 Walnut, CA

	9	Southbound	d		Westbound	d	ı	Vorthbound	d		Eastbouna	1	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	Т	L	R	Т	L	R	T	L	R	T	L	TOtals.
16:00	20	64	24	18	39	12	32	103	41	29	60	23	465
16:15	16	78	21	22	41	20	34	125	63	29	67	22	538
16:30	22	77	38	30	36	30	45	122	54	35	59	16	564
16:45	18	80	31	26	58	21	42	140	42	31	102	18	609
17:00	19	85	36	22	61	16	54	163	76	20	96	19	667
17:15	7	94	32	25	48	22	48	165	75	32	106	31	685
17:30	28	103	40	35	68	16	44	162	70	39	106	31	742
17:45	30	69	29	40	46	31	31	176	85	47	99	23	706

Total Volume:	160	650	251	218	397	168	330	1156	506	262	695	183	4976
Approach %	15%	61%	24%	28%	51%	21%	17%	58%	25%	23%	61%	16%	

Peak Hr Begin:	17:00												
PHV	84	351	137	122	223	85	177	666	306	138	407	104	2800
PHF		0.836			0.903			0.980			0.922		0.943

Turning Movement Count Report AM

Location ID: 3

 North/South:
 Lemon Avenue
 Date:
 9/13/2015

 East/West:
 La Puente Road
 City:
 Walnut, CA

	2	outhbound	a		Westbound	7	1	Vorthboun	a		Eastbound	<u>'</u>	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	Т	L	R	T	L	R	T	L	R	T	٦	TOtals.
10:00	37	87	53	10	24	15	14	43	32	20	44	13	392
10:15	10	61	23	23	28	25	13	77	26	28	40	35	389
10:30	13	73	15	13	31	16	10	63	19	21	31	26	331
10:45	11	68	16	16	19	16	17	51	37	31	41	6	329
11:00	11	67	25	11	20	12	16	48	32	25	43	11	321
11:15	8	59	22	11	35	14	19	47	27	31	30	10	313
11:30	17	59	19	24	33	31	17	48	30	31	50	18	377
11:45	36	79	29	24	42	35	11	77	20	27	40	35	455

Total Volume:	143	553	202	132	232	164	117	454	223	214	319	154	2907
Approach %	16%	62%	22%	25%	44%	31%	15%	57%	28%	31%	46%	22%	

F	Peak Hr Begin:	11:00												
	PHV	72	264	95	70	130	92	63	220	109	114	163	74	1466
	PHF		0.748			0.723			0.907			0.860		0.805

Location ID:

 North/South:
 Lemon Avenue
 Date:
 09/09/15

 East/West:
 Valley Boulevard
 City:
 Walnut, CA

		Southbound	d	'	Westbound	1	1	Vorthboun	d		Eastbound	1	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	Т	L	R	Т	L	R	T	L	R	T	L	TOtals.
7:00	25	92	12	11	297	42	40	69	33	21	95	13	750
7:15	53	145	21	14	238	56	49	85	30	35	144	22	892
7:30	59	164	35	13	302	52	49	81	37	46	171	22	1031
7:45	58	237	15	15	270	51	38	114	34	48	147	14	1041
8:00	54	146	25	18	261	64	32	152	42	51	123	44	1012
8:15	55	159	23	6	276	49	25	99	40	44	108	31	915
8:30	53	173	33	16	249	57	23	78	25	35	91	25	858
8:45	54	119	17	17	234	41	36	85	23	39	101	24	790

Total Volume:	411	1235	181	110	2127	412	292	763	264	319	980	195	7289
Approach %	22%	68%	10%	4%	80%	16%	22%	58%	20%	21%	66%	13%	

Peak Hr Begin:	7:30												
PHV	226	706	98	52	1109	216	144	446	153	189	549	111	3999
PHF		0.831			0.938			0.822			0.888		0.960

Turning Movement Count Report PM

Location ID: 4

 North/South:
 Lemon Avenue
 Date:
 09/09/15

 East/West:
 Valley Boulevard
 City:
 Walnut, CA

	9	Southbound	d		Westbound	1	1	Vorthbound	d		Eastbouna	1	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	Т	L	R	T	L	R	T	L	R	T	L	TOLAIS.
16:00	24	102	27	15	123	70	39	113	35	34	245	41	868
16:15	33	111	29	27	128	60	41	119	23	49	243	43	906
16:30	42	103	29	29	135	69	52	128	36	61	257	45	986
16:45	34	87	33	39	160	58	38	114	32	56	343	50	1044
17:00	49	146	38	39	159	69	46	149	32	65	233	39	1064
17:15	37	122	28	44	193	113	48	133	34	55	277	57	1141
17:30	36	115	23	39	196	96	60	151	54	49	280	48	1147
17:45	29	143	21	35	169	64	60	184	42	46	285	53	1131

Total Volume:	284	929	228	267	1263	599	384	1091	288	415	2163	376	8287
Approach %	20%	64%	16%	13%	59%	28%	22%	62%	16%	14%	73%	13%	

Peak Hr Begin:	17:00												
PHV	151	526	110	157	717	342	214	617	162	215	1075	197	4483
PHF		0.844			0.869			0.868			0.956		0.977

Turning Movement Count Report AM

Location ID: 4

 North/South:
 Lemon Avenue
 Date:
 09/13/15

 East/West:
 Valley Boulevard
 City:
 Walnut, CA

	9,	outhbound	d		Westbound	1	1	Vorthboun	d		Eastbound		
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	Т	L	R	T	L	R	T	L	R	T	L	Totals.
10:00	38	75	14	5	40	22	9	44	10	0	41	25	323
10:15	33	89	15	9	62	19	6	68	11	0	61	26	399
10:30	34	96	13	1	52	19	13	50	9	0	65	26	378
10:45	34	80	14	11	73	20	5	48	9	0	41	21	356
11:00	26	83	12	11	65	12	15	62	16	0	57	26	385
11:15	36	76	21	5	55	16	13	49	16	0	58	24	369
11:30	32	81	13	8	69	19	13	66	11	0	54	25	391
11:45	35	82	14	11	66	22	11	60	9	0	56	27	393

Total Volume:	268	662	116	61	482	149	85	447	91	0	433	200	2994
Approach %	26%	63%	11%	9%	70%	22%	14%	72%	15%	0%	68%	32%	

Peak Hr Begin:	11:00												
PHV	129	322	60	35	255	69	52	237	52	0	225	102	1538
PHF		0.961			0.907			0.917			0.985		0.978

Location ID: 5

 North/South:
 Colt Lane
 Date:
 09/09/15

 East/West:
 Meadow Pass Road
 City:
 Walnut, CA

		Southboun	d	'	Westbound	H	1	Vorthboun	d		Eastbouna	1	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	Т	L	R	T	L	R	T	L	TOtals.
7:00	1	0	0	0	19	0	0	0	0	0	33	1	54
7:15	0	0	2	0	52	0	0	0	0	0	103	1	158
7:30	0	0	0	1	59	0	0	0	0	0	74	1	135
7:45	1	0	1	1	30	0	0	0	0	0	40	0	73
8:00	2	0	0	1	25	0	0	0	0	0	40	1	69
8:15	0	0	1	1	51	0	0	0	0	0	66	0	119
8:30	0	0	1	1	62	0	0	0	0	0	30	1	95
8:45	1	0	0	0	27	0	0	0	0	0	34	1	63

Total Volume:	5	0	5	5	325	0	0	0	0	0	420	6	766
Approach %	50%	0%	50%	2%	98%	0%	0%	0%	0%	0%	99%	1%	

Peak Hr Begin:	7:15												
PHV	3	0	3	3	166	0	0	0	0	0	257	3	435
PHF		0.750			0.704			0.000			0.625		0.688

Turning Movement Count Report PM

Location ID:

 North/South:
 Colt Lane
 Date:
 09/09/15

 East/West:
 Meadow Pass Road
 City:
 Walnut, CA

	9	Southbound	d	'	Westbound	1	1	Vorthboun	d		Eastbouna	1	
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	Т	L	R	T	L	R	T	L	R	T	L	Totals.
16:00	1	0	1	1	22	0	0	0	0	0	40	0	65
16:15	0	0	1	0	25	0	0	0	0	0	43	0	69
16:30	0	0	0	1	35	0	0	0	0	0	36	1	73
16:45	1	0	0	0	24	0	0	0	0	0	51	1	77
17:00	1	0	1	2	26	0	0	0	0	0	46	1	77
17:15	0	0	2	0	34	0	0	0	0	0	53	0	89
17:30	0	0	0	0	44	0	0	0	0	0	51	1	96
17:45	0	0	0	2	39	0	0	0	0	0	45	1	87

Total Volume:	3	0	5	6	249	0	0	0	0	0	365	5	633
Approach %	38%	0%	63%	2%	98%	0%	0%	0%	0%	0%	99%	1%	

Peak Hr Begin:	17:00												
PHV	1	0	3	4	143	0	0	0	0	0	195	3	349
PHF		0.500			0.835			0.000			0.934		0.909

Turning Movement Count Report AM

Location ID: 5

 North/South:
 Colt lane
 Date:
 09/13/15

 East/West:
 Meadow Pass Road
 City:
 Walnut, CA

		• 1	Southbound	d		Westbound	1	1	Vorthboun	d		Eastbound	1	
		1	2	3	4	5	6	7	8	9	10	11	12	Totals:
	Movements:	R	Т	L	R	T	L	R	T	L	R	T	L	TOtals.
	10:00	0	0	0	0	29	1	0	0	0	0	48	0	78
	10:15	0	0	1	0	32	1	0	0	0	1	16	0	51
	10:30	0	0	0	0	55	0	0	0	0	0	26	0	81
	10:45	1	0	0	0	27	0	0	0	0	0	18	0	46
	11:00	0	0	1	0	19	0	0	0	0	1	17	0	38
	11:15	0	0	0	1	28	1	0	0	0	0	18	0	48
	11:30	3	0	1	0	22	1	0	0	0	1	19	0	47
L	11:45	4	0	2	1	29	2	0	0	0	4	59	2	103

Total Volume:	8	0	5	2	241	6	0	0	0	7	221	2	492
Approach %	62%	0%	38%	1%	97%	2%	0%	0%	0%	3%	96%	1%	

Peak Hr Beg	n: 10:00												
PHV	1	0	1	0	143	2	0	0	0	1	108	0	256
PHF		0.500			0.659			0.000			0.568		

Appendix B – Existing Conditions Intersection Operations Analysis Worksheets

