APPENDIX P

Preliminary Hydrology Report

Preliminary Hydrology Report

TTM NO. 39179
Madison Club
Ranch Expansion

Prepared for:

Discovery Land Company
John Gamlin
53035 Meriwether Way
La Quinta, CA 92253
jgamlin@discoverylandco.com

Prepared by:

RTM engineering consultants, LLC
Victoria Whitaker
1 Ada, Suite 100
Irvine, CA 92618
victoria.whitaker@rtmec.com

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Introduction

This report presents a preliminary hydrologic study for the Madison Club East development in Riverside County. It examines the existing drainage patterns at the project site and outlines recommended stormwater management strategies to effectively mitigate runoff, in compliance with the Riverside County Flood Control and Water Conservation District (RCFC & WCD) Hydrology Manual, dated April 1978. The purpose of this report is to present the Synthetic Unit Hydrograph Analysis for the 100-year storm water discharge of the proposed Madison Club East Development (Tract 39179) located in Riverside County, California. This report is intended to provide a comprehensive analysis of the storm runoff volumes generated at project build-out. Specifically, this report addresses the necessary storage volume to retain all off-site and on-site runoff generated by a 100-year 24-hour event. The selection of the 24-hour event as the greatest volume is explained in METHODOLOGY below.

Project Description

The proposed development spans approximately 175 acres of undeveloped land, currently zoned as "Light Agriculture" and "Low Density Residential Rural Community." The site is located in unincorporated Riverside County, immediately east of the City of La Quinta's boundary. It is bordered by Monroe Street to the west, with residential and vacant parcels to the east, north, and south. The site is also bisected by Avenue 53, which will require a partial vacation to accommodate the proposed layout. The Assessor's Parcel Numbers (APNs) for the property are 780-010-12, 780-010-13, 780-010-14, 780-020-001, 780-020-002, and 780-020-003. For reference, please refer to the Location Maps in Appendix A and Existing Conditions Map in Appendix B.

The development will consist of 65 single-family residential lots, a private golf short course, a clubhouse which will feature dining facilities and spaces for events, and various sports and leisure amenities. In terms of infrastructure, paved roads will be constructed throughout the development, while four on-site water quality lakes will be integrated into the golf course to manage stormwater runoff in compliance with environmental regulations.

Existing Conditions

Aside from a single-family residential structure located in the northeast corner, the site is primarily vacant agricultural land. The land is used seasonally, meaning it alternates between being vegetated and barren. Currently, the site's drainage flows in a sheet pattern from the northwest corner to the southeast corner, with no drainage structures in place. To the north of the proposed site, there is both a vacant and developed lot. It is assumed that the developed lot (APNs 780-010-005, 780-010-006, and 780-010-004) detains their runoff while the vacant lot (APN 780-010-008) sheet flows to the southeast as well.

The Madison Club East project is designed to provide the storage volume necessary to retain all off-site and on-site runoff generated by the largest 100-year 24 hour event, based on the Synthetic Unit Hydrograph method, while also maintaining existing and historical flow paths.

Additionally, Coachella Valley Water District (CVWD) has existing underground tile drain lines both on and adjacent to the site. Coordination with CVWD will be required to determine whether these lines must remain in place or can be abandoned/demolished.

Proposed Hydrology

The proposed project and perimeter street (Monroe St) will be hydrologically isolated, meaning all runoff will be stored on-site. The current site plan is divided into five (5) drainage management areas (DMAs). Each area will drain to a designated water quality lake via surface flow and storm drainpipes. Three (3) additional DMAs account for the offsite runoff from the northern lot (APN 780-010-008) and will be captured through inlets and storm drain. All runoff within the project and portion of the perimeter streets adjacent to the project are to be stored on-site. Each watershed drains to a storage basin (future golf lake, dry retention, or low point) within the golf course and will be retained within the watershed.

Methodology

The watersheds were modeled in accordance with the RCFC & WCD Hydrology Manual. Specifically, the manuals "Shortcut Unit Hydrograph method" was used to create unit hydrographs for each watershed area. The impervious area used in each watershed is a weighted average based on RCFC&WCD recommended percent impervious values and the area ratio of each development type. For residential areas (including offsite streets) a 50% impervious value was used based on the average lot size. For common areas (clubhouse) a 90% impervious value was used. For landscape/golf course areas a 10% impervious area was used. For lake areas, a 100% impervious value was assigned. During final engineering, impervious areas and respective impervious percentages will be refined and therefore provide more detailed flow rates.

For each watershed area, a hydrograph was created to determine the runoff volume for the 100-year storm event. The model was run for a 3-hour, 6-hour and 24-hour duration storm. Comparison of the hydrographs reveals that the 24-hour storm produces the maximum 100-year runoff volumes. These volumes were increased by 10% as a conservative factor of safety. The resulting hydrographs are included in Appendix B. Water Quality volumes will be calculated as part of a separate Water Quality Management Plan (WQMP).

Hydrology Summary

As mentioned earlier, the proposed site is designed to retain 100% of the stormwater runoff. Since no runoff will be leaving the site, calculations for the existing peak flow rates were not necessary. However, the existing runoff will be analyzed for the northern lot (APN 780-010-008) since it is vacant and drains towards the proposed site. The 100-year 24-hour runoff volumes were taken from the maximum volume generated from the Synthetic Unit Hydrographs in Appendix A. The lake storage, depth and water surface maximums were taken from the Lake Storage Analysis Calculations in Appendix C._Comparing the 100-year 24-hour runoff volumes to the lakes' storage maximum volumes demonstrates 100% retention of the 24-hour storm within each watershed area.

Off-site Flows

Off-site flows drain on-site along the northern property line of the Madison Club East project, from Assessor's Parcel Number (APN) 780-010-008. Stormwater runoff from the existing vacant lot will be captured through proposed inlets along the north boundary of the Madison Club East development in order to maintain existing flow paths. Onsite lakes have been adequately sized to provide enough storage for the offsite flows.

Post-Development

Flow rates and volumes for all required storm events across the eight (8) DMAs were calculated using the Synthetic Unit Hydrograph Method, as outlined in the RCFC & WCD Hydrology Manual. Runoff from streets and residential areas will be collected and conveyed through a system of street catch basins and storm drainpipes which will then be discharged into on-site lakes. Runoff from the golf course and other landscaped areas will flow directly into the lakes via sheet flow.

Table 1 provides a summary of the post-development runoff volumes, detailed in Appendix B. The stage storage volume calculations for each of the lakes are also summarized below in Table 2. Table 3 provides a summary showing that DMA-4 has more than enough additional onsite volume for the 100YR-24HR volume required for the offsite flows.

Table 1: Onsite Storm Runoff Volume Summary

Drainage Management Area (DMA)	Drainage Area (AC)	100Yr-24HR Volume Increase by 10% (AC-FT)	Lake / Retention Volume (AC-FT)
DMA-1	51.5	6.3	9.9
DMA-2	39.8	5.0	9.3
DMA-3	19.5	2.9	3.1
DMA-4	33.2	4.5	13.1
DMA-5	35.7	4.8	5.4
Total:		23.5	40.8

Table 2: Stage Storage Calculations			
ELEV.	**AREA (SQ. FT)**	**AVG. END TOTAL VOLUME (CU. FT)**	**AVG. END TOTAL VOLUME (AC-FT)**
DMA-1A			
976.00	36,165.86	117,638.31	2.70
975.00	32,699.76	83,205.51	1.91
974.00	29,334.18	52,188.54	1.20
973.00	26,069.14	24,486.88	0.56
972.00	22,904.62	0.00	0.00
DMA-1B			
969.00	55,903.14	189,947.90	4.36
968.00	51,607.09	136,192.79	3.13
967.00	47,411.58	86,683.45	1.99
966.00	43,316.59	41,319.37	0.95
965.00	39,322.14	0.00	0.00
DMA-1C			
960.00	46,527.72	122,319.17	2.81
959.00	42,635.43	77,737.60	1.78
958.00	38,843.67	36,998.05	0.85
957.00	35,152.43	0.00	0.00
DMA-2A			
960.00	41,788.53	103,895.03	2.39
959.00	36,961.45	64,520.04	1.48
958.00	32,234.89	29,921.88	0.69
957.00	27,608.86	0.00	0.00
DMA-2B			
958.00	111,618.04	301,060.31	6.91
957.00	104,052.45	193,225.06	4.44
956.00	96,587.40	92,905.14	2.13
955.00	89,222.88	0.00	0.00

Table 2: Stage Storage Calculations (Continued..)			
ELEV.	AREA (SQ. FT)	AVG. END TOTAL VOLUME (CU. FT)	AVG. END TOTAL VOLUME (AC-FT)
DMA-3			
960.00	50,459.92	134,301.89	3.08
959.00	46,608.99	85,767.43	1.97
958.00	42,858.58	41,033.65	0.94
957.00	39,208.71	0.00	0.00
DMA-4A			
964.00	73,394.92	241,863.06	5.55
963.00	66,842.38	171,744.41	3.94
962.00	60,390.37	108,128.04	2.48
961.00	54,038.89	50,913.41	1.17
960.00	47,787.94	0.00	0.00
DMA-4B			
964.00	61,180.43	324,987.61	7.46
963.00	56,778.40	266,008.19	6.11
962.00	52,476.91	211,380.53	4.85
961.00	48,275.95	161,004.10	3.70
960.00	44,175.52	114,778.36	2.63
959.00	40,175.63	72,602.79	1.67
958.00	36,276.26	34,376.84	0.79
957.00	32,477.42	0.00	0.00
DMA-5			
959.50	144,191.06	233232.75	5.35
959.00	55,956.98	183195.74	4.21
958.00	50,789.99	129822.25	2.98
957.00	45,723.54	81565.48	1.87
956.00	40,757.61	38324.91	0.88
955.00	35,892.21	0.00	0.00

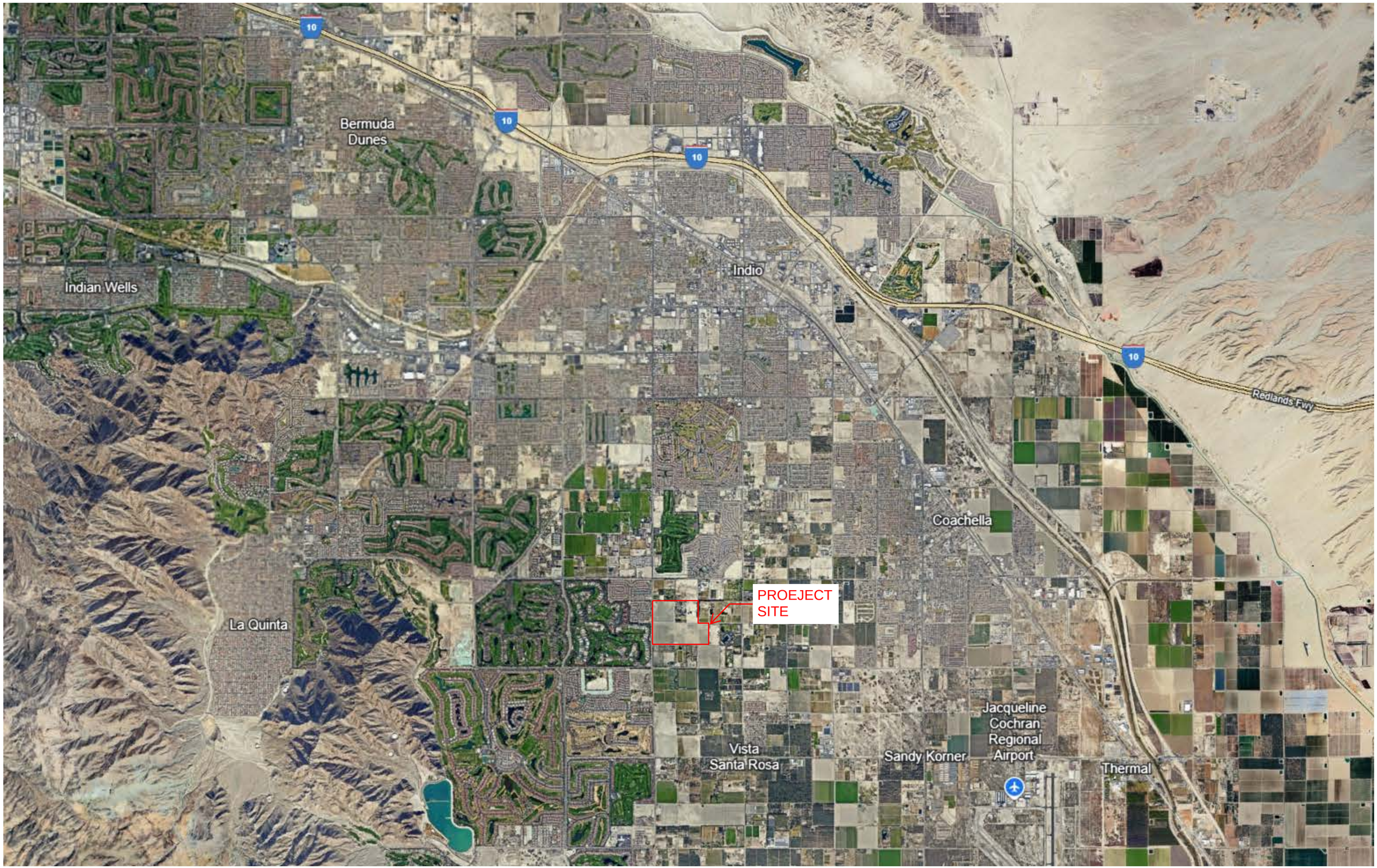
Table 3: Offsite Storm Runoff Volume Summary			
Drainage Management Area (DMA)	Drainage Area (AC)	100Yr-24HR Volume Increase by 10% (AC-FT)	Additional On-site Volume (AC-FT)
DMA-6	11.6	2.9	3.6 (DMA-1)
DMA-7	20.3	4.8	8.6 (DMA-2)
DMA-8	12.4	3.0	
	Total:	10.7	12.2

Conclusion

Based on the preliminary hydrology study results presented above, the proposed stormwater mitigation facilities are designed to adequately manage the 100-year, 24-hour event. This report will be updated during the final engineering phase, incorporating the finalized site and landscape plan.

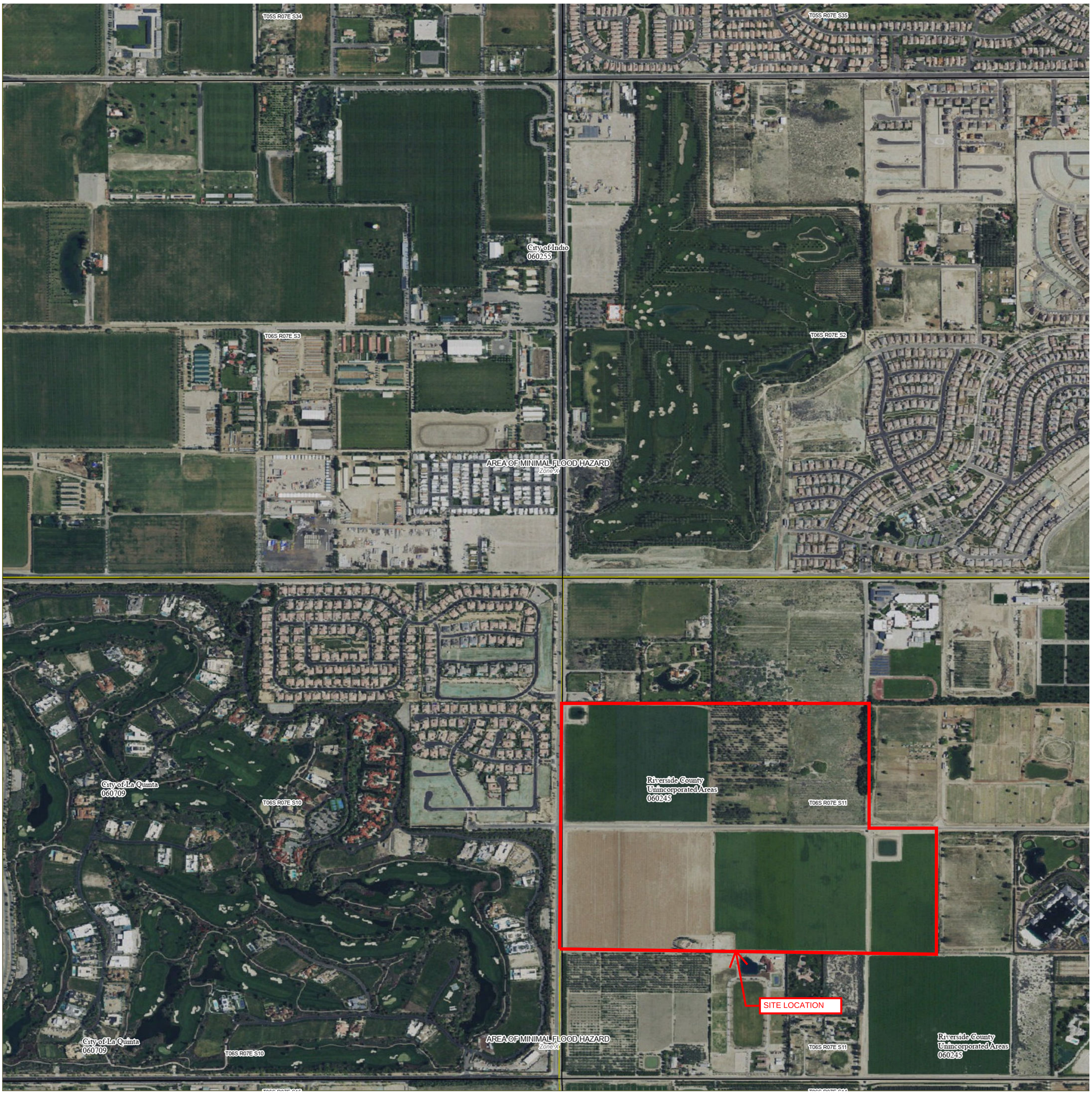
APPENDIX A

Location Map
FEMA Map
NOAA Precipitation Frequency Estimates
Soil Map
Riverside County Flood Control and Water Conservation District
Runoff Index
Impervious Cover for Developed Areas


10
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Bermuda Dunes
Indian Wells
Indio
Redlands Fwy
Coachella
PROEJECT SITE
La Quinta
Vista Santa Rosa
Sandy Korner
Jacqueline Cochran Regional Airport
Thermal


Blue Lot
Polo Rd
Polo Rd
Palmdale Estates
Clinton St
Green Lot Day Parking
Red Lot
Whitetail Dr
Sidewinder Dr
San Gorgonio Dr
Live Oak Canyon Dr
Cathedral Canyon Dr
June Hill's Table
W Coral Mountain Dr
Murray Canyon Dr
Polo Club Dr
Coral Mountain Dr
Rosewood Dr
52nd Ave
52nd Ave
52nd Ave
52nd Ave
52nd Ave
Cahuilla Desert Academy
52nd Ave
Madison Country Club Golf Course
Rancho Santana Dr
Ricochet Way
Seabiscuit Way
Thoroughbred Trail
Charismatic Way
Hidden Links Dr
Mountain Spur Dr
Festival Farms
The Mirabella Estate
Santa Rosa Ranch
PROJECT SITE
Frank Capra Grave
Lily Landin
Monroe St
Avenue 53
Avenue 53
Avenue 53
Zenyara
Herdsman Way
Humboldt Blvd
Contento St
Via La Serena St
Ameno
Alegre
Peary Pl
The Madison Club
Cavallo Ranch

116°15'W 33°41'21.61"N



116°13'7.11"W 33°39'15.93"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **1/29/2025 3:56 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: No elevation features on this FIRM
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

PANEL 2261 OF 3805

Panel Contains:

COMMUNITY	NUMBER	PANEL
RIVERSIDE COUNTY	060245	2261
CITY OF INDIO	060255	2261
CITY OF LA QUINTA	060709	2261

MAP NUMBER
06065C2261H
EFFECTIVE DATE
March 06, 2018

NOAA Atlas 14, Volume 6, Version 2
Location name: Indio, California, USA*
Latitude: 33.6638°, Longitude: -116.2259°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.063 (0.053-0.077)	0.099 (0.082-0.120)	0.150 (0.125-0.182)	0.196 (0.161-0.240)	0.264 (0.210-0.335)	0.322 (0.251-0.417)	0.387 (0.294-0.514)	0.460 (0.340-0.628)	0.571 (0.404-0.814)	0.669 (0.457-0.988)
10-min	0.091 (0.076-0.110)	0.142 (0.118-0.172)	0.215 (0.179-0.262)	0.281 (0.231-0.344)	0.379 (0.302-0.480)	0.462 (0.360-0.598)	0.554 (0.422-0.736)	0.659 (0.487-0.901)	0.818 (0.579-1.17)	0.958 (0.655-1.42)
15-min	0.110 (0.092-0.133)	0.171 (0.143-0.208)	0.260 (0.217-0.316)	0.339 (0.280-0.416)	0.458 (0.365-0.580)	0.559 (0.436-0.724)	0.671 (0.510-0.891)	0.797 (0.589-1.09)	0.989 (0.701-1.41)	1.16 (0.792-1.71)
30-min	0.158 (0.132-0.191)	0.246 (0.205-0.298)	0.374 (0.311-0.454)	0.487 (0.402-0.597)	0.658 (0.524-0.834)	0.802 (0.626-1.04)	0.963 (0.733-1.28)	1.14 (0.846-1.56)	1.42 (1.01-2.03)	1.66 (1.14-2.46)
60-min	0.221 (0.184-0.267)	0.345 (0.288-0.418)	0.524 (0.436-0.637)	0.683 (0.563-0.837)	0.922 (0.734-1.17)	1.12 (0.877-1.46)	1.35 (1.03-1.79)	1.60 (1.19-2.19)	1.99 (1.41-2.84)	2.33 (1.60-3.45)
2-hr	0.306 (0.255-0.370)	0.454 (0.378-0.549)	0.674 (0.560-0.818)	0.874 (0.721-1.07)	1.18 (0.944-1.50)	1.45 (1.13-1.88)	1.76 (1.34-2.34)	2.11 (1.56-2.88)	2.64 (1.87-3.77)	3.12 (2.13-4.61)
3-hr	0.369 (0.308-0.447)	0.538 (0.448-0.651)	0.792 (0.658-0.962)	1.03 (0.846-1.26)	1.39 (1.11-1.77)	1.72 (1.34-2.22)	2.09 (1.59-2.77)	2.52 (1.86-3.44)	3.18 (2.25-4.54)	3.77 (2.58-5.58)
6-hr	0.488 (0.407-0.590)	0.703 (0.586-0.852)	1.03 (0.857-1.25)	1.34 (1.10-1.64)	1.82 (1.45-2.30)	2.24 (1.75-2.90)	2.73 (2.08-3.63)	3.31 (2.44-4.52)	4.21 (2.98-6.01)	5.02 (3.43-7.42)
12-hr	0.588 (0.491-0.711)	0.866 (0.722-1.05)	1.28 (1.07-1.56)	1.67 (1.38-2.04)	2.27 (1.81-2.88)	2.80 (2.18-3.62)	3.40 (2.58-4.52)	4.10 (3.03-5.60)	5.18 (3.67-7.39)	6.15 (4.20-9.08)
24-hr	0.739 (0.654-0.852)	1.12 (0.990-1.29)	1.68 (1.48-1.95)	2.19 (1.92-2.56)	2.97 (2.52-3.58)	3.64 (3.02-4.47)	4.39 (3.56-5.53)	5.25 (4.15-6.78)	6.56 (4.98-8.82)	7.70 (5.65-10.7)
2-day	0.852 (0.754-0.983)	1.31 (1.16-1.51)	1.98 (1.74-2.29)	2.57 (2.25-3.00)	3.46 (2.93-4.16)	4.21 (3.50-5.17)	5.04 (4.09-6.34)	5.97 (4.71-7.71)	7.36 (5.58-9.89)	8.54 (6.27-11.9)
3-day	0.914 (0.809-1.05)	1.41 (1.25-1.63)	2.13 (1.88-2.47)	2.77 (2.42-3.23)	3.71 (3.15-4.47)	4.51 (3.74-5.54)	5.38 (4.36-6.76)	6.35 (5.01-8.20)	7.79 (5.91-10.5)	9.01 (6.61-12.5)
4-day	0.966 (0.855-1.11)	1.50 (1.32-1.73)	2.25 (1.99-2.61)	2.92 (2.56-3.41)	3.91 (3.31-4.71)	4.74 (3.93-5.82)	5.64 (4.58-7.10)	6.65 (5.25-8.59)	8.13 (6.17-10.9)	9.39 (6.89-13.1)
7-day	1.03 (0.908-1.18)	1.58 (1.40-1.82)	2.37 (2.09-2.74)	3.07 (2.68-3.58)	4.09 (3.47-4.93)	4.94 (4.11-6.08)	5.88 (4.77-7.39)	6.90 (5.45-8.92)	8.41 (6.38-11.3)	9.68 (7.11-13.5)
10-day	1.06 (0.937-1.22)	1.63 (1.44-1.88)	2.44 (2.15-2.82)	3.15 (2.76-3.68)	4.20 (3.56-5.06)	5.07 (4.21-6.23)	6.02 (4.88-7.57)	7.06 (5.58-9.12)	8.59 (6.52-11.6)	9.88 (7.25-13.7)
20-day	1.13 (0.999-1.30)	1.75 (1.55-2.02)	2.64 (2.33-3.06)	3.41 (2.99-3.98)	4.55 (3.86-5.48)	5.49 (4.56-6.75)	6.51 (5.28-8.19)	7.62 (6.02-9.85)	9.24 (7.02-12.4)	10.6 (7.78-14.7)
30-day	1.18 (1.04-1.36)	1.86 (1.64-2.14)	2.83 (2.49-3.27)	3.68 (3.22-4.29)	4.92 (4.17-5.93)	5.95 (4.94-7.31)	7.06 (5.72-8.88)	8.26 (6.52-10.7)	9.99 (7.58-13.4)	11.4 (8.38-15.9)
45-day	1.28 (1.13-1.47)	2.05 (1.81-2.36)	3.15 (2.78-3.64)	4.11 (3.60-4.80)	5.53 (4.68-6.66)	6.70 (5.56-8.23)	7.95 (6.45-9.99)	9.30 (7.34-12.0)	11.2 (8.53-15.1)	12.8 (9.42-17.8)
60-day	1.34 (1.19-1.55)	2.18 (1.93-2.52)	3.39 (2.99-3.92)	4.45 (3.89-5.19)	5.99 (5.08-7.22)	7.27 (6.04-8.94)	8.64 (7.01-10.9)	10.1 (7.99-13.1)	12.2 (9.28-16.4)	13.9 (10.2-19.4)

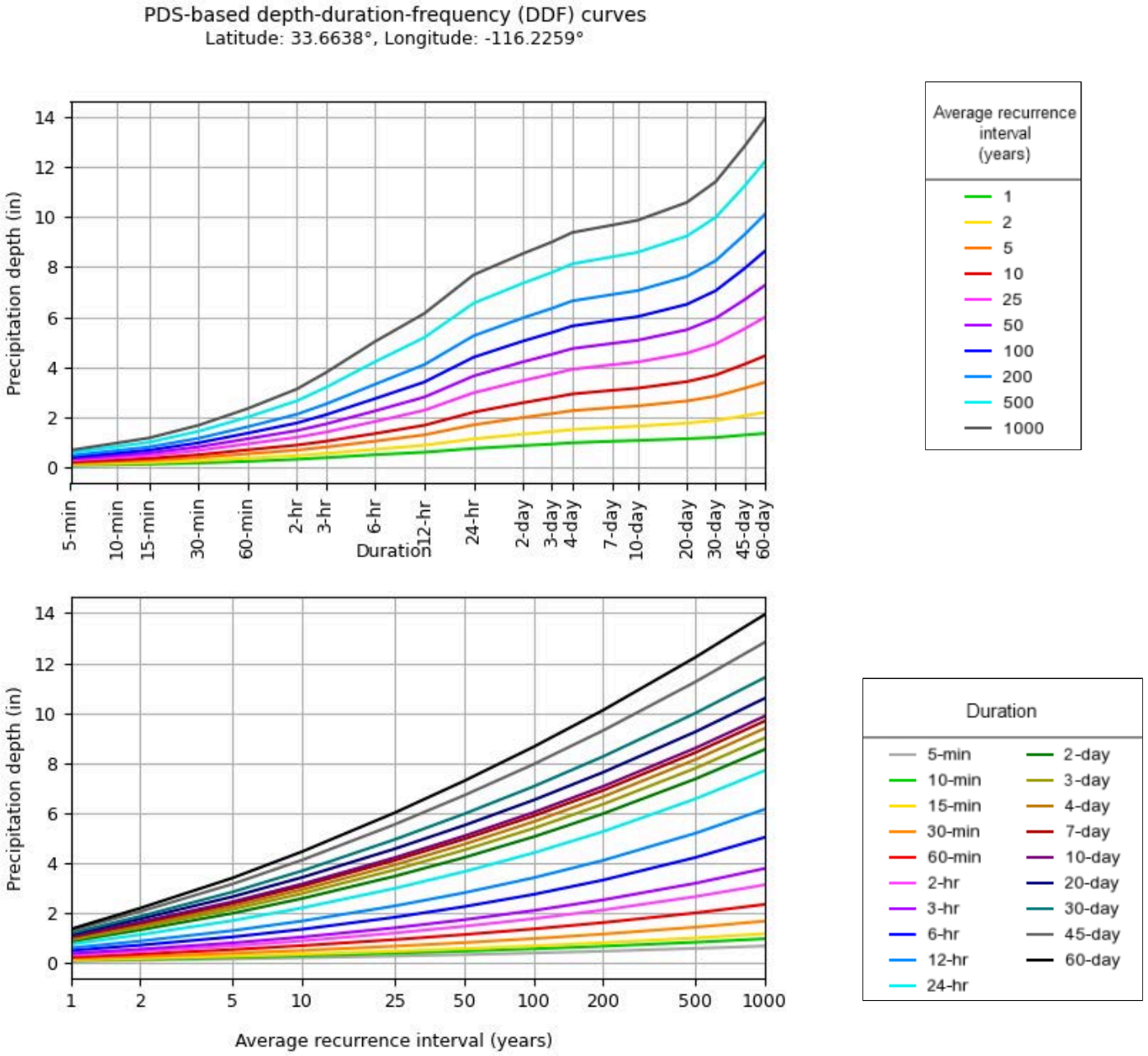
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



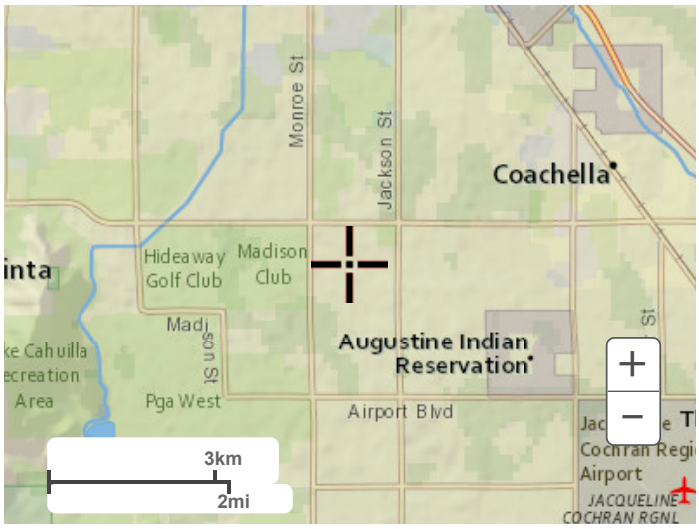
NOAA Atlas 14, Volume 6, Version 2

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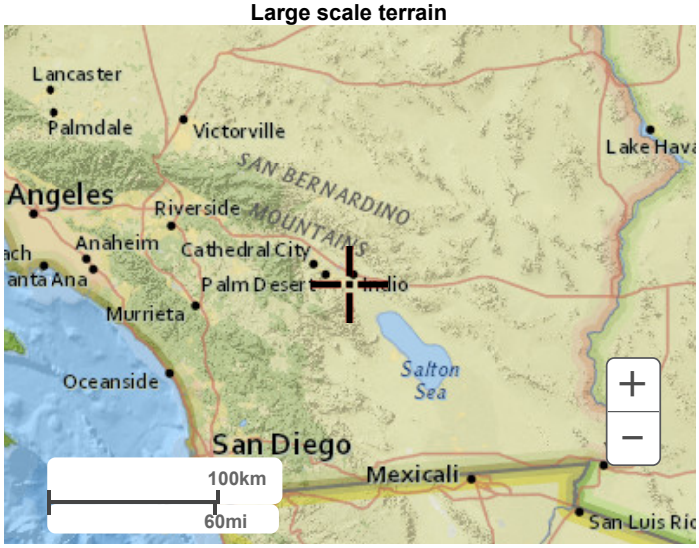
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Maps & aerials

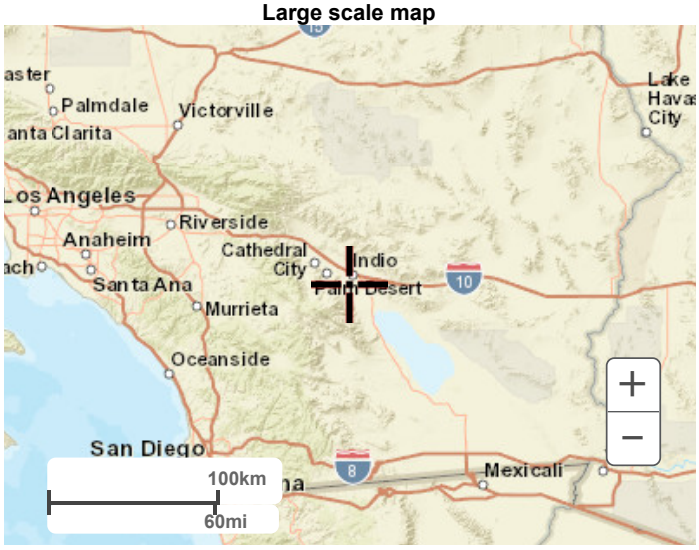
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Soil Classification Description

Symbol	Name	Inches per Foot
CcC	CARRIZO STONY SAND, 2 TO 9 PERCENT SLOPES	0.48
ChC	CARSITAS COBBLY SAND, 2 TO 9 PERCENT SLOPES	0.60
CkB	CARSITAS FINE SAND, 0 TO 5 PERCENT SLOPES	0.72
CdC	CARSITAS GRAVELLY SAND, 0 TO 9 PERCENT SLOPES	0.60
CdE	CARSITAS GRAVELLY SAND, 9 TO 30 PERCENT SLOPES	0.60
CfB	CARSITAS SAND, WET, 0 TO 5 PERCENT SLOPES	0.72
CmB	CARSITAS VARIANT, 2 TO 5 PERCENT SLOPES	0.79
CmE	CARSITAS VARIANT, 5 TO 30 PERCENT SLOPES	0.79
CoB	CHUCKAWALLA VERY GRAVELLY SANDY CLAY LOAM, 2 TO 5 PERCENT SLOPES	0.72
CoD	CHUCKAWALLA VERY GRAVELLY SANDY CLAY LOAM, 5 TO 15 PERCENT SLOPES	0.72
CpA	COACHELLA FINE SAND, 0 TO 2 PERCENT SLOPES	0.72
CpB	COACHELLA FINE SAND, HUMMOCKY, 2 TO 5 PERCENT SLOPES	0.72
CsA	COACHELLA FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES	0.72
NaB	NILAND SAND, 2 TO 5 PERCENT SLOPES	0.72
NbB	NILAND SAND, WET, 2 TO 5 PERCENT SLOPES	0.72
RA	RIVERWASH	0.43
RU	RUBBLE LAND	0.60
SoD	SOBOBA COBBLY SAND, 2 TO 15 PERCENT SLOPES	0.36
SpE	SOBOBA STONY SAND, 5 TO 30 PERCENT SLOPES	0.36
TrC	TUJUNGA GRAVELLY LOAMY SAND, 0 TO 9 PERCENT SLOPES	0.72
Fe	FLUVENTS	0.84
CnC	CHUCKAWALLA COBBLY FINE SANDY LOAM, 2 TO 9 PERCENT SLOPES	0.96
CnE	CHUCKAWALLA COBBLY FINE SANDY LOAM, 9 TO 30 PERCENT SLOPES	0.96
MaB	MYOMA FINE SAND, 0 TO 5 PERCENT SLOPES	0.96
MaD	MYOMA FINE SAND, 5 TO 15 PERCENT SLOPES	0.96
TpE	TUJUNGA FINE SAND, 5 TO 30 PERCENT SLOPES	0.96
CbD	CAJON VARIANT, 2 TO 15 PERCENT SLOPES	0.96
McB	MYOMA FINE SAND, WET, 0 TO 5 PERCENT SLOPES	0.96
CaD	CAJON LOAMY SAND, 5 TO 15 PERCENT SLOPES	0.98
Or	OMSTOTT-ROCK OUTCROP COMPLEX	1.25
GaB	GILMAN LOAMY FINE SAND, 0 TO 5 PERCENT SLOPES	1.27
OmD	OMSTOTT COARSE SANDY LOAM, 5 TO 15 PERCENT SLOPES	1.34
TsB	TUJUNGA LOAMY FINE SAND, 0 TO 5 PERCENT SLOPES	1.44
IoC	IMPERIAL-GULLIED LAND COMPLEX, WET, 2 TO 9 PERCENT SLOPES	1.52
CrA	COACHELLA FINE SAND, WET, 0 TO 2 PERCENT SLOPES	1.56
Sa	SALTON FINE SANDY LOAM	1.60
BtE	BULL TRAIL STONY SANDY LOAM, 9 TO 30 PERCENT SLOPES	1.61
Ip	INDIO FINE SANDY LOAM	1.80
Ir	INDIO FINE SANDY LOAM, WET	1.80
GcA	GILMAN FINE SANDY LOAM, WET, 0 TO 2 PERCENT SLOPES	2.04
GbA	GILMAN FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES	2.04
GeA	GILMAN SILT LOAM, 0 TO 2 PERCENT SLOPES	2.04
GdA	GILMAN FINE SANDY LOAM, MODERATELY FINE SUBSTRATUM, 0 TO 2 PERCENT SLOPES	2.04
GbB	GILMAN FINE SANDY LOAM, 2 TO 5 PERCENT SLOPES	2.04
GfA	GILMAN SILT LOAM, WET, 0 TO 2 PERCENT SLOPES	2.04
Sb	SALTON SILTY CLAY LOAM	2.04
ImC	IMPERIAL-GULLIED LAND COMPLEX, 2 TO 9 PERCENT SLOPES	2.14
Is	INDIO VERY FINE SANDY LOAM	2.28
IeA	IMPERIAL SILTY CLAY, 0 TO 2 PERCENT SLOPES	2.28
It	INDIO VERY FINE SANDY LOAM, WET	2.28
IfA	IMPERIAL SILTY CLAY, WET, 0 TO 2 PERCENT SLOPES	2.28

SITE LOCATION

Available Water Storage Capacity
Inch Water per Foot Soil

- 0.36 - 0.79
- 0.80 - 0.98
- 0.99 - 1.44
- 1.45 - 1.80
- 1.81 - 2.28
- Soil Classification

Background Image: CVWD 2007
Soils Data: NRCS SSURGO - Riverside County

JMLord incorporated
scientists and engineers

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREA

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

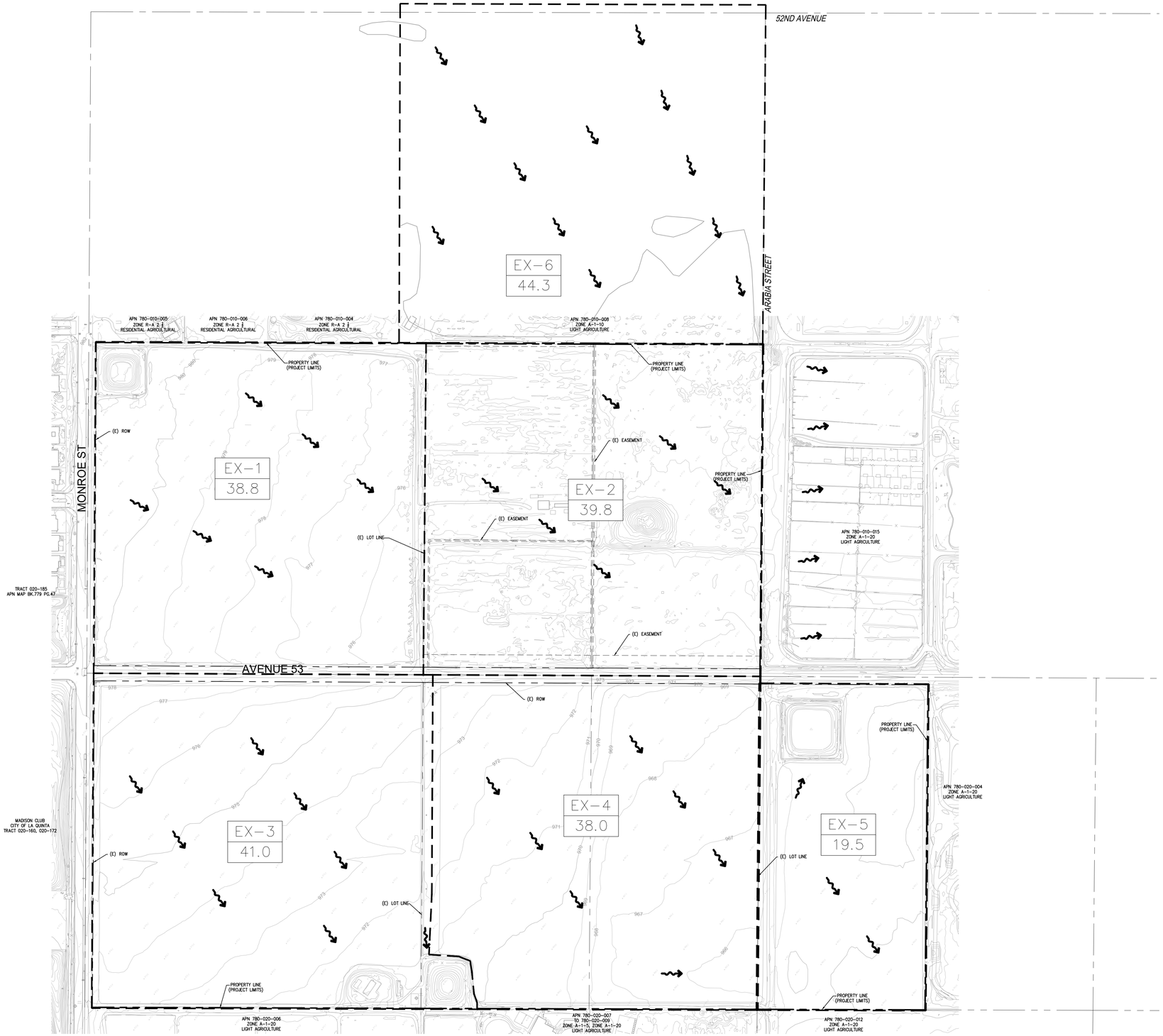
RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE D-5.6

APPENDIX B

Existing Conditions Map
Proposed Hydrology Map
Synthetic Unit Hydrograph
Watershed Area 1
Watershed Area 2
Watershed Area 3
Watershed Area 4
Watershed Area 5
Watershed Area 6
Watershed Area 7
Watershed Area 8



LEGEND:

- WATERSHED BOUNDARY
- FLOW DIRECTION
- XX-X / XX.X — WATERSHED NUMBER / WATERSHED AREA (ACRES)

200 100 0 200 400

1 INCH = 200 FEET

EXISTING CONDITIONS MAP

THE RANCH EXPANSION

THE MADISON CLUB

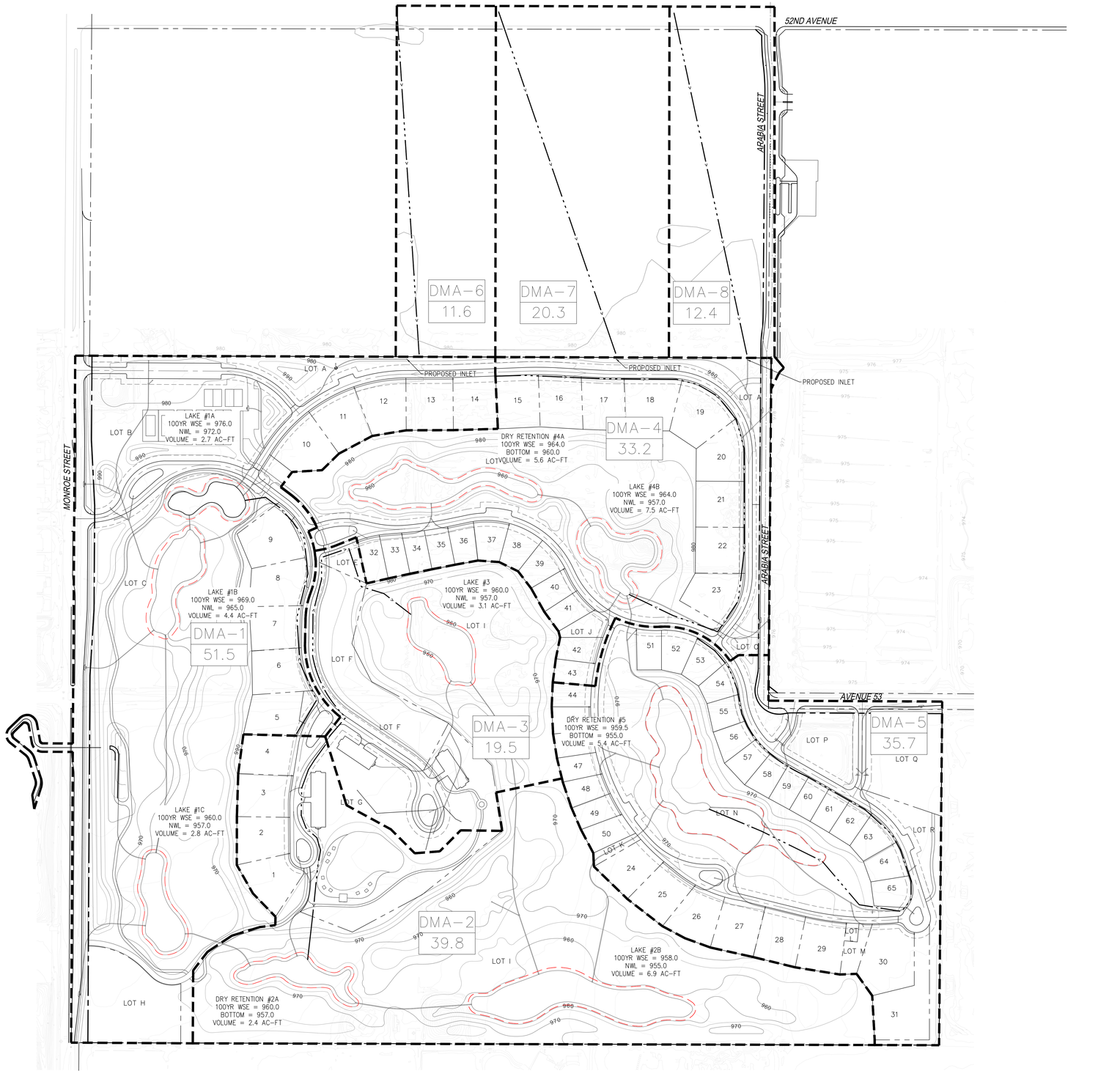
SHEET 1 OF 1

PREPARED BY:

rtm engineering consultants

1 Ada
Suite 100
Irvine, CA. 92618
Phone: 949.453.0111

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LEGEND

SYMBOL	DESCRIPTION
	WATERSHED BOUNDARY
	DRAINAGE PATH
	100-YEAR WATER SURFACE ELEVATION
XXX-X / XX.X	WATERSHED DESIGNATION / WATERSHED AREA (ACRES)

150 75 0 150 300

1 INCH = 150 FEET

REGISTERED PROFESSIONAL ENGINEER — VICTORIA WHITE — R.C.E. NO. C65009 — EXP. 6-30-27 — CIVIL — STATE OF CALIFORNIA

REVISIONS			
DESCRIPTION	APD	REV	DATE

SURVEY BY:
VERTEX SURVEY
28348 Constellation Rd
SUITE 800
SANTA CLARITA, CA 91355
(661) 254-1928

rtm engineering consultants
1 Ada, Suite 100
Irvine, CA 92618
Phone: 949.453.0111

COUNTY OF RIVERSIDE
TENTATIVE TRACT MAP NO. 39179

Drawn By: SM
Checked By: VW
Scale:

PRELIMINARY HYDROLOGY BOUNDARY MAP
RANCH EXPANSION
THE MADISON CLUB

SHEET 1 OF 1

Drawing: C:\Users\wasley.ahearn\OneDrive - RTM Engineering Consultants LLC\1681.46400-MC RANCH\Project Files\06 PROJECT DOCS\03 REPORTS\Hydrology\Appendix\App - B Hydrographs\Hydro Maps\P Hydro Map.dwg Layout: Layout1 Saved: 1/26/2026 4:41 PM Plotted: 1/26/2026 4:43 PM By: Wasey A'Hearn

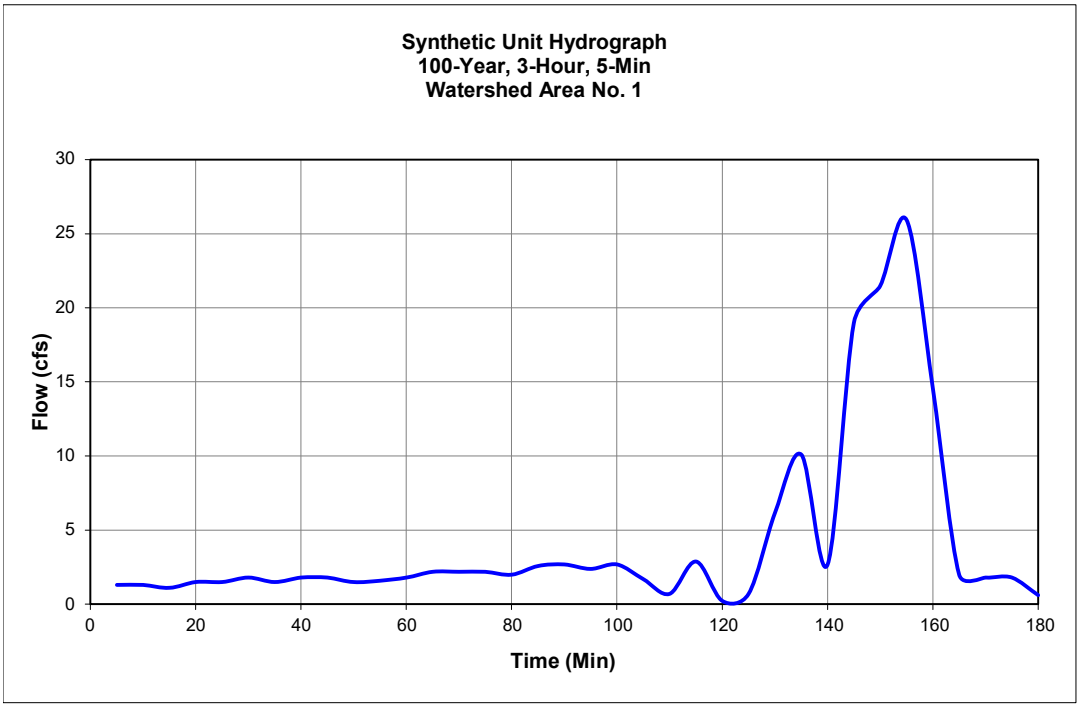
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	1	
Drainage Area - acres	51.5	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.28	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.3	0.351	0.28	0.28	0.07	3.4	5
2	1.3	0.351	0.28	0.28	0.07	3.4	10
3	1.1	0.297	0.28	0.24	0.01	0.7	15
4	1.5	0.405	0.28	0.32	0.12	6.2	20
5	1.5	0.405	0.28	0.32	0.12	6.2	25
6	1.8	0.486	0.28	0.39	0.20	10.4	30
7	1.5	0.405	0.28	0.32	0.12	6.2	35
8	1.8	0.486	0.28	0.39	0.20	10.4	40
9	1.8	0.486	0.28	0.39	0.20	10.4	45
10	1.5	0.405	0.28	0.32	0.12	6.2	50
11	1.6	0.432	0.28	0.35	0.15	7.6	55
12	1.8	0.486	0.28	0.39	0.20	10.4	60
13	2.2	0.594	0.28	0.48	0.31	16.0	65
14	2.2	0.594	0.28	0.48	0.31	16.0	70
15	2.2	0.594	0.28	0.48	0.31	16.0	75
16	2	0.540	0.28	0.43	0.26	13.2	80
17	2.6	0.702	0.28	0.56	0.42	21.5	85
18	2.7	0.729	0.28	0.58	0.44	22.9	90
19	2.4	0.648	0.28	0.52	0.36	18.7	95
20	2.7	0.729	0.28	0.58	0.44	22.9	100
21	3.3	0.891	0.28	0.71	0.61	31.3	105
22	3.1	0.837	0.28	0.67	0.55	28.5	110
23	2.9	0.783	0.28	0.63	0.50	25.7	115
24	3	0.810	0.28	0.65	0.53	27.1	120
25	3.1	0.837	0.28	0.67	0.55	28.5	125
26	4.2	1.134	0.28	0.91	0.85	43.8	130
27	5	1.350	0.28	1.08	1.07	54.9	135
28	3.5	0.945	0.28	0.76	0.66	34.0	140
29	6.8	1.836	0.28	1.47	1.55	79.9	145
30	7.3	1.971	0.28	1.58	1.69	86.9	150
31	8.2	2.214	0.28	1.77	1.93	99.4	155
32	5.9	1.593	0.28	1.27	1.31	67.4	160
33	2	0.540	0.28	0.43	0.26	13.2	165
34	1.8	0.486	0.28	0.39	0.20	10.4	170
35	1.8	0.486	0.28	0.39	0.20	10.4	175
36	0.6	0.162	0.28	0.13	0.03	1.7	180
	100				16.93	in/hr	
					1.41	in	
					6.05	ac-ft	

Lake Area - acres	2.24
Lake normal WSE	0
Lake 100yr WSE	2.7

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

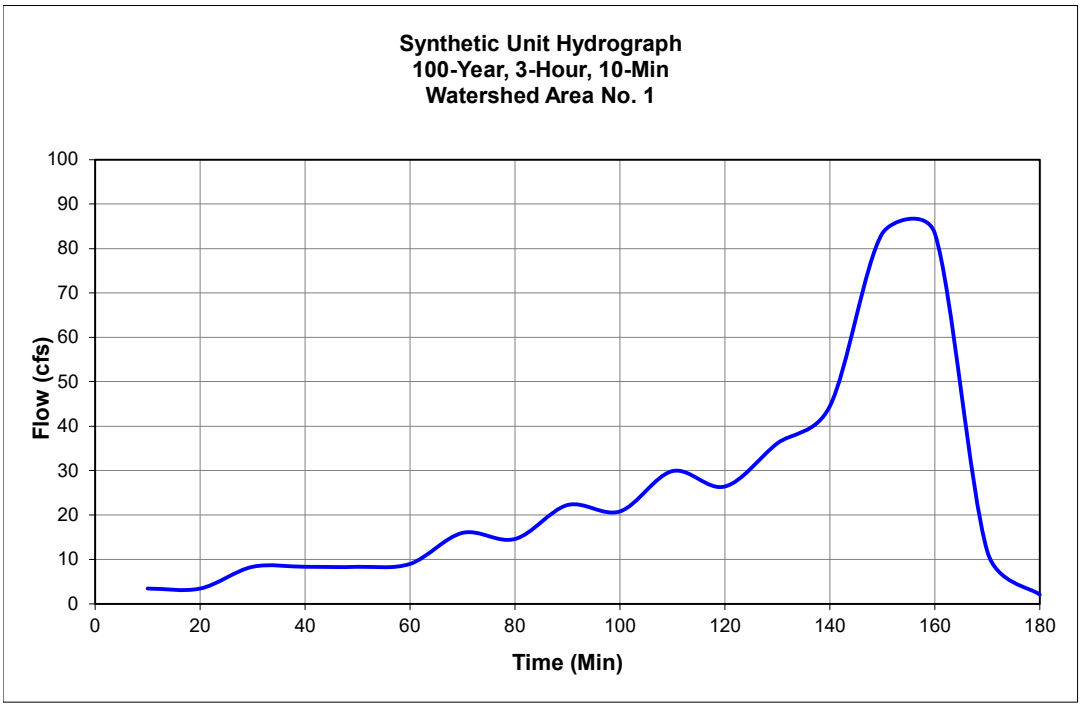


Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	1	
Drainage Area - acres	51.5	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.28	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	2.6	0.351	0.28	0.28	0.07	3.4	10
2	2.6	0.351	0.28	0.28	0.07	3.4	20
3	3.3	0.446	0.28	0.36	0.16	8.3	30
4	3.3	0.446	0.28	0.36	0.16	8.3	40
5	3.3	0.446	0.28	0.36	0.16	8.3	50
6	3.4	0.459	0.28	0.37	0.17	9.0	60
7	4.4	0.594	0.28	0.48	0.31	16.0	70
8	4.2	0.567	0.28	0.45	0.28	14.6	80
9	5.3	0.716	0.28	0.57	0.43	22.2	90
10	5.1	0.689	0.28	0.55	0.40	20.8	100
11	6.4	0.864	0.28	0.69	0.58	29.9	110
12	5.9	0.797	0.28	0.64	0.51	26.4	120
13	7.3	0.986	0.28	0.79	0.70	36.1	130
14	8.5	1.148	0.28	0.92	0.86	44.5	140
15	14.1	1.904	0.28	1.52	1.62	83.4	150
16	14.1	1.904	0.28	1.52	1.62	83.4	160
17	3.8	0.513	0.28	0.41	0.23	11.8	170
18	2.4	0.324	0.28	0.26	0.04	2.1	180
	100				8.39	in/hr	
					1.40	in	
					6.00	ac-ft	

Lake Area - acres	2.24
Lake normal WSE	0
Lake 100yr WSE	2.7



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

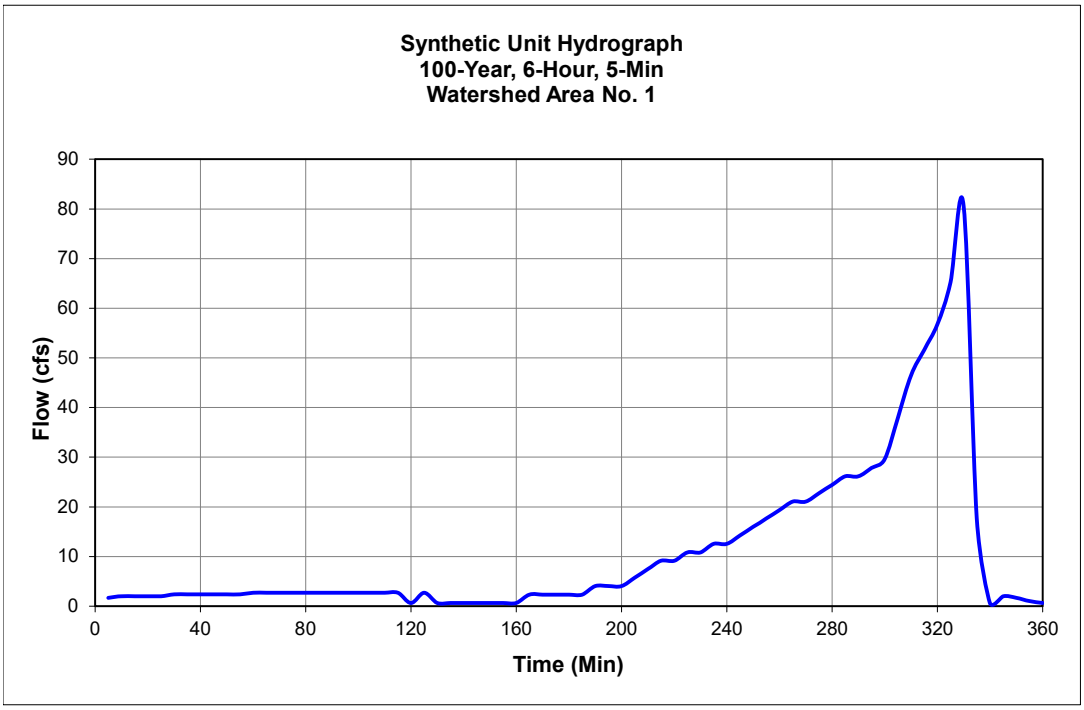
Watersehd Area Designation	1	
Drainage Area - acres	51.5	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.28	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	0.5	0.165	0.28	0.13	0.03	1.7	5
2	0.6	0.198	0.28	0.16	0.04	2.0	10
3	0.6	0.198	0.28	0.16	0.04	2.0	15
4	0.6	0.198	0.28	0.16	0.04	2.0	20
5	0.6	0.198	0.28	0.16	0.04	2.0	25
6	0.7	0.231	0.28	0.18	0.05	2.4	30
7	0.7	0.231	0.28	0.18	0.05	2.4	35
8	0.7	0.231	0.28	0.18	0.05	2.4	40
9	0.7	0.231	0.28	0.18	0.05	2.4	45
10	0.7	0.231	0.28	0.18	0.05	2.4	50
11	0.7	0.231	0.28	0.18	0.05	2.4	55
12	0.8	0.264	0.28	0.21	0.05	2.7	60
13	0.8	0.264	0.28	0.21	0.05	2.7	65
14	0.8	0.264	0.28	0.21	0.05	2.7	70
15	0.8	0.264	0.28	0.21	0.05	2.7	75
16	0.8	0.264	0.28	0.21	0.05	2.7	80
17	0.8	0.264	0.28	0.21	0.05	2.7	85
18	0.8	0.264	0.28	0.21	0.05	2.7	90
19	0.8	0.264	0.28	0.21	0.05	2.7	95
20	0.8	0.264	0.28	0.21	0.05	2.7	100
21	0.8	0.264	0.28	0.21	0.05	2.7	105
22	0.8	0.264	0.28	0.21	0.05	2.7	110
23	0.8	0.264	0.28	0.21	0.05	2.7	115
24	0.9	0.297	0.28	0.24	0.01	0.7	120
25	0.8	0.264	0.28	0.21	0.05	2.7	125
26	0.9	0.297	0.28	0.24	0.01	0.7	130
27	0.9	0.297	0.28	0.24	0.01	0.7	135
28	0.9	0.297	0.28	0.24	0.01	0.7	140
29	0.9	0.297	0.28	0.24	0.01	0.7	145
30	0.9	0.297	0.28	0.24	0.01	0.7	150
31	0.9	0.297	0.28	0.24	0.01	0.7	155
32	0.9	0.297	0.28	0.24	0.01	0.7	160
33	1	0.330	0.28	0.26	0.05	2.4	165
34	1	0.330	0.28	0.26	0.05	2.4	170
35	1	0.330	0.28	0.26	0.05	2.4	175
36	1	0.330	0.28	0.26	0.05	2.4	180
37	1	0.330	0.28	0.26	0.05	2.4	185
38	1.1	0.363	0.28	0.29	0.08	4.1	190
39	1.1	0.363	0.28	0.29	0.08	4.1	195
40	1.1	0.363	0.28	0.29	0.08	4.1	200
41	1.2	0.396	0.28	0.32	0.11	5.8	205
42	1.3	0.429	0.28	0.34	0.14	7.5	210
43	1.4	0.462	0.28	0.37	0.18	9.2	215
44	1.4	0.462	0.28	0.37	0.18	9.2	220
45	1.5	0.495	0.28	0.40	0.21	10.9	225
46	1.5	0.495	0.28	0.40	0.21	10.9	230
47	1.6	0.528	0.28	0.42	0.24	12.6	235
48	1.6	0.528	0.28	0.42	0.24	12.6	240
49	1.7	0.561	0.28	0.45	0.28	14.3	245
50	1.8	0.594	0.28	0.48	0.31	16.0	250
51	1.9	0.627	0.28	0.50	0.34	17.7	255
52	2	0.660	0.28	0.53	0.38	19.4	260
53	2.1	0.693	0.28	0.55	0.41	21.1	265
54	2.1	0.693	0.28	0.55	0.41	21.1	270
55	2.2	0.726	0.28	0.58	0.44	22.8	275
56	2.3	0.759	0.28	0.61	0.47	24.5	280
57	2.4	0.792	0.28	0.63	0.51	26.2	285
58	2.4	0.792	0.28	0.63	0.51	26.2	290
59	2.5	0.825	0.28	0.66	0.54	27.9	295
60	2.6	0.858	0.28	0.69	0.57	29.6	300
61	3.1	1.023	0.28	0.82	0.74	38.1	305
62	3.6	1.188	0.28	0.95	0.90	46.6	310
63	3.9	1.287	0.28	1.03	1.00	51.7	315

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

64	4.2	1.386	0.28	1.11	1.10	56.7	320
65	4.7	1.551	0.28	1.24	1.27	65.2	325
66	5.6	1.848	0.28	1.48	1.56	80.5	330
67	1.9	0.627	0.28	0.50	0.34	17.7	335
68	0.9	0.297	0.28	0.24	0.01	0.7	340
69	0.6	0.198	0.28	0.16	0.04	2.0	345
70	0.5	0.165	0.28	0.13	0.03	1.7	350
71	0.3	0.099	0.28	0.08	0.02	1.0	355
72	0.2	0.066	0.28	0.05	0.01	0.7	360
	100				15.46	in/hr	
					1.29	in	
					5.53	ac-ft	

Lake Area - acres	2.24
Lake normal WSE	0
Lake 100yr WSE	2.5



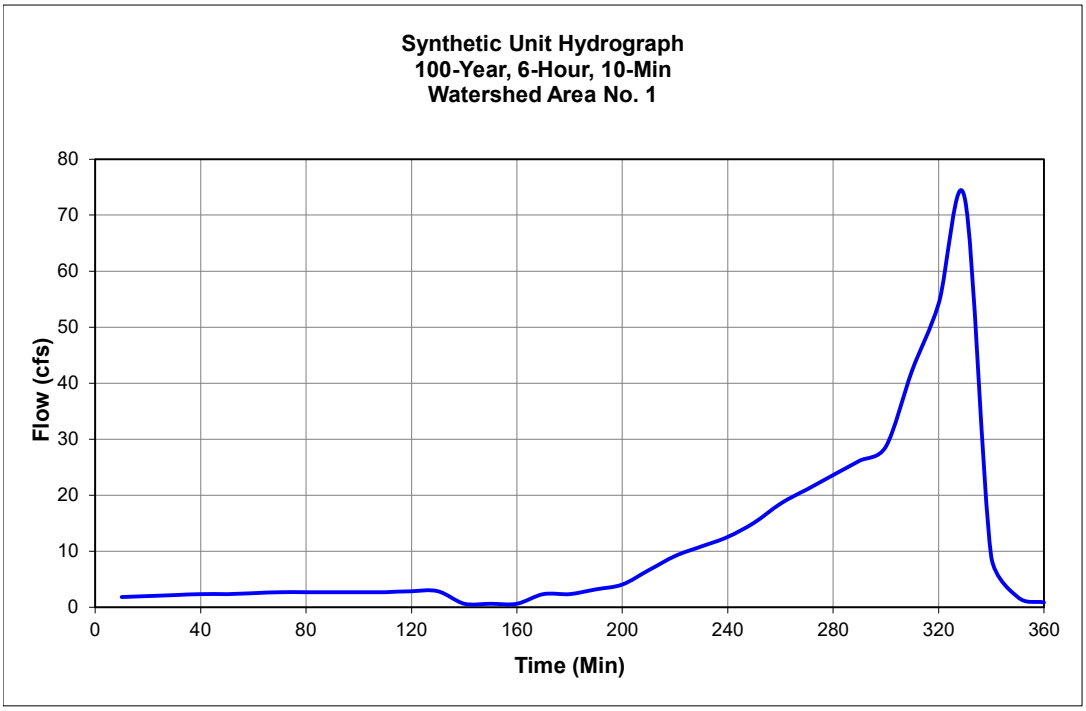
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	1	
Drainage Area - acres	51.5	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.28	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.1	0.182	0.28	0.15	0.04	1.9	10
2	1.2	0.198	0.28	0.16	0.04	2.0	20
3	1.3	0.215	0.28	0.17	0.04	2.2	30
4	1.4	0.231	0.28	0.18	0.05	2.4	40
5	1.4	0.231	0.28	0.18	0.05	2.4	50
6	1.5	0.248	0.28	0.20	0.05	2.5	60
7	1.6	0.264	0.28	0.21	0.05	2.7	70
8	1.6	0.264	0.28	0.21	0.05	2.7	80
9	1.6	0.264	0.28	0.21	0.05	2.7	90
10	1.6	0.264	0.28	0.21	0.05	2.7	100
11	1.6	0.264	0.28	0.21	0.05	2.7	110
12	1.7	0.281	0.28	0.22	0.06	2.9	120
13	1.7	0.281	0.28	0.22	0.06	2.9	130
14	1.8	0.297	0.28	0.24	0.01	0.7	140
15	1.8	0.297	0.28	0.24	0.01	0.7	150
16	1.8	0.297	0.28	0.24	0.01	0.7	160
17	2	0.330	0.28	0.26	0.05	2.4	170
18	2	0.330	0.28	0.26	0.05	2.4	180
19	2.1	0.347	0.28	0.28	0.06	3.2	190
20	2.2	0.363	0.28	0.29	0.08	4.1	200
21	2.5	0.413	0.28	0.33	0.13	6.6	210
22	2.8	0.462	0.28	0.37	0.18	9.2	220
23	3	0.495	0.28	0.40	0.21	10.9	230
24	3.2	0.528	0.28	0.42	0.24	12.6	240
25	3.5	0.578	0.28	0.46	0.29	15.1	250
26	3.9	0.644	0.28	0.51	0.36	18.5	260
27	4.2	0.693	0.28	0.55	0.41	21.1	270
28	4.5	0.743	0.28	0.59	0.46	23.6	280
29	4.8	0.792	0.28	0.63	0.51	26.2	290
30	5.1	0.842	0.28	0.67	0.56	28.7	300
31	6.7	1.106	0.28	0.88	0.82	42.3	310
32	8.1	1.337	0.28	1.07	1.05	54.2	320
33	10.3	1.700	0.28	1.36	1.42	72.9	330
34	2.8	0.462	0.28	0.37	0.18	9.2	340
35	1.1	0.182	0.28	0.15	0.04	1.9	350
36	0.5	0.083	0.28	0.07	0.02	0.8	360
	100				7.78	in/hr	
					1.30	in	
					5.56	ac-ft	

Lake Area - acres	2.24
Lake normal WSE	0
Lake 100yr WSE	2.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

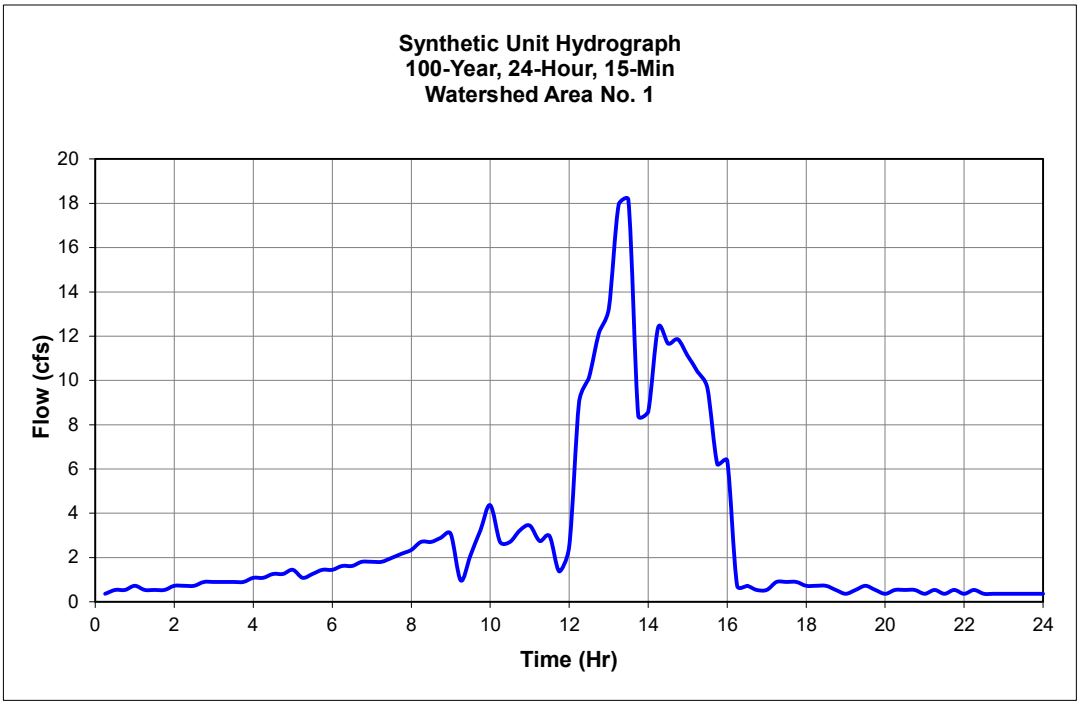
Watershed Area Designation	1	
Drainage Area - acres	51.5	
Unit Time - minutes	15	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	24
Total Adjusted Storm Rain-Inches	4.39	
Constant Loss Rate - in/hr	per calc	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (hr)
1	0.2	0.035	0.50	0.03	0.01	0.4	0.25
2	0.3	0.053	0.50	0.04	0.01	0.5	0.5
3	0.3	0.053	0.49	0.04	0.01	0.5	0.75
4	0.4	0.070	0.48	0.06	0.01	0.7	1
5	0.3	0.053	0.48	0.04	0.01	0.5	1.25
6	0.3	0.053	0.47	0.04	0.01	0.5	1.5
7	0.3	0.053	0.47	0.04	0.01	0.5	1.75
8	0.4	0.070	0.46	0.06	0.01	0.7	2
9	0.4	0.070	0.46	0.06	0.01	0.7	2.25
10	0.4	0.070	0.45	0.06	0.01	0.7	2.5
11	0.5	0.088	0.44	0.07	0.02	0.9	2.75
12	0.5	0.088	0.44	0.07	0.02	0.9	3
13	0.5	0.088	0.43	0.07	0.02	0.9	3.25
14	0.5	0.088	0.43	0.07	0.02	0.9	3.5
15	0.5	0.088	0.42	0.07	0.02	0.9	3.75
16	0.6	0.105	0.42	0.08	0.02	1.1	4
17	0.6	0.105	0.41	0.08	0.02	1.1	4.25
18	0.7	0.123	0.41	0.10	0.02	1.3	4.5
19	0.7	0.123	0.40	0.10	0.02	1.3	4.75
20	0.8	0.140	0.40	0.11	0.03	1.4	5
21	0.6	0.105	0.39	0.08	0.02	1.1	5.25
22	0.7	0.123	0.39	0.10	0.02	1.3	5.5
23	0.8	0.140	0.38	0.11	0.03	1.4	5.75
24	0.8	0.140	0.38	0.11	0.03	1.4	6
25	0.9	0.158	0.37	0.13	0.03	1.6	6.25
26	0.9	0.158	0.37	0.13	0.03	1.6	6.5
27	1	0.176	0.36	0.14	0.04	1.8	6.75
28	1	0.176	0.36	0.14	0.04	1.8	7
29	1	0.176	0.35	0.14	0.04	1.8	7.25
30	1.1	0.193	0.35	0.15	0.04	2.0	7.5
31	1.2	0.211	0.34	0.17	0.04	2.2	7.75
32	1.3	0.228	0.34	0.18	0.05	2.4	8
33	1.5	0.263	0.33	0.21	0.05	2.7	8.25
34	1.5	0.263	0.33	0.21	0.05	2.7	8.5
35	1.6	0.281	0.32	0.22	0.06	2.9	8.75
36	1.7	0.299	0.32	0.24	0.06	3.1	9
37	1.9	0.334	0.31	0.27	0.02	1.0	9.25
38	2	0.351	0.31	0.28	0.04	2.1	9.5
39	2.1	0.369	0.31	0.30	0.06	3.2	9.75
40	2.2	0.386	0.30	0.31	0.08	4.4	10
41	1.5	0.263	0.30	0.21	0.05	2.7	10.25
42	1.5	0.263	0.29	0.21	0.05	2.7	10.5
43	2	0.351	0.29	0.28	0.06	3.2	10.75
44	2	0.351	0.28	0.28	0.07	3.4	11
45	1.9	0.334	0.28	0.27	0.05	2.8	11.25
46	1.9	0.334	0.28	0.27	0.06	3.0	11.5
47	1.7	0.299	0.27	0.24	0.03	1.4	11.75
48	1.8	0.316	0.27	0.25	0.05	2.5	12
49	2.5	0.439	0.26	0.35	0.18	9.0	12.25
50	2.6	0.457	0.26	0.37	0.20	10.1	12.5
51	2.8	0.492	0.26	0.39	0.24	12.1	12.75
52	2.9	0.509	0.25	0.41	0.26	13.2	13
53	3.4	0.597	0.25	0.48	0.35	18.0	13.25
54	3.4	0.597	0.24	0.48	0.35	18.2	13.5
55	2.3	0.404	0.24	0.32	0.16	8.4	13.75
56	2.3	0.404	0.24	0.32	0.17	8.6	14
57	2.7	0.474	0.23	0.38	0.24	12.4	14.25
58	2.6	0.457	0.23	0.37	0.23	11.7	14.5
59	2.6	0.457	0.23	0.37	0.23	11.8	14.75
60	2.5	0.439	0.22	0.35	0.22	11.1	15
61	2.4	0.421	0.22	0.34	0.20	10.4	15.25
62	2.3	0.404	0.22	0.32	0.19	9.7	15.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

63	1.9	0.334	0.21	0.27	0.12	6.2	15.75
64	1.9	0.334	0.21	0.27	0.12	6.4	16
65	0.4	0.070	0.21	0.06	0.01	0.7	16.25
66	0.4	0.070	0.20	0.06	0.01	0.7	16.5
67	0.3	0.053	0.20	0.04	0.01	0.5	16.75
68	0.3	0.053	0.20	0.04	0.01	0.5	17
69	0.5	0.088	0.19	0.07	0.02	0.9	17.25
70	0.5	0.088	0.19	0.07	0.02	0.9	17.5
71	0.5	0.088	0.19	0.07	0.02	0.9	17.75
72	0.4	0.070	0.19	0.06	0.01	0.7	18
73	0.4	0.070	0.18	0.06	0.01	0.7	18.25
74	0.4	0.070	0.18	0.06	0.01	0.7	18.5
75	0.3	0.053	0.18	0.04	0.01	0.5	18.75
76	0.2	0.035	0.18	0.03	0.01	0.4	19
77	0.3	0.053	0.17	0.04	0.01	0.5	19.25
78	0.4	0.070	0.17	0.06	0.01	0.7	19.5
79	0.3	0.053	0.17	0.04	0.01	0.5	19.75
80	0.2	0.035	0.17	0.03	0.01	0.4	20
81	0.3	0.053	0.16	0.04	0.01	0.5	20.25
82	0.3	0.053	0.16	0.04	0.01	0.5	20.5
83	0.3	0.053	0.16	0.04	0.01	0.5	20.75
84	0.2	0.035	0.16	0.03	0.01	0.4	21
85	0.3	0.053	0.16	0.04	0.01	0.5	21.25
86	0.2	0.035	0.15	0.03	0.01	0.4	21.5
87	0.3	0.053	0.15	0.04	0.01	0.5	21.75
88	0.2	0.035	0.15	0.03	0.01	0.4	22
89	0.3	0.053	0.15	0.04	0.01	0.5	22.25
90	0.2	0.035	0.15	0.03	0.01	0.4	22.5
91	0.2	0.035	0.15	0.03	0.01	0.4	22.75
92	0.2	0.035	0.15	0.03	0.01	0.4	23
93	0.2	0.035	0.14	0.03	0.01	0.4	23.25
94	0.2	0.035	0.14	0.03	0.01	0.4	23.5
95	0.2	0.035	0.14	0.03	0.01	0.4	23.75
96	0.2	0.035	0.14	0.03	0.01	0.4	24
	100				5.35	in/hr	
					1.34	in	
					5.74	ac-ft	

Lake Area - acres	2.24
Lake normal WSE	0
Lake 100yr WSE	2.6



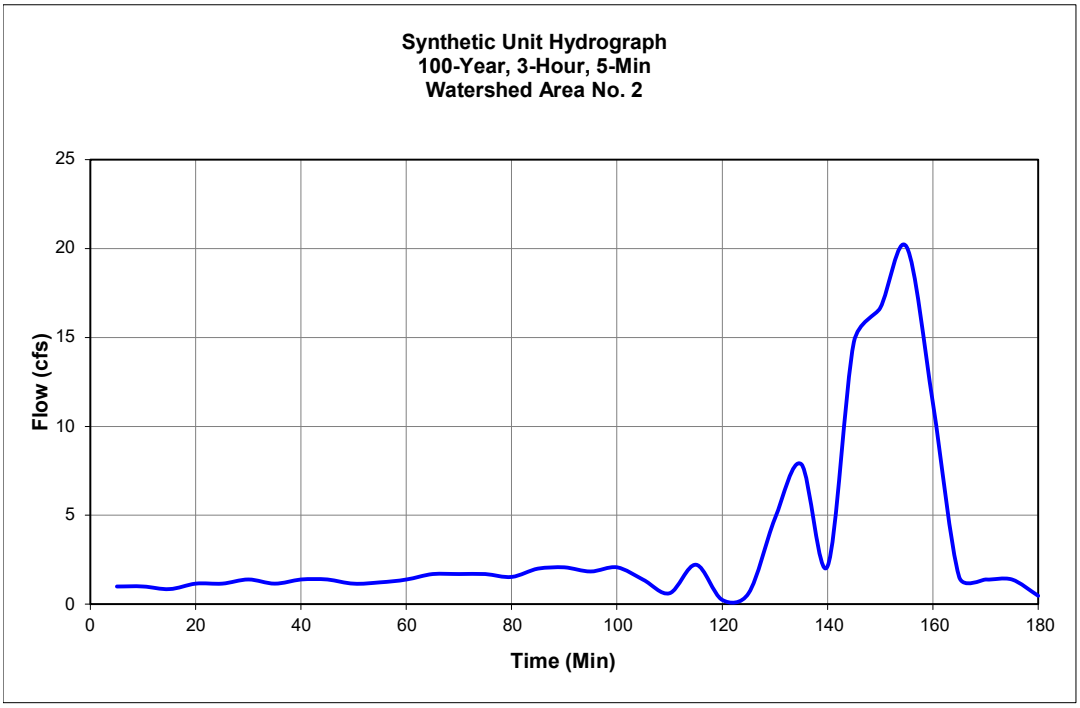
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	2	
Drainage Area - acres	39.8	
Unit Time - minutes	5	
Lag Time - minutes	2	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.28	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.3	0.351	0.28	0.28	0.07	2.7	5
2	1.3	0.351	0.28	0.28	0.07	2.7	10
3	1.1	0.297	0.28	0.24	0.01	0.6	15
4	1.5	0.405	0.28	0.32	0.12	4.9	20
5	1.5	0.405	0.28	0.32	0.12	4.9	25
6	1.8	0.486	0.28	0.39	0.20	8.1	30
7	1.5	0.405	0.28	0.32	0.12	4.9	35
8	1.8	0.486	0.28	0.39	0.20	8.1	40
9	1.8	0.486	0.28	0.39	0.20	8.1	45
10	1.5	0.405	0.28	0.32	0.12	4.9	50
11	1.6	0.432	0.28	0.35	0.15	6.0	55
12	1.8	0.486	0.28	0.39	0.20	8.1	60
13	2.2	0.594	0.28	0.48	0.31	12.4	65
14	2.2	0.594	0.28	0.48	0.31	12.4	70
15	2.2	0.594	0.28	0.48	0.31	12.4	75
16	2	0.540	0.28	0.43	0.26	10.3	80
17	2.6	0.702	0.28	0.56	0.42	16.7	85
18	2.7	0.729	0.28	0.58	0.45	17.8	90
19	2.4	0.648	0.28	0.52	0.37	14.6	95
20	2.7	0.729	0.28	0.58	0.45	17.8	100
21	3.3	0.891	0.28	0.71	0.61	24.2	105
22	3.1	0.837	0.28	0.67	0.55	22.1	110
23	2.9	0.783	0.28	0.63	0.50	19.9	115
24	3	0.810	0.28	0.65	0.53	21.0	120
25	3.1	0.837	0.28	0.67	0.55	22.1	125
26	4.2	1.134	0.28	0.91	0.85	33.9	130
27	5	1.350	0.28	1.08	1.07	42.5	135
28	3.5	0.945	0.28	0.76	0.66	26.4	140
29	6.8	1.836	0.28	1.47	1.55	61.8	145
30	7.3	1.971	0.28	1.58	1.69	67.2	150
31	8.2	2.214	0.28	1.77	1.93	76.9	155
32	5.9	1.593	0.28	1.27	1.31	52.2	160
33	2	0.540	0.28	0.43	0.26	10.3	165
34	1.8	0.486	0.28	0.39	0.20	8.1	170
35	1.8	0.486	0.28	0.39	0.20	8.1	175
36	0.6	0.162	0.28	0.13	0.03	1.3	180
	100				16.99	in/hr	
					1.42	in	
					4.69	ac-ft	

Lake Area - acres	2.05
Lake normal WSE	0
Lake 100yr WSE	2.3

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

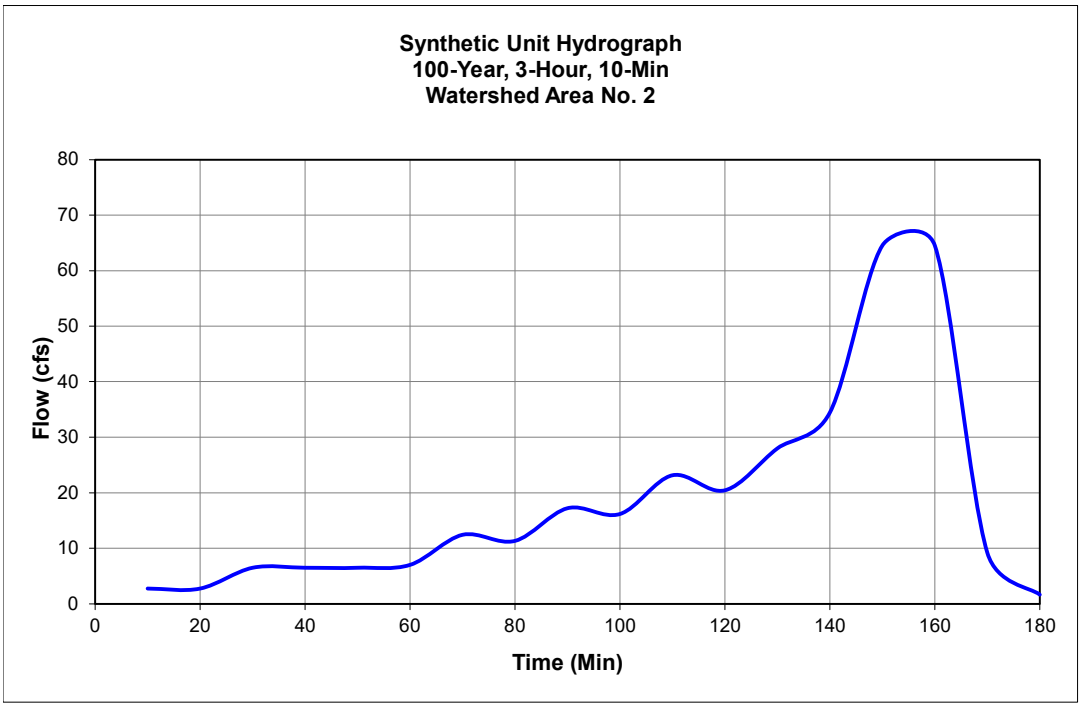


Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	2	
Drainage Area - acres	39.8	
Unit Time - minutes	10	
Lag Time - minutes	2	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.28	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	2.6	0.351	0.28	0.28	0.07	2.7	10
2	2.6	0.351	0.28	0.28	0.07	2.7	20
3	3.3	0.446	0.28	0.36	0.16	6.5	30
4	3.3	0.446	0.28	0.36	0.16	6.5	40
5	3.3	0.446	0.28	0.36	0.16	6.5	50
6	3.4	0.459	0.28	0.37	0.18	7.0	60
7	4.4	0.594	0.28	0.48	0.31	12.4	70
8	4.2	0.567	0.28	0.45	0.28	11.3	80
9	5.3	0.716	0.28	0.57	0.43	17.2	90
10	5.1	0.689	0.28	0.55	0.41	16.2	100
11	6.4	0.864	0.28	0.69	0.58	23.1	110
12	5.9	0.797	0.28	0.64	0.51	20.5	120
13	7.3	0.986	0.28	0.79	0.70	28.0	130
14	8.5	1.148	0.28	0.92	0.87	34.4	140
15	14.1	1.904	0.28	1.52	1.62	64.5	150
16	14.1	1.904	0.28	1.52	1.62	64.5	160
17	3.8	0.513	0.28	0.41	0.23	9.2	170
18	2.4	0.324	0.28	0.26	0.04	1.7	180
	100				8.42	in/hr	
					1.40	in	
					4.65	ac-ft	

Lake Area - acres	2.05	
Lake normal WSE	0	
Lake 100yr WSE	2.3	



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

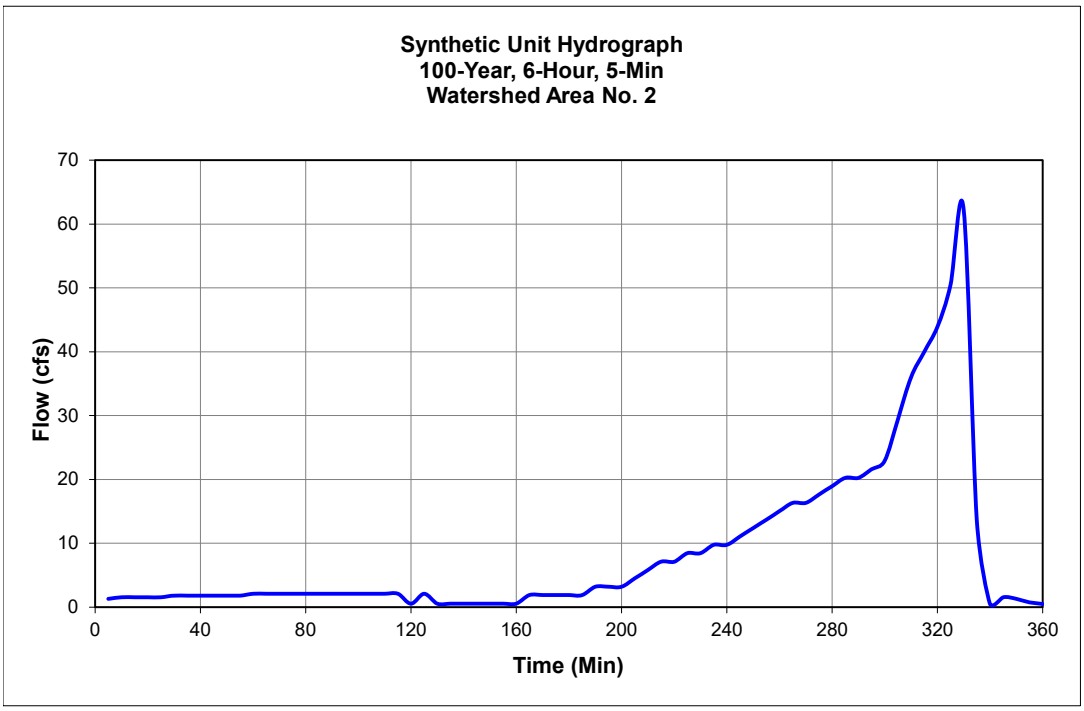
Watersehd Area Designation	2	
Drainage Area - acres	39.8	
Unit Time - minutes	5	
Lag Time - minutes	2	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.28	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	0.5	0.165	0.28	0.13	0.03	1.3	5
2	0.6	0.198	0.28	0.16	0.04	1.6	10
3	0.6	0.198	0.28	0.16	0.04	1.6	15
4	0.6	0.198	0.28	0.16	0.04	1.6	20
5	0.6	0.198	0.28	0.16	0.04	1.6	25
6	0.7	0.231	0.28	0.18	0.05	1.8	30
7	0.7	0.231	0.28	0.18	0.05	1.8	35
8	0.7	0.231	0.28	0.18	0.05	1.8	40
9	0.7	0.231	0.28	0.18	0.05	1.8	45
10	0.7	0.231	0.28	0.18	0.05	1.8	50
11	0.7	0.231	0.28	0.18	0.05	1.8	55
12	0.8	0.264	0.28	0.21	0.05	2.1	60
13	0.8	0.264	0.28	0.21	0.05	2.1	65
14	0.8	0.264	0.28	0.21	0.05	2.1	70
15	0.8	0.264	0.28	0.21	0.05	2.1	75
16	0.8	0.264	0.28	0.21	0.05	2.1	80
17	0.8	0.264	0.28	0.21	0.05	2.1	85
18	0.8	0.264	0.28	0.21	0.05	2.1	90
19	0.8	0.264	0.28	0.21	0.05	2.1	95
20	0.8	0.264	0.28	0.21	0.05	2.1	100
21	0.8	0.264	0.28	0.21	0.05	2.1	105
22	0.8	0.264	0.28	0.21	0.05	2.1	110
23	0.8	0.264	0.28	0.21	0.05	2.1	115
24	0.9	0.297	0.28	0.24	0.01	0.6	120
25	0.8	0.264	0.28	0.21	0.05	2.1	125
26	0.9	0.297	0.28	0.24	0.01	0.6	130
27	0.9	0.297	0.28	0.24	0.01	0.6	135
28	0.9	0.297	0.28	0.24	0.01	0.6	140
29	0.9	0.297	0.28	0.24	0.01	0.6	145
30	0.9	0.297	0.28	0.24	0.01	0.6	150
31	0.9	0.297	0.28	0.24	0.01	0.6	155
32	0.9	0.297	0.28	0.24	0.01	0.6	160
33	1	0.330	0.28	0.26	0.05	1.9	165
34	1	0.330	0.28	0.26	0.05	1.9	170
35	1	0.330	0.28	0.26	0.05	1.9	175
36	1	0.330	0.28	0.26	0.05	1.9	180
37	1	0.330	0.28	0.26	0.05	1.9	185
38	1.1	0.363	0.28	0.29	0.08	3.2	190
39	1.1	0.363	0.28	0.29	0.08	3.2	195
40	1.1	0.363	0.28	0.29	0.08	3.2	200
41	1.2	0.396	0.28	0.32	0.11	4.5	205
42	1.3	0.429	0.28	0.34	0.15	5.8	210
43	1.4	0.462	0.28	0.37	0.18	7.1	215
44	1.4	0.462	0.28	0.37	0.18	7.1	220
45	1.5	0.495	0.28	0.40	0.21	8.5	225
46	1.5	0.495	0.28	0.40	0.21	8.5	230
47	1.6	0.528	0.28	0.42	0.25	9.8	235
48	1.6	0.528	0.28	0.42	0.25	9.8	240
49	1.7	0.561	0.28	0.45	0.28	11.1	245
50	1.8	0.594	0.28	0.48	0.31	12.4	250
51	1.9	0.627	0.28	0.50	0.34	13.7	255
52	2	0.660	0.28	0.53	0.38	15.0	260
53	2.1	0.693	0.28	0.55	0.41	16.3	265
54	2.1	0.693	0.28	0.55	0.41	16.3	270
55	2.2	0.726	0.28	0.58	0.44	17.7	275
56	2.3	0.759	0.28	0.61	0.48	19.0	280
57	2.4	0.792	0.28	0.63	0.51	20.3	285
58	2.4	0.792	0.28	0.63	0.51	20.3	290
59	2.5	0.825	0.28	0.66	0.54	21.6	295
60	2.6	0.858	0.28	0.69	0.58	22.9	300
61	3.1	1.023	0.28	0.82	0.74	29.5	305
62	3.6	1.188	0.28	0.95	0.91	36.0	310
63	3.9	1.287	0.28	1.03	1.00	40.0	315

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

64	4.2	1.386	0.28	1.11	1.10	43.9	320
65	4.7	1.551	0.28	1.24	1.27	50.5	325
66	5.6	1.848	0.28	1.48	1.57	62.3	330
67	1.9	0.627	0.28	0.50	0.34	13.7	335
68	0.9	0.297	0.28	0.24	0.01	0.6	340
69	0.6	0.198	0.28	0.16	0.04	1.6	345
70	0.5	0.165	0.28	0.13	0.03	1.3	350
71	0.3	0.099	0.28	0.08	0.02	0.8	355
72	0.2	0.066	0.28	0.05	0.01	0.5	360
	100				15.53	in/hr	
					1.29	in	
					4.29	ac-ft	

Lake Area - acres	2.05
Lake normal WSE	0
Lake 100yr WSE	2.1



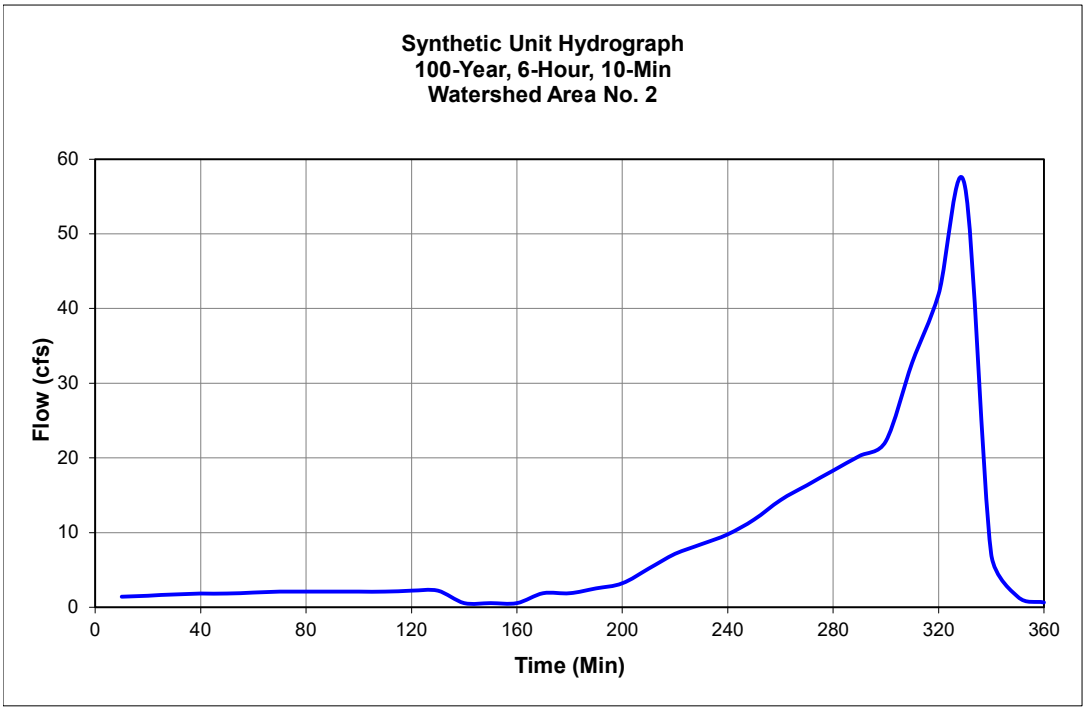
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	2	
Drainage Area - acres	39.8	
Unit Time - minutes	10	
Lag Time - minutes	2	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.28	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.1	0.182	0.28	0.15	0.04	1.4	10
2	1.2	0.198	0.28	0.16	0.04	1.6	20
3	1.3	0.215	0.28	0.17	0.04	1.7	30
4	1.4	0.231	0.28	0.18	0.05	1.8	40
5	1.4	0.231	0.28	0.18	0.05	1.8	50
6	1.5	0.248	0.28	0.20	0.05	2.0	60
7	1.6	0.264	0.28	0.21	0.05	2.1	70
8	1.6	0.264	0.28	0.21	0.05	2.1	80
9	1.6	0.264	0.28	0.21	0.05	2.1	90
10	1.6	0.264	0.28	0.21	0.05	2.1	100
11	1.6	0.264	0.28	0.21	0.05	2.1	110
12	1.7	0.281	0.28	0.22	0.06	2.2	120
13	1.7	0.281	0.28	0.22	0.06	2.2	130
14	1.8	0.297	0.28	0.24	0.01	0.6	140
15	1.8	0.297	0.28	0.24	0.01	0.6	150
16	1.8	0.297	0.28	0.24	0.01	0.6	160
17	2	0.330	0.28	0.26	0.05	1.9	170
18	2	0.330	0.28	0.26	0.05	1.9	180
19	2.1	0.347	0.28	0.28	0.06	2.6	190
20	2.2	0.363	0.28	0.29	0.08	3.2	200
21	2.5	0.413	0.28	0.33	0.13	5.2	210
22	2.8	0.462	0.28	0.37	0.18	7.1	220
23	3	0.495	0.28	0.40	0.21	8.5	230
24	3.2	0.528	0.28	0.42	0.25	9.8	240
25	3.5	0.578	0.28	0.46	0.30	11.7	250
26	3.9	0.644	0.28	0.51	0.36	14.4	260
27	4.2	0.693	0.28	0.55	0.41	16.3	270
28	4.5	0.743	0.28	0.59	0.46	18.3	280
29	4.8	0.792	0.28	0.63	0.51	20.3	290
30	5.1	0.842	0.28	0.67	0.56	22.3	300
31	6.7	1.106	0.28	0.88	0.82	32.8	310
32	8.1	1.337	0.28	1.07	1.05	42.0	320
33	10.3	1.700	0.28	1.36	1.42	56.4	330
34	2.8	0.462	0.28	0.37	0.18	7.1	340
35	1.1	0.182	0.28	0.15	0.04	1.4	350
36	0.5	0.083	0.28	0.07	0.02	0.7	360
	100				7.81	in/hr	
					1.30	in	
					4.32	ac-ft	

Lake Area - acres	2.05
Lake normal WSE	0
Lake 100yr WSE	2.1

Riverside County
Synthetic Unit Hydrograph
Short Cut Method



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

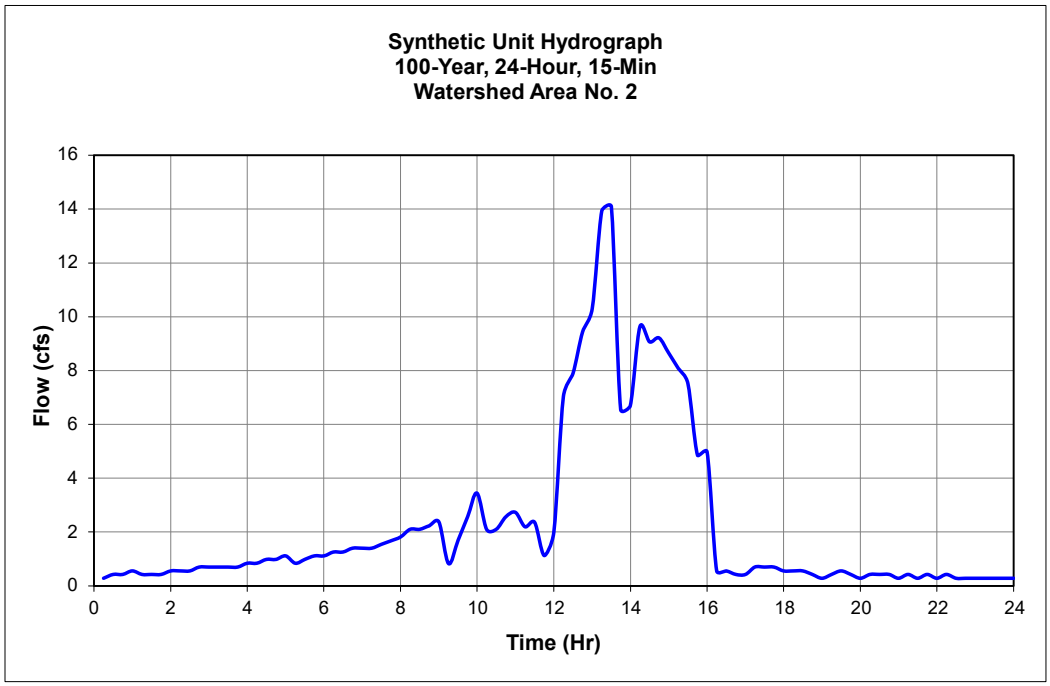
Watershed Area Designation	2	
Drainage Area - acres	39.8	
Unit Time - minutes	15	
Lag Time - minutes	2	
Storm Frequency & Duration - yr/hr	100	24
Total Adjusted Storm Rain-Inches	4.39	
Constant Loss Rate - in/hr	per calc	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (hr)
1	0.2	0.035	0.50	0.03	0.01	0.3	0.25
2	0.3	0.053	0.49	0.04	0.01	0.4	0.5
3	0.3	0.053	0.49	0.04	0.01	0.4	0.75
4	0.4	0.070	0.48	0.06	0.01	0.6	1
5	0.3	0.053	0.48	0.04	0.01	0.4	1.25
6	0.3	0.053	0.47	0.04	0.01	0.4	1.5
7	0.3	0.053	0.46	0.04	0.01	0.4	1.75
8	0.4	0.070	0.46	0.06	0.01	0.6	2
9	0.4	0.070	0.45	0.06	0.01	0.6	2.25
10	0.4	0.070	0.45	0.06	0.01	0.6	2.5
11	0.5	0.088	0.44	0.07	0.02	0.7	2.75
12	0.5	0.088	0.44	0.07	0.02	0.7	3
13	0.5	0.088	0.43	0.07	0.02	0.7	3.25
14	0.5	0.088	0.43	0.07	0.02	0.7	3.5
15	0.5	0.088	0.42	0.07	0.02	0.7	3.75
16	0.6	0.105	0.42	0.08	0.02	0.8	4
17	0.6	0.105	0.41	0.08	0.02	0.8	4.25
18	0.7	0.123	0.41	0.10	0.02	1.0	4.5
19	0.7	0.123	0.40	0.10	0.02	1.0	4.75
20	0.8	0.140	0.39	0.11	0.03	1.1	5
21	0.6	0.105	0.39	0.08	0.02	0.8	5.25
22	0.7	0.123	0.38	0.10	0.02	1.0	5.5
23	0.8	0.140	0.38	0.11	0.03	1.1	5.75
24	0.8	0.140	0.37	0.11	0.03	1.1	6
25	0.9	0.158	0.37	0.13	0.03	1.3	6.25
26	0.9	0.158	0.36	0.13	0.03	1.3	6.5
27	1	0.176	0.36	0.14	0.04	1.4	6.75
28	1	0.176	0.35	0.14	0.04	1.4	7
29	1	0.176	0.35	0.14	0.04	1.4	7.25
30	1.1	0.193	0.35	0.15	0.04	1.5	7.5
31	1.2	0.211	0.34	0.17	0.04	1.7	7.75
32	1.3	0.228	0.34	0.18	0.05	1.8	8
33	1.5	0.263	0.33	0.21	0.05	2.1	8.25
34	1.5	0.263	0.33	0.21	0.05	2.1	8.5
35	1.6	0.281	0.32	0.22	0.06	2.2	8.75
36	1.7	0.299	0.32	0.24	0.06	2.4	9
37	1.9	0.334	0.31	0.27	0.02	0.8	9.25
38	2	0.351	0.31	0.28	0.04	1.7	9.5
39	2.1	0.369	0.30	0.30	0.06	2.6	9.75
40	2.2	0.386	0.30	0.31	0.09	3.4	10
41	1.5	0.263	0.30	0.21	0.05	2.1	10.25
42	1.5	0.263	0.29	0.21	0.05	2.1	10.5
43	2	0.351	0.29	0.28	0.06	2.6	10.75
44	2	0.351	0.28	0.28	0.07	2.7	11
45	1.9	0.334	0.28	0.27	0.06	2.2	11.25
46	1.9	0.334	0.27	0.27	0.06	2.4	11.5
47	1.7	0.299	0.27	0.24	0.03	1.1	11.75
48	1.8	0.316	0.27	0.25	0.05	2.0	12
49	2.5	0.439	0.26	0.35	0.18	7.0	12.25
50	2.6	0.457	0.26	0.37	0.20	7.9	12.5
51	2.8	0.492	0.25	0.39	0.24	9.4	12.75
52	2.9	0.509	0.25	0.41	0.26	10.3	13
53	3.4	0.597	0.25	0.48	0.35	13.9	13.25
54	3.4	0.597	0.24	0.48	0.35	14.1	13.5
55	2.3	0.404	0.24	0.32	0.16	6.5	13.75
56	2.3	0.404	0.24	0.32	0.17	6.7	14
57	2.7	0.474	0.23	0.38	0.24	9.6	14.25
58	2.6	0.457	0.23	0.37	0.23	9.1	14.5
59	2.6	0.457	0.23	0.37	0.23	9.2	14.75
60	2.5	0.439	0.22	0.35	0.22	8.6	15
61	2.4	0.421	0.22	0.34	0.20	8.1	15.25
62	2.3	0.404	0.21	0.32	0.19	7.5	15.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

63	1.9	0.334	0.21	0.27	0.12	4.9	15.75
64	1.9	0.334	0.21	0.27	0.13	5.0	16
65	0.4	0.070	0.21	0.06	0.01	0.6	16.25
66	0.4	0.070	0.20	0.06	0.01	0.6	16.5
67	0.3	0.053	0.20	0.04	0.01	0.4	16.75
68	0.3	0.053	0.20	0.04	0.01	0.4	17
69	0.5	0.088	0.19	0.07	0.02	0.7	17.25
70	0.5	0.088	0.19	0.07	0.02	0.7	17.5
71	0.5	0.088	0.19	0.07	0.02	0.7	17.75
72	0.4	0.070	0.18	0.06	0.01	0.6	18
73	0.4	0.070	0.18	0.06	0.01	0.6	18.25
74	0.4	0.070	0.18	0.06	0.01	0.6	18.5
75	0.3	0.053	0.18	0.04	0.01	0.4	18.75
76	0.2	0.035	0.17	0.03	0.01	0.3	19
77	0.3	0.053	0.17	0.04	0.01	0.4	19.25
78	0.4	0.070	0.17	0.06	0.01	0.6	19.5
79	0.3	0.053	0.17	0.04	0.01	0.4	19.75
80	0.2	0.035	0.16	0.03	0.01	0.3	20
81	0.3	0.053	0.16	0.04	0.01	0.4	20.25
82	0.3	0.053	0.16	0.04	0.01	0.4	20.5
83	0.3	0.053	0.16	0.04	0.01	0.4	20.75
84	0.2	0.035	0.16	0.03	0.01	0.3	21
85	0.3	0.053	0.15	0.04	0.01	0.4	21.25
86	0.2	0.035	0.15	0.03	0.01	0.3	21.5
87	0.3	0.053	0.15	0.04	0.01	0.4	21.75
88	0.2	0.035	0.15	0.03	0.01	0.3	22
89	0.3	0.053	0.15	0.04	0.01	0.4	22.25
90	0.2	0.035	0.15	0.03	0.01	0.3	22.5
91	0.2	0.035	0.15	0.03	0.01	0.3	22.75
92	0.2	0.035	0.14	0.03	0.01	0.3	23
93	0.2	0.035	0.14	0.03	0.01	0.3	23.25
94	0.2	0.035	0.14	0.03	0.01	0.3	23.5
95	0.2	0.035	0.14	0.03	0.01	0.3	23.75
96	0.2	0.035	0.14	0.03	0.01	0.3	24
	100				5.39	in/hr	
					1.35	in	
					4.47	ac-ft	

Lake Area - acres	2.05
Lake normal WSE	0
Lake 100yr WSE	2.2



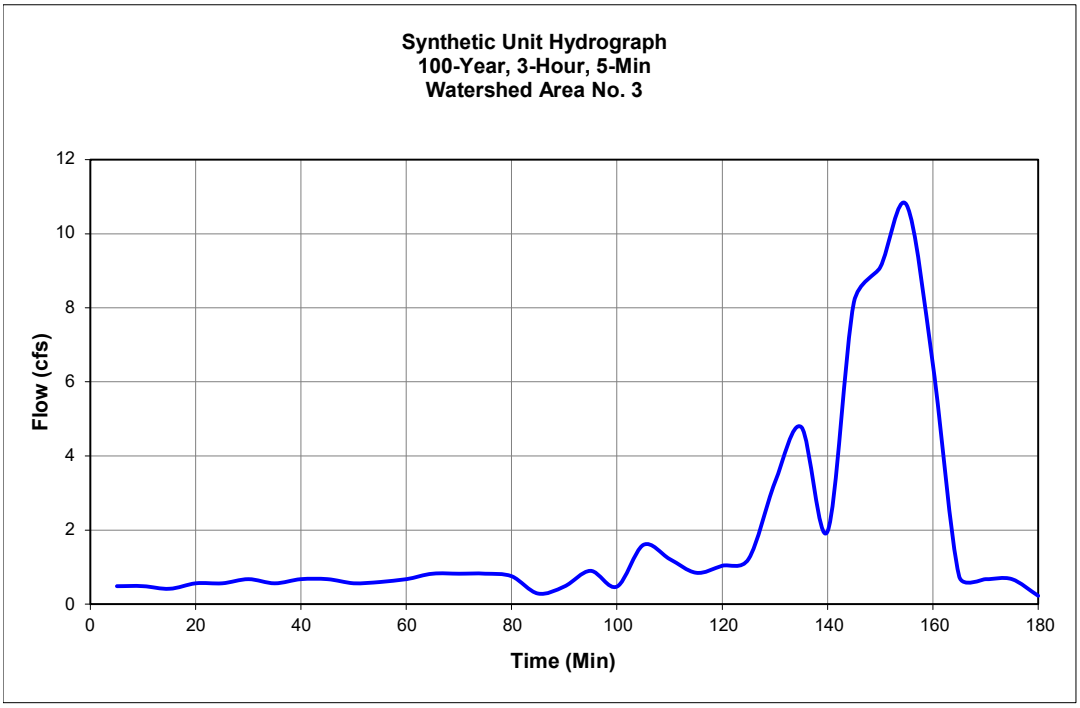
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	3	
Drainage Area - acres	19.5	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.24	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.3	0.351	0.24	0.28	0.12	2.3	5
2	1.3	0.351	0.24	0.28	0.12	2.3	10
3	1.1	0.297	0.24	0.24	0.06	1.2	15
4	1.5	0.405	0.24	0.32	0.17	3.3	20
5	1.5	0.405	0.24	0.32	0.17	3.3	25
6	1.8	0.486	0.24	0.39	0.25	4.9	30
7	1.5	0.405	0.24	0.32	0.17	3.3	35
8	1.8	0.486	0.24	0.39	0.25	4.9	40
9	1.8	0.486	0.24	0.39	0.25	4.9	45
10	1.5	0.405	0.24	0.32	0.17	3.3	50
11	1.6	0.432	0.24	0.35	0.20	3.8	55
12	1.8	0.486	0.24	0.39	0.25	4.9	60
13	2.2	0.594	0.24	0.48	0.36	7.0	65
14	2.2	0.594	0.24	0.48	0.36	7.0	70
15	2.2	0.594	0.24	0.48	0.36	7.0	75
16	2	0.540	0.24	0.43	0.30	5.9	80
17	2.6	0.702	0.24	0.56	0.47	9.1	85
18	2.7	0.729	0.24	0.58	0.49	9.6	90
19	2.4	0.648	0.24	0.52	0.41	8.1	95
20	2.7	0.729	0.24	0.58	0.49	9.6	100
21	3.3	0.891	0.24	0.71	0.66	12.8	105
22	3.1	0.837	0.24	0.67	0.60	11.7	110
23	2.9	0.783	0.24	0.63	0.55	10.7	115
24	3	0.810	0.24	0.65	0.57	11.2	120
25	3.1	0.837	0.24	0.67	0.60	11.7	125
26	4.2	1.134	0.24	0.91	0.90	17.5	130
27	5	1.350	0.24	1.08	1.11	21.7	135
28	3.5	0.945	0.24	0.76	0.71	13.8	140
29	6.8	1.836	0.24	1.47	1.60	31.2	145
30	7.3	1.971	0.24	1.58	1.74	33.9	150
31	8.2	2.214	0.24	1.77	1.98	38.6	155
32	5.9	1.593	0.24	1.27	1.36	26.5	160
33	2	0.540	0.24	0.43	0.30	5.9	165
34	1.8	0.486	0.24	0.39	0.25	4.9	170
35	1.8	0.486	0.24	0.39	0.25	4.9	175
36	0.6	0.162	0.24	0.13	0.03	0.6	180
	100				18.64	in/hr	
					1.55	in	
					2.52	ac-ft	

Lake Area - acres	0.96
Lake normal WSE	957
Lake 100yr WSE	959.6

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

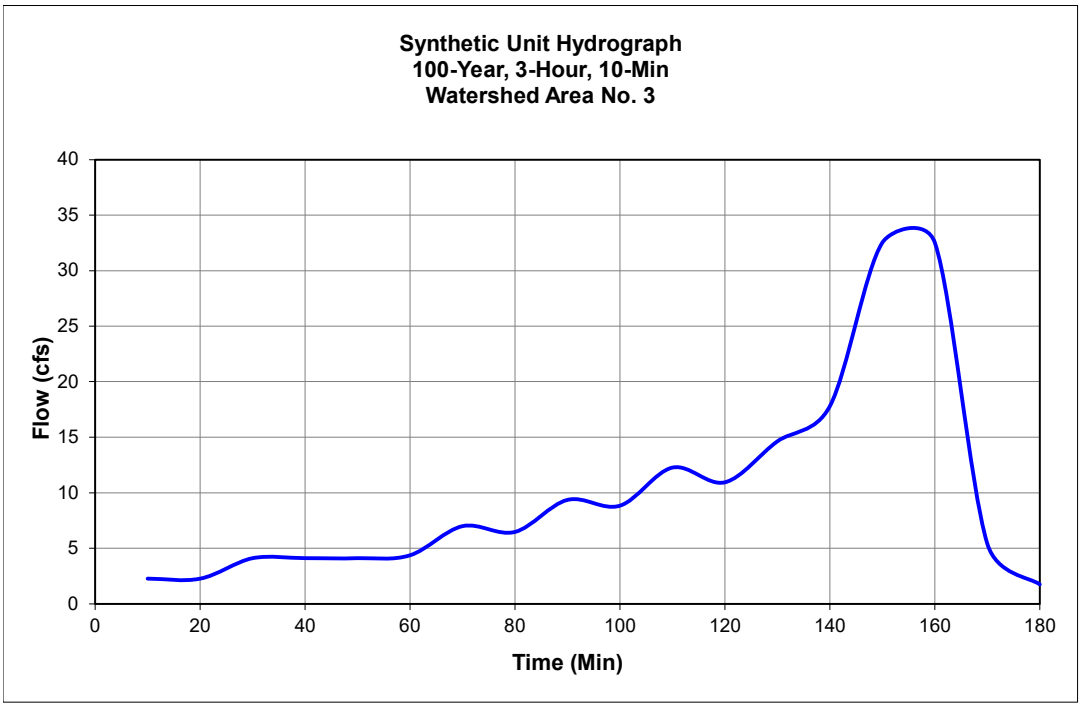


Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	3	
Drainage Area - acres	19.5	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.24	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	2.6	0.351	0.24	0.28	0.12	2.3	10
2	2.6	0.351	0.24	0.28	0.12	2.3	20
3	3.3	0.446	0.24	0.36	0.21	4.1	30
4	3.3	0.446	0.24	0.36	0.21	4.1	40
5	3.3	0.446	0.24	0.36	0.21	4.1	50
6	3.4	0.459	0.24	0.37	0.22	4.4	60
7	4.4	0.594	0.24	0.48	0.36	7.0	70
8	4.2	0.567	0.24	0.45	0.33	6.5	80
9	5.3	0.716	0.24	0.57	0.48	9.4	90
10	5.1	0.689	0.24	0.55	0.45	8.8	100
11	6.4	0.864	0.24	0.69	0.63	12.3	110
12	5.9	0.797	0.24	0.64	0.56	10.9	120
13	7.3	0.986	0.24	0.79	0.75	14.6	130
14	8.5	1.148	0.24	0.92	0.91	17.8	140
15	14.1	1.904	0.24	1.52	1.67	32.5	150
16	14.1	1.904	0.24	1.52	1.67	32.5	160
17	3.8	0.513	0.24	0.41	0.28	5.4	170
18	2.4	0.324	0.24	0.26	0.09	1.7	180
	100				9.27	in/hr	
					1.54	in	
					2.51	ac-ft	

Lake Area - acres	0.96
Lake normal WSE	957
Lake 100yr WSE	959.6



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

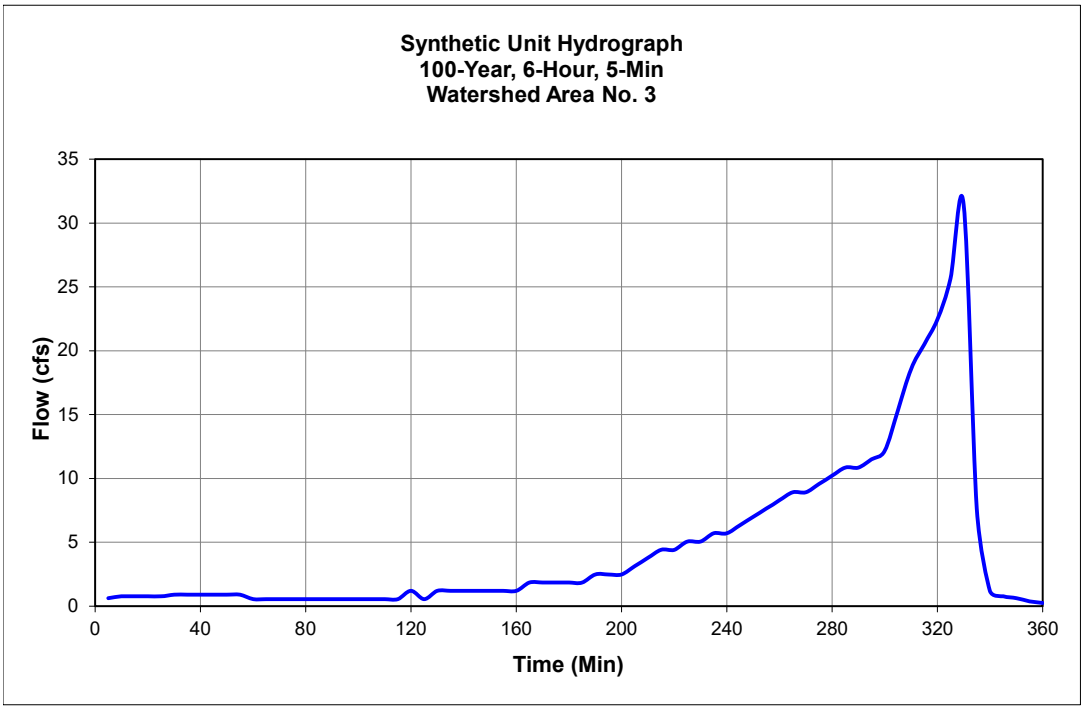
Watersehd Area Designation	3	
Drainage Area - acres	19.5	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.24	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	0.5	0.165	0.24	0.13	0.03	0.6	5
2	0.6	0.198	0.24	0.16	0.04	0.8	10
3	0.6	0.198	0.24	0.16	0.04	0.8	15
4	0.6	0.198	0.24	0.16	0.04	0.8	20
5	0.6	0.198	0.24	0.16	0.04	0.8	25
6	0.7	0.231	0.24	0.18	0.05	0.9	30
7	0.7	0.231	0.24	0.18	0.05	0.9	35
8	0.7	0.231	0.24	0.18	0.05	0.9	40
9	0.7	0.231	0.24	0.18	0.05	0.9	45
10	0.7	0.231	0.24	0.18	0.05	0.9	50
11	0.7	0.231	0.24	0.18	0.05	0.9	55
12	0.8	0.264	0.24	0.21	0.03	0.6	60
13	0.8	0.264	0.24	0.21	0.03	0.6	65
14	0.8	0.264	0.24	0.21	0.03	0.6	70
15	0.8	0.264	0.24	0.21	0.03	0.6	75
16	0.8	0.264	0.24	0.21	0.03	0.6	80
17	0.8	0.264	0.24	0.21	0.03	0.6	85
18	0.8	0.264	0.24	0.21	0.03	0.6	90
19	0.8	0.264	0.24	0.21	0.03	0.6	95
20	0.8	0.264	0.24	0.21	0.03	0.6	100
21	0.8	0.264	0.24	0.21	0.03	0.6	105
22	0.8	0.264	0.24	0.21	0.03	0.6	110
23	0.8	0.264	0.24	0.21	0.03	0.6	115
24	0.9	0.297	0.24	0.24	0.06	1.2	120
25	0.8	0.264	0.24	0.21	0.03	0.6	125
26	0.9	0.297	0.24	0.24	0.06	1.2	130
27	0.9	0.297	0.24	0.24	0.06	1.2	135
28	0.9	0.297	0.24	0.24	0.06	1.2	140
29	0.9	0.297	0.24	0.24	0.06	1.2	145
30	0.9	0.297	0.24	0.24	0.06	1.2	150
31	0.9	0.297	0.24	0.24	0.06	1.2	155
32	0.9	0.297	0.24	0.24	0.06	1.2	160
33	1	0.330	0.24	0.26	0.09	1.9	165
34	1	0.330	0.24	0.26	0.09	1.9	170
35	1	0.330	0.24	0.26	0.09	1.9	175
36	1	0.330	0.24	0.26	0.09	1.9	180
37	1	0.330	0.24	0.26	0.09	1.9	185
38	1.1	0.363	0.24	0.29	0.13	2.5	190
39	1.1	0.363	0.24	0.29	0.13	2.5	195
40	1.1	0.363	0.24	0.29	0.13	2.5	200
41	1.2	0.396	0.24	0.32	0.16	3.1	205
42	1.3	0.429	0.24	0.34	0.19	3.8	210
43	1.4	0.462	0.24	0.37	0.23	4.4	215
44	1.4	0.462	0.24	0.37	0.23	4.4	220
45	1.5	0.495	0.24	0.40	0.26	5.1	225
46	1.5	0.495	0.24	0.40	0.26	5.1	230
47	1.6	0.528	0.24	0.42	0.29	5.7	235
48	1.6	0.528	0.24	0.42	0.29	5.7	240
49	1.7	0.561	0.24	0.45	0.33	6.4	245
50	1.8	0.594	0.24	0.48	0.36	7.0	250
51	1.9	0.627	0.24	0.50	0.39	7.6	255
52	2	0.660	0.24	0.53	0.42	8.3	260
53	2.1	0.693	0.24	0.55	0.46	8.9	265
54	2.1	0.693	0.24	0.55	0.46	8.9	270
55	2.2	0.726	0.24	0.58	0.49	9.6	275
56	2.3	0.759	0.24	0.61	0.52	10.2	280
57	2.4	0.792	0.24	0.63	0.56	10.9	285
58	2.4	0.792	0.24	0.63	0.56	10.9	290
59	2.5	0.825	0.24	0.66	0.59	11.5	295
60	2.6	0.858	0.24	0.69	0.62	12.1	300
61	3.1	1.023	0.24	0.82	0.79	15.4	305
62	3.6	1.188	0.24	0.95	0.95	18.6	310
63	3.9	1.287	0.24	1.03	1.05	20.5	315

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

64	4.2	1.386	0.24	1.11	1.15	22.4	320
65	4.7	1.551	0.24	1.24	1.32	25.7	325
66	5.6	1.848	0.24	1.48	1.61	31.5	330
67	1.9	0.627	0.24	0.50	0.39	7.6	335
68	0.9	0.297	0.24	0.24	0.06	1.2	340
69	0.6	0.198	0.24	0.16	0.04	0.8	345
70	0.5	0.165	0.24	0.13	0.03	0.6	350
71	0.3	0.099	0.24	0.08	0.02	0.4	355
72	0.2	0.066	0.24	0.05	0.01	0.3	360
	100				17.31	in/hr	
					1.44	in	
					2.34	ac-ft	

Lake Area - acres	0.96
Lake normal WSE	957
Lake 100yr WSE	959.4



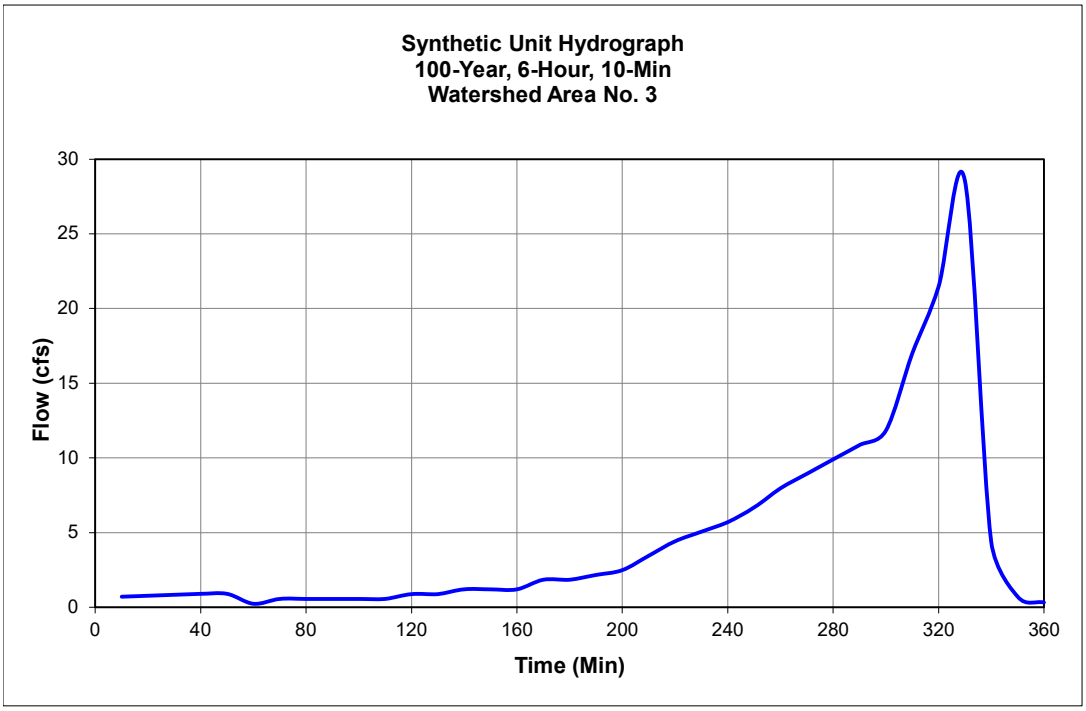
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	3	
Drainage Area - acres	19.5	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.24	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.1	0.182	0.24	0.15	0.04	0.7	10
2	1.2	0.198	0.24	0.16	0.04	0.8	20
3	1.3	0.215	0.24	0.17	0.04	0.8	30
4	1.4	0.231	0.24	0.18	0.05	0.9	40
5	1.4	0.231	0.24	0.18	0.05	0.9	50
6	1.5	0.248	0.24	0.20	0.01	0.2	60
7	1.6	0.264	0.24	0.21	0.03	0.6	70
8	1.6	0.264	0.24	0.21	0.03	0.6	80
9	1.6	0.264	0.24	0.21	0.03	0.6	90
10	1.6	0.264	0.24	0.21	0.03	0.6	100
11	1.6	0.264	0.24	0.21	0.03	0.6	110
12	1.7	0.281	0.24	0.22	0.05	0.9	120
13	1.7	0.281	0.24	0.22	0.05	0.9	130
14	1.8	0.297	0.24	0.24	0.06	1.2	140
15	1.8	0.297	0.24	0.24	0.06	1.2	150
16	1.8	0.297	0.24	0.24	0.06	1.2	160
17	2	0.330	0.24	0.26	0.09	1.9	170
18	2	0.330	0.24	0.26	0.09	1.9	180
19	2.1	0.347	0.24	0.28	0.11	2.2	190
20	2.2	0.363	0.24	0.29	0.13	2.5	200
21	2.5	0.413	0.24	0.33	0.18	3.5	210
22	2.8	0.462	0.24	0.37	0.23	4.4	220
23	3	0.495	0.24	0.40	0.26	5.1	230
24	3.2	0.528	0.24	0.42	0.29	5.7	240
25	3.5	0.578	0.24	0.46	0.34	6.7	250
26	3.9	0.644	0.24	0.51	0.41	8.0	260
27	4.2	0.693	0.24	0.55	0.46	8.9	270
28	4.5	0.743	0.24	0.59	0.51	9.9	280
29	4.8	0.792	0.24	0.63	0.56	10.9	290
30	5.1	0.842	0.24	0.67	0.61	11.8	300
31	6.7	1.106	0.24	0.88	0.87	17.0	310
32	8.1	1.337	0.24	1.07	1.10	21.5	320
33	10.3	1.700	0.24	1.36	1.46	28.6	330
34	2.8	0.462	0.24	0.37	0.23	4.4	340
35	1.1	0.182	0.24	0.15	0.04	0.7	350
36	0.5	0.083	0.24	0.07	0.02	0.3	360
	100				8.63	in/hr	
					1.44	in	
					2.34	ac-ft	

Lake Area - acres	0.96
Lake normal WSE	957
Lake 100yr WSE	959.4

Riverside County
Synthetic Unit Hydrograph
Short Cut Method



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

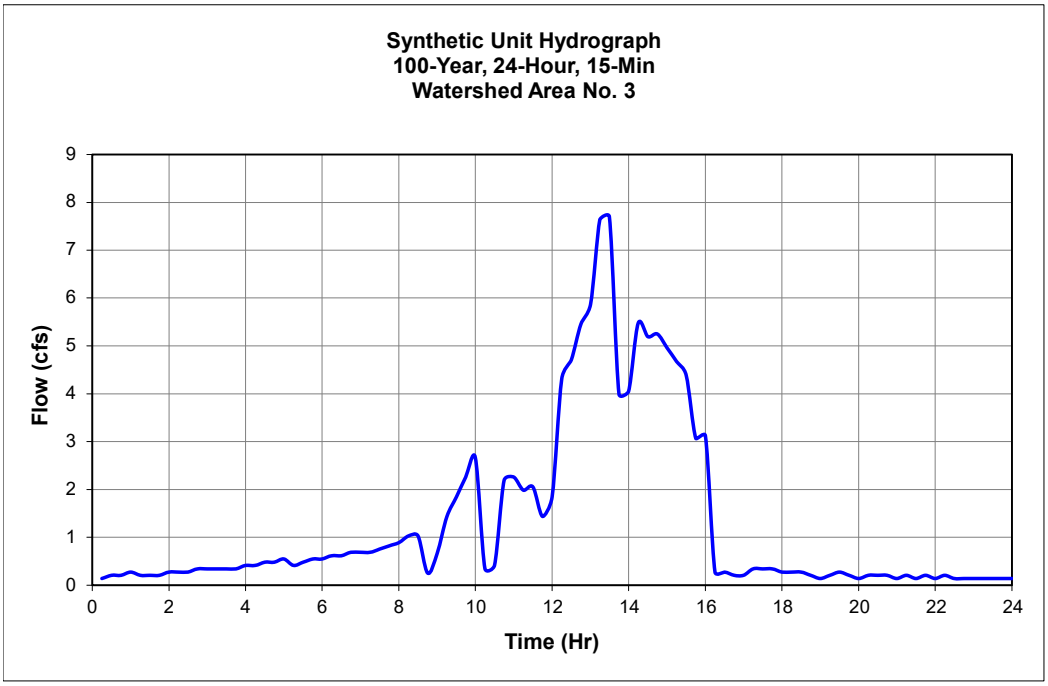
Watershed Area Designation	3	
Drainage Area - acres	19.5	
Unit Time - minutes	15	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	24
Total Adjusted Storm Rain-Inches	4.39	
Constant Loss Rate - in/hr	per calc	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (hr)
1	0.2	0.035	0.42	0.03	0.01	0.1	0.25
2	0.3	0.053	0.41	0.04	0.01	0.2	0.5
3	0.3	0.053	0.41	0.04	0.01	0.2	0.75
4	0.4	0.070	0.40	0.06	0.01	0.3	1
5	0.3	0.053	0.40	0.04	0.01	0.2	1.25
6	0.3	0.053	0.39	0.04	0.01	0.2	1.5
7	0.3	0.053	0.39	0.04	0.01	0.2	1.75
8	0.4	0.070	0.38	0.06	0.01	0.3	2
9	0.4	0.070	0.38	0.06	0.01	0.3	2.25
10	0.4	0.070	0.37	0.06	0.01	0.3	2.5
11	0.5	0.088	0.37	0.07	0.02	0.3	2.75
12	0.5	0.088	0.36	0.07	0.02	0.3	3
13	0.5	0.088	0.36	0.07	0.02	0.3	3.25
14	0.5	0.088	0.35	0.07	0.02	0.3	3.5
15	0.5	0.088	0.35	0.07	0.02	0.3	3.75
16	0.6	0.105	0.35	0.08	0.02	0.4	4
17	0.6	0.105	0.34	0.08	0.02	0.4	4.25
18	0.7	0.123	0.34	0.10	0.02	0.5	4.5
19	0.7	0.123	0.33	0.10	0.02	0.5	4.75
20	0.8	0.140	0.33	0.11	0.03	0.5	5
21	0.6	0.105	0.32	0.08	0.02	0.4	5.25
22	0.7	0.123	0.32	0.10	0.02	0.5	5.5
23	0.8	0.140	0.32	0.11	0.03	0.5	5.75
24	0.8	0.140	0.31	0.11	0.03	0.5	6
25	0.9	0.158	0.31	0.13	0.03	0.6	6.25
26	0.9	0.158	0.30	0.13	0.03	0.6	6.5
27	1	0.176	0.30	0.14	0.04	0.7	6.75
28	1	0.176	0.30	0.14	0.04	0.7	7
29	1	0.176	0.29	0.14	0.04	0.7	7.25
30	1.1	0.193	0.29	0.15	0.04	0.8	7.5
31	1.2	0.211	0.28	0.17	0.04	0.8	7.75
32	1.3	0.228	0.28	0.18	0.05	0.9	8
33	1.5	0.263	0.28	0.21	0.05	1.0	8.25
34	1.5	0.263	0.27	0.21	0.05	1.0	8.5
35	1.6	0.281	0.27	0.22	0.01	0.3	8.75
36	1.7	0.299	0.26	0.24	0.03	0.7	9
37	1.9	0.334	0.26	0.27	0.07	1.4	9.25
38	2	0.351	0.26	0.28	0.09	1.8	9.5
39	2.1	0.369	0.25	0.30	0.12	2.3	9.75
40	2.2	0.386	0.25	0.31	0.14	2.7	10
41	1.5	0.263	0.25	0.21	0.02	0.3	10.25
42	1.5	0.263	0.24	0.21	0.02	0.4	10.5
43	2	0.351	0.24	0.28	0.11	2.2	10.75
44	2	0.351	0.24	0.28	0.12	2.3	11
45	1.9	0.334	0.23	0.27	0.10	2.0	11.25
46	1.9	0.334	0.23	0.27	0.11	2.1	11.5
47	1.7	0.299	0.22	0.24	0.07	1.4	11.75
48	1.8	0.316	0.22	0.25	0.09	1.8	12
49	2.5	0.439	0.22	0.35	0.22	4.3	12.25
50	2.6	0.457	0.22	0.37	0.24	4.7	12.5
51	2.8	0.492	0.21	0.39	0.28	5.5	12.75
52	2.9	0.509	0.21	0.41	0.30	5.9	13
53	3.4	0.597	0.21	0.48	0.39	7.6	13.25
54	3.4	0.597	0.20	0.48	0.39	7.7	13.5
55	2.3	0.404	0.20	0.32	0.20	4.0	13.75
56	2.3	0.404	0.20	0.32	0.21	4.0	14
57	2.7	0.474	0.19	0.38	0.28	5.5	14.25
58	2.6	0.457	0.19	0.37	0.27	5.2	14.5
59	2.6	0.457	0.19	0.37	0.27	5.2	14.75
60	2.5	0.439	0.18	0.35	0.25	5.0	15
61	2.4	0.421	0.18	0.34	0.24	4.7	15.25
62	2.3	0.404	0.18	0.32	0.22	4.4	15.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

63	1.9	0.334	0.18	0.27	0.16	3.1	15.75
64	1.9	0.334	0.17	0.27	0.16	3.1	16
65	0.4	0.070	0.17	0.06	0.01	0.3	16.25
66	0.4	0.070	0.17	0.06	0.01	0.3	16.5
67	0.3	0.053	0.17	0.04	0.01	0.2	16.75
68	0.3	0.053	0.16	0.04	0.01	0.2	17
69	0.5	0.088	0.16	0.07	0.02	0.3	17.25
70	0.5	0.088	0.16	0.07	0.02	0.3	17.5
71	0.5	0.088	0.16	0.07	0.02	0.3	17.75
72	0.4	0.070	0.15	0.06	0.01	0.3	18
73	0.4	0.070	0.15	0.06	0.01	0.3	18.25
74	0.4	0.070	0.15	0.06	0.01	0.3	18.5
75	0.3	0.053	0.15	0.04	0.01	0.2	18.75
76	0.2	0.035	0.14	0.03	0.01	0.1	19
77	0.3	0.053	0.14	0.04	0.01	0.2	19.25
78	0.4	0.070	0.14	0.06	0.01	0.3	19.5
79	0.3	0.053	0.14	0.04	0.01	0.2	19.75
80	0.2	0.035	0.14	0.03	0.01	0.1	20
81	0.3	0.053	0.14	0.04	0.01	0.2	20.25
82	0.3	0.053	0.13	0.04	0.01	0.2	20.5
83	0.3	0.053	0.13	0.04	0.01	0.2	20.75
84	0.2	0.035	0.13	0.03	0.01	0.1	21
85	0.3	0.053	0.13	0.04	0.01	0.2	21.25
86	0.2	0.035	0.13	0.03	0.01	0.1	21.5
87	0.3	0.053	0.13	0.04	0.01	0.2	21.75
88	0.2	0.035	0.12	0.03	0.01	0.1	22
89	0.3	0.053	0.12	0.04	0.01	0.2	22.25
90	0.2	0.035	0.12	0.03	0.01	0.1	22.5
91	0.2	0.035	0.12	0.03	0.01	0.1	22.75
92	0.2	0.035	0.12	0.03	0.01	0.1	23
93	0.2	0.035	0.12	0.03	0.01	0.1	23.25
94	0.2	0.035	0.12	0.03	0.01	0.1	23.5
95	0.2	0.035	0.12	0.03	0.01	0.1	23.75
96	0.2	0.035	0.12	0.03	0.01	0.1	24
	100				6.37	in/hr	
					1.59	in	
					2.59	ac-ft	

Lake Area - acres	0.96
Lake normal WSE	957
Lake 100yr WSE	959.7



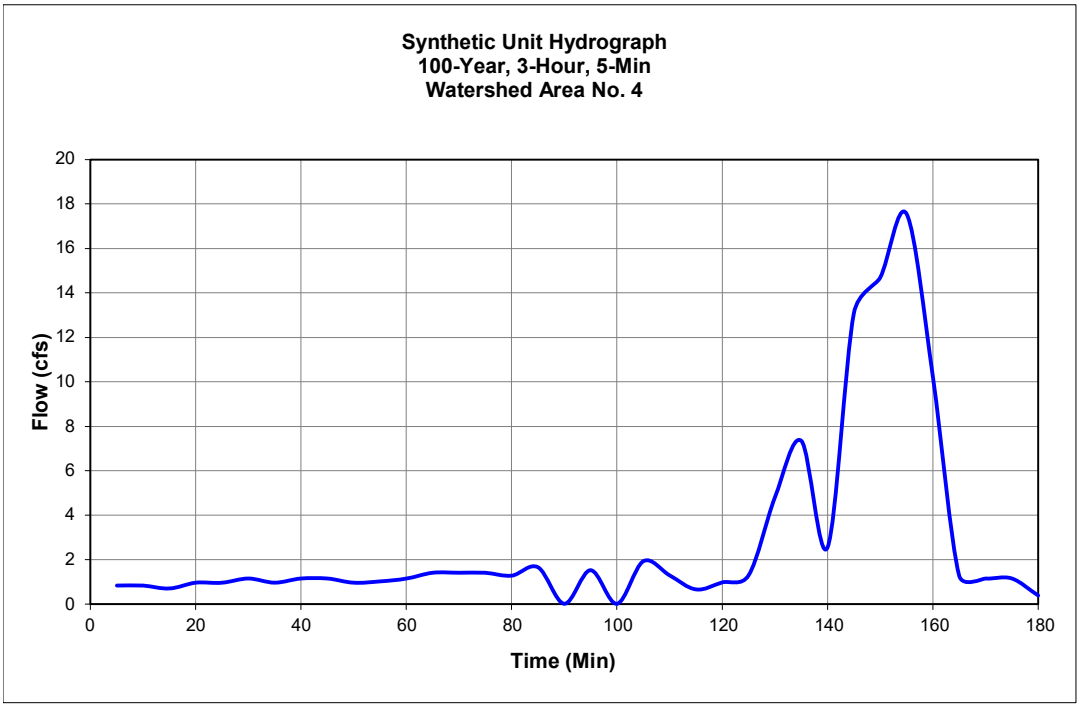
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	4	
Drainage Area - acres	33.2	
Unit Time - minutes	5	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.26	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.3	0.351	0.26	0.28	0.09	3.1	5
2	1.3	0.351	0.26	0.28	0.09	3.1	10
3	1.1	0.297	0.26	0.24	0.04	1.3	15
4	1.5	0.405	0.26	0.32	0.15	4.9	20
5	1.5	0.405	0.26	0.32	0.15	4.9	25
6	1.8	0.486	0.26	0.39	0.23	7.5	30
7	1.5	0.405	0.26	0.32	0.15	4.9	35
8	1.8	0.486	0.26	0.39	0.23	7.5	40
9	1.8	0.486	0.26	0.39	0.23	7.5	45
10	1.5	0.405	0.26	0.32	0.15	4.9	50
11	1.6	0.432	0.26	0.35	0.17	5.8	55
12	1.8	0.486	0.26	0.39	0.23	7.5	60
13	2.2	0.594	0.26	0.48	0.34	11.1	65
14	2.2	0.594	0.26	0.48	0.34	11.1	70
15	2.2	0.594	0.26	0.48	0.34	11.1	75
16	2	0.540	0.26	0.43	0.28	9.3	80
17	2.6	0.702	0.26	0.56	0.44	14.7	85
18	2.7	0.729	0.26	0.58	0.47	15.6	90
19	2.4	0.648	0.26	0.52	0.39	12.9	95
20	2.7	0.729	0.26	0.58	0.47	15.6	100
21	3.3	0.891	0.26	0.71	0.63	21.0	105
22	3.1	0.837	0.26	0.67	0.58	19.2	110
23	2.9	0.783	0.26	0.63	0.52	17.4	115
24	3	0.810	0.26	0.65	0.55	18.3	120
25	3.1	0.837	0.26	0.67	0.58	19.2	125
26	4.2	1.134	0.26	0.91	0.88	29.1	130
27	5	1.350	0.26	1.08	1.09	36.2	135
28	3.5	0.945	0.26	0.76	0.69	22.8	140
29	6.8	1.836	0.26	1.47	1.58	52.4	145
30	7.3	1.971	0.26	1.58	1.71	56.8	150
31	8.2	2.214	0.26	1.77	1.96	64.9	155
32	5.9	1.593	0.26	1.27	1.33	44.3	160
33	2	0.540	0.26	0.43	0.28	9.3	165
34	1.8	0.486	0.26	0.39	0.23	7.5	170
35	1.8	0.486	0.26	0.39	0.23	7.5	175
36	0.6	0.162	0.26	0.13	0.03	1.1	180
	100				17.82	in/hr	
					1.48	in	
					4.11	ac-ft	

Lake Area - acres	0.75
Lake normal WSE	957
Lake 100yr WSE	962.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

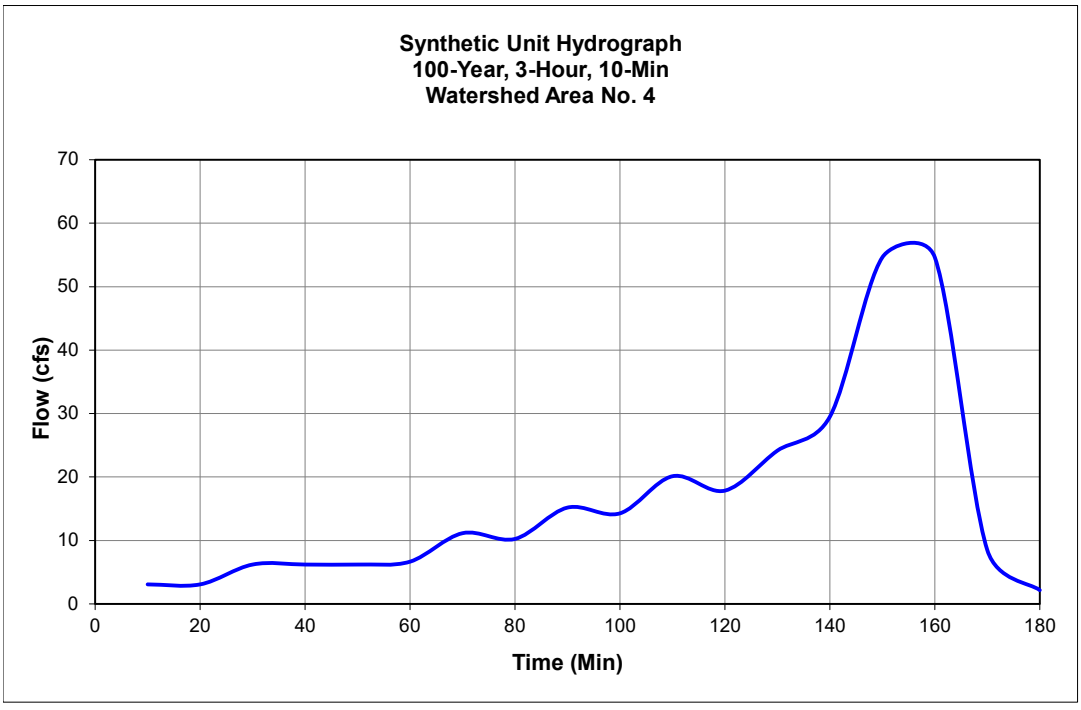


Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	4	
Drainage Area - acres	33.2	
Unit Time - minutes	10	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.26	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	2.6	0.351	0.26	0.28	0.09	3.1	10
2	2.6	0.351	0.26	0.28	0.09	3.1	20
3	3.3	0.446	0.26	0.36	0.19	6.2	30
4	3.3	0.446	0.26	0.36	0.19	6.2	40
5	3.3	0.446	0.26	0.36	0.19	6.2	50
6	3.4	0.459	0.26	0.37	0.20	6.6	60
7	4.4	0.594	0.26	0.48	0.34	11.1	70
8	4.2	0.567	0.26	0.45	0.31	10.2	80
9	5.3	0.716	0.26	0.57	0.46	15.2	90
10	5.1	0.689	0.26	0.55	0.43	14.3	100
11	6.4	0.864	0.26	0.69	0.61	20.1	110
12	5.9	0.797	0.26	0.64	0.54	17.9	120
13	7.3	0.986	0.26	0.79	0.73	24.1	130
14	8.5	1.148	0.26	0.92	0.89	29.5	140
15	14.1	1.904	0.26	1.52	1.64	54.6	150
16	14.1	1.904	0.26	1.52	1.64	54.6	160
17	3.8	0.513	0.26	0.41	0.25	8.4	170
18	2.4	0.324	0.26	0.26	0.07	2.2	180
	100				8.84	in/hr	
					1.47	in	
					4.08	ac-ft	

Lake Area - acres	0.75
Lake normal WSE	957
Lake 100yr WSE	962.4



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

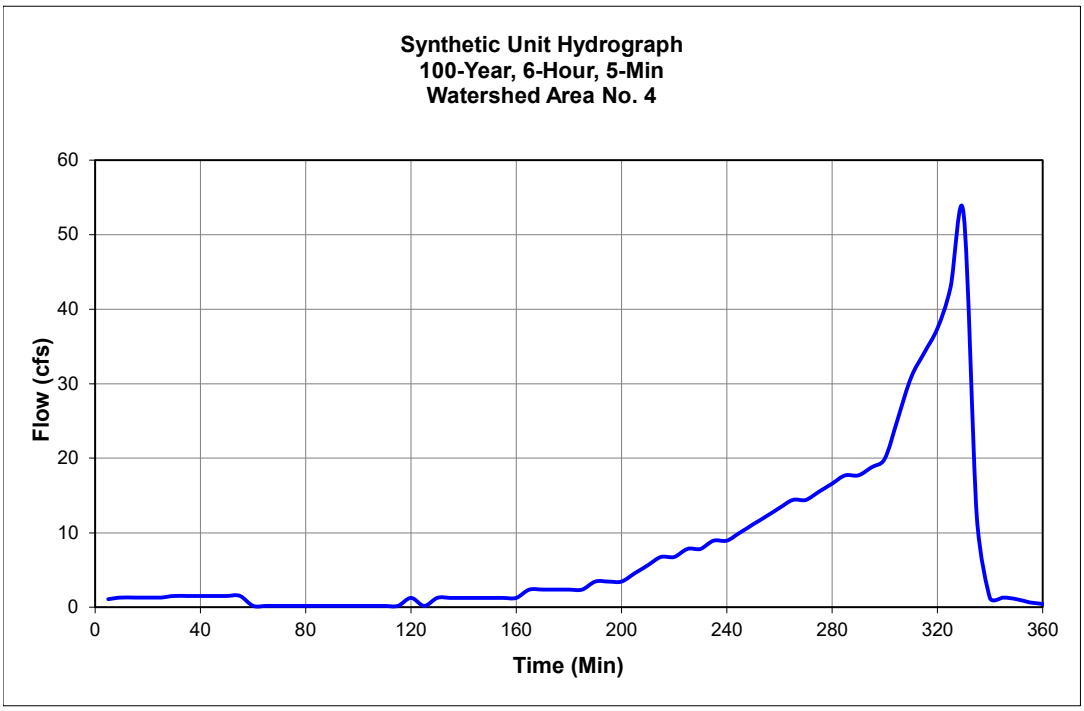
Watersehd Area Designation	4	
Drainage Area - acres	33.2	
Unit Time - minutes	5	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.26	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	0.5	0.165	0.26	0.13	0.03	1.1	5
2	0.6	0.198	0.26	0.16	0.04	1.3	10
3	0.6	0.198	0.26	0.16	0.04	1.3	15
4	0.6	0.198	0.26	0.16	0.04	1.3	20
5	0.6	0.198	0.26	0.16	0.04	1.3	25
6	0.7	0.231	0.26	0.18	0.05	1.5	30
7	0.7	0.231	0.26	0.18	0.05	1.5	35
8	0.7	0.231	0.26	0.18	0.05	1.5	40
9	0.7	0.231	0.26	0.18	0.05	1.5	45
10	0.7	0.231	0.26	0.18	0.05	1.5	50
11	0.7	0.231	0.26	0.18	0.05	1.5	55
12	0.8	0.264	0.26	0.21	0.01	0.2	60
13	0.8	0.264	0.26	0.21	0.01	0.2	65
14	0.8	0.264	0.26	0.21	0.01	0.2	70
15	0.8	0.264	0.26	0.21	0.01	0.2	75
16	0.8	0.264	0.26	0.21	0.01	0.2	80
17	0.8	0.264	0.26	0.21	0.01	0.2	85
18	0.8	0.264	0.26	0.21	0.01	0.2	90
19	0.8	0.264	0.26	0.21	0.01	0.2	95
20	0.8	0.264	0.26	0.21	0.01	0.2	100
21	0.8	0.264	0.26	0.21	0.01	0.2	105
22	0.8	0.264	0.26	0.21	0.01	0.2	110
23	0.8	0.264	0.26	0.21	0.01	0.2	115
24	0.9	0.297	0.26	0.24	0.04	1.3	120
25	0.8	0.264	0.26	0.21	0.01	0.2	125
26	0.9	0.297	0.26	0.24	0.04	1.3	130
27	0.9	0.297	0.26	0.24	0.04	1.3	135
28	0.9	0.297	0.26	0.24	0.04	1.3	140
29	0.9	0.297	0.26	0.24	0.04	1.3	145
30	0.9	0.297	0.26	0.24	0.04	1.3	150
31	0.9	0.297	0.26	0.24	0.04	1.3	155
32	0.9	0.297	0.26	0.24	0.04	1.3	160
33	1	0.330	0.26	0.26	0.07	2.4	165
34	1	0.330	0.26	0.26	0.07	2.4	170
35	1	0.330	0.26	0.26	0.07	2.4	175
36	1	0.330	0.26	0.26	0.07	2.4	180
37	1	0.330	0.26	0.26	0.07	2.4	185
38	1.1	0.363	0.26	0.29	0.10	3.5	190
39	1.1	0.363	0.26	0.29	0.10	3.5	195
40	1.1	0.363	0.26	0.29	0.10	3.5	200
41	1.2	0.396	0.26	0.32	0.14	4.6	205
42	1.3	0.429	0.26	0.34	0.17	5.7	210
43	1.4	0.462	0.26	0.37	0.20	6.7	215
44	1.4	0.462	0.26	0.37	0.20	6.7	220
45	1.5	0.495	0.26	0.40	0.24	7.8	225
46	1.5	0.495	0.26	0.40	0.24	7.8	230
47	1.6	0.528	0.26	0.42	0.27	8.9	235
48	1.6	0.528	0.26	0.42	0.27	8.9	240
49	1.7	0.561	0.26	0.45	0.30	10.0	245
50	1.8	0.594	0.26	0.48	0.34	11.1	250
51	1.9	0.627	0.26	0.50	0.37	12.2	255
52	2	0.660	0.26	0.53	0.40	13.3	260
53	2.1	0.693	0.26	0.55	0.43	14.4	265
54	2.1	0.693	0.26	0.55	0.43	14.4	270
55	2.2	0.726	0.26	0.58	0.47	15.5	275
56	2.3	0.759	0.26	0.61	0.50	16.6	280
57	2.4	0.792	0.26	0.63	0.53	17.7	285
58	2.4	0.792	0.26	0.63	0.53	17.7	290
59	2.5	0.825	0.26	0.66	0.57	18.8	295
60	2.6	0.858	0.26	0.69	0.60	19.9	300
61	3.1	1.023	0.26	0.82	0.76	25.4	305
62	3.6	1.188	0.26	0.95	0.93	30.9	310
63	3.9	1.287	0.26	1.03	1.03	34.1	315

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

64	4.2	1.386	0.26	1.11	1.13	37.4	320
65	4.7	1.551	0.26	1.24	1.29	42.9	325
66	5.6	1.848	0.26	1.48	1.59	52.8	330
67	1.9	0.627	0.26	0.50	0.37	12.2	335
68	0.9	0.297	0.26	0.24	0.04	1.3	340
69	0.6	0.198	0.26	0.16	0.04	1.3	345
70	0.5	0.165	0.26	0.13	0.03	1.1	350
71	0.3	0.099	0.26	0.08	0.02	0.7	355
72	0.2	0.066	0.26	0.05	0.01	0.4	360
	100				15.96	in/hr	
					1.33	in	
					3.68	ac-ft	

Lake Area - acres	0.75
Lake normal WSE	957
Lake 100yr WSE	961.9



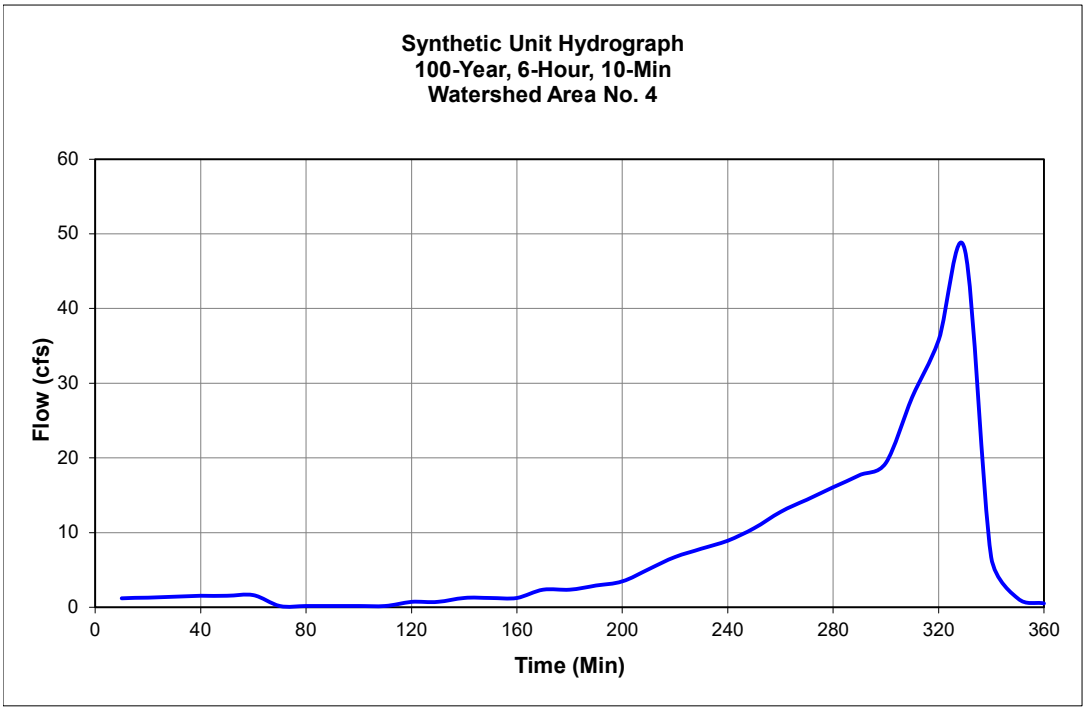
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	4	
Drainage Area - acres	33.2	
Unit Time - minutes	10	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.26	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.1	0.182	0.26	0.15	0.04	1.2	10
2	1.2	0.198	0.26	0.16	0.04	1.3	20
3	1.3	0.215	0.26	0.17	0.04	1.4	30
4	1.4	0.231	0.26	0.18	0.05	1.5	40
5	1.4	0.231	0.26	0.18	0.05	1.5	50
6	1.5	0.248	0.26	0.20	0.05	1.6	60
7	1.6	0.264	0.26	0.21	0.01	0.2	70
8	1.6	0.264	0.26	0.21	0.01	0.2	80
9	1.6	0.264	0.26	0.21	0.01	0.2	90
10	1.6	0.264	0.26	0.21	0.01	0.2	100
11	1.6	0.264	0.26	0.21	0.01	0.2	110
12	1.7	0.281	0.26	0.22	0.02	0.7	120
13	1.7	0.281	0.26	0.22	0.02	0.7	130
14	1.8	0.297	0.26	0.24	0.04	1.3	140
15	1.8	0.297	0.26	0.24	0.04	1.3	150
16	1.8	0.297	0.26	0.24	0.04	1.3	160
17	2	0.330	0.26	0.26	0.07	2.4	170
18	2	0.330	0.26	0.26	0.07	2.4	180
19	2.1	0.347	0.26	0.28	0.09	2.9	190
20	2.2	0.363	0.26	0.29	0.10	3.5	200
21	2.5	0.413	0.26	0.33	0.15	5.1	210
22	2.8	0.462	0.26	0.37	0.20	6.7	220
23	3	0.495	0.26	0.40	0.24	7.8	230
24	3.2	0.528	0.26	0.42	0.27	8.9	240
25	3.5	0.578	0.26	0.46	0.32	10.6	250
26	3.9	0.644	0.26	0.51	0.38	12.8	260
27	4.2	0.693	0.26	0.55	0.43	14.4	270
28	4.5	0.743	0.26	0.59	0.48	16.1	280
29	4.8	0.792	0.26	0.63	0.53	17.7	290
30	5.1	0.842	0.26	0.67	0.58	19.3	300
31	6.7	1.106	0.26	0.88	0.85	28.1	310
32	8.1	1.337	0.26	1.07	1.08	35.8	320
33	10.3	1.700	0.26	1.36	1.44	47.8	330
34	2.8	0.462	0.26	0.37	0.20	6.7	340
35	1.1	0.182	0.26	0.15	0.04	1.2	350
36	0.5	0.083	0.26	0.07	0.02	0.5	360
	100				8.00	in/hr	
					1.33	in	
					3.69	ac-ft	

Lake Area - acres	0.75
Lake normal WSE	957
Lake 100yr WSE	961.9

Riverside County
Synthetic Unit Hydrograph
Short Cut Method



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

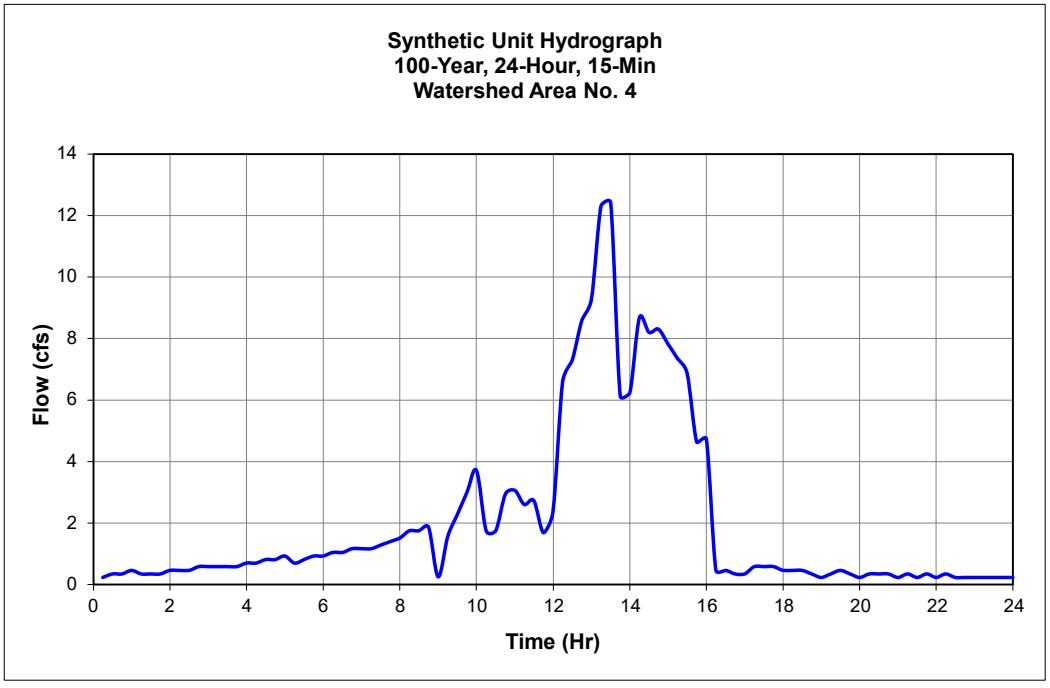
Watershed Area Designation	4	
Drainage Area - acres	33.2	
Unit Time - minutes	15	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	24
Total Adjusted Storm Rain-Inches	4.39	
Constant Loss Rate - in/hr	per calc	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (hr)
1	0.2	0.035	0.46	0.03	0.01	0.2	0.25
2	0.3	0.053	0.45	0.04	0.01	0.3	0.5
3	0.3	0.053	0.45	0.04	0.01	0.3	0.75
4	0.4	0.070	0.44	0.06	0.01	0.5	1
5	0.3	0.053	0.44	0.04	0.01	0.3	1.25
6	0.3	0.053	0.43	0.04	0.01	0.3	1.5
7	0.3	0.053	0.43	0.04	0.01	0.3	1.75
8	0.4	0.070	0.42	0.06	0.01	0.5	2
9	0.4	0.070	0.42	0.06	0.01	0.5	2.25
10	0.4	0.070	0.41	0.06	0.01	0.5	2.5
11	0.5	0.088	0.41	0.07	0.02	0.6	2.75
12	0.5	0.088	0.40	0.07	0.02	0.6	3
13	0.5	0.088	0.40	0.07	0.02	0.6	3.25
14	0.5	0.088	0.39	0.07	0.02	0.6	3.5
15	0.5	0.088	0.39	0.07	0.02	0.6	3.75
16	0.6	0.105	0.38	0.08	0.02	0.7	4
17	0.6	0.105	0.38	0.08	0.02	0.7	4.25
18	0.7	0.123	0.37	0.10	0.02	0.8	4.5
19	0.7	0.123	0.37	0.10	0.02	0.8	4.75
20	0.8	0.140	0.36	0.11	0.03	0.9	5
21	0.6	0.105	0.36	0.08	0.02	0.7	5.25
22	0.7	0.123	0.35	0.10	0.02	0.8	5.5
23	0.8	0.140	0.35	0.11	0.03	0.9	5.75
24	0.8	0.140	0.34	0.11	0.03	0.9	6
25	0.9	0.158	0.34	0.13	0.03	1.0	6.25
26	0.9	0.158	0.33	0.13	0.03	1.0	6.5
27	1	0.176	0.33	0.14	0.04	1.2	6.75
28	1	0.176	0.33	0.14	0.04	1.2	7
29	1	0.176	0.32	0.14	0.04	1.2	7.25
30	1.1	0.193	0.32	0.15	0.04	1.3	7.5
31	1.2	0.211	0.31	0.17	0.04	1.4	7.75
32	1.3	0.228	0.31	0.18	0.05	1.5	8
33	1.5	0.263	0.30	0.21	0.05	1.7	8.25
34	1.5	0.263	0.30	0.21	0.05	1.7	8.5
35	1.6	0.281	0.29	0.22	0.06	1.9	8.75
36	1.7	0.299	0.29	0.24	0.01	0.3	9
37	1.9	0.334	0.29	0.27	0.05	1.6	9.25
38	2	0.351	0.28	0.28	0.07	2.3	9.5
39	2.1	0.369	0.28	0.30	0.09	3.0	9.75
40	2.2	0.386	0.27	0.31	0.11	3.7	10
41	1.5	0.263	0.27	0.21	0.05	1.7	10.25
42	1.5	0.263	0.27	0.21	0.05	1.7	10.5
43	2	0.351	0.26	0.28	0.09	2.9	10.75
44	2	0.351	0.26	0.28	0.09	3.1	11
45	1.9	0.334	0.26	0.27	0.08	2.6	11.25
46	1.9	0.334	0.25	0.27	0.08	2.7	11.5
47	1.7	0.299	0.25	0.24	0.05	1.7	11.75
48	1.8	0.316	0.24	0.25	0.07	2.4	12
49	2.5	0.439	0.24	0.35	0.20	6.6	12.25
50	2.6	0.457	0.24	0.37	0.22	7.3	12.5
51	2.8	0.492	0.23	0.39	0.26	8.6	12.75
52	2.9	0.509	0.23	0.41	0.28	9.3	13
53	3.4	0.597	0.23	0.48	0.37	12.3	13.25
54	3.4	0.597	0.22	0.48	0.37	12.4	13.5
55	2.3	0.404	0.22	0.32	0.18	6.1	13.75
56	2.3	0.404	0.22	0.32	0.19	6.2	14
57	2.7	0.474	0.21	0.38	0.26	8.7	14.25
58	2.6	0.457	0.21	0.37	0.25	8.2	14.5
59	2.6	0.457	0.21	0.37	0.25	8.3	14.75
60	2.5	0.439	0.20	0.35	0.24	7.8	15
61	2.4	0.421	0.20	0.34	0.22	7.4	15.25
62	2.3	0.404	0.20	0.32	0.21	6.9	15.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

63	1.9	0.334	0.19	0.27	0.14	4.6	15.75
64	1.9	0.334	0.19	0.27	0.14	4.7	16
65	0.4	0.070	0.19	0.06	0.01	0.5	16.25
66	0.4	0.070	0.19	0.06	0.01	0.5	16.5
67	0.3	0.053	0.18	0.04	0.01	0.3	16.75
68	0.3	0.053	0.18	0.04	0.01	0.3	17
69	0.5	0.088	0.18	0.07	0.02	0.6	17.25
70	0.5	0.088	0.17	0.07	0.02	0.6	17.5
71	0.5	0.088	0.17	0.07	0.02	0.6	17.75
72	0.4	0.070	0.17	0.06	0.01	0.5	18
73	0.4	0.070	0.17	0.06	0.01	0.5	18.25
74	0.4	0.070	0.16	0.06	0.01	0.5	18.5
75	0.3	0.053	0.16	0.04	0.01	0.3	18.75
76	0.2	0.035	0.16	0.03	0.01	0.2	19
77	0.3	0.053	0.16	0.04	0.01	0.3	19.25
78	0.4	0.070	0.16	0.06	0.01	0.5	19.5
79	0.3	0.053	0.15	0.04	0.01	0.3	19.75
80	0.2	0.035	0.15	0.03	0.01	0.2	20
81	0.3	0.053	0.15	0.04	0.01	0.3	20.25
82	0.3	0.053	0.15	0.04	0.01	0.3	20.5
83	0.3	0.053	0.15	0.04	0.01	0.3	20.75
84	0.2	0.035	0.14	0.03	0.01	0.2	21
85	0.3	0.053	0.14	0.04	0.01	0.3	21.25
86	0.2	0.035	0.14	0.03	0.01	0.2	21.5
87	0.3	0.053	0.14	0.04	0.01	0.3	21.75
88	0.2	0.035	0.14	0.03	0.01	0.2	22
89	0.3	0.053	0.14	0.04	0.01	0.3	22.25
90	0.2	0.035	0.13	0.03	0.01	0.2	22.5
91	0.2	0.035	0.13	0.03	0.01	0.2	22.75
92	0.2	0.035	0.13	0.03	0.01	0.2	23
93	0.2	0.035	0.13	0.03	0.01	0.2	23.25
94	0.2	0.035	0.13	0.03	0.01	0.2	23.5
95	0.2	0.035	0.13	0.03	0.01	0.2	23.75
96	0.2	0.035	0.13	0.03	0.01	0.2	24
	100				5.89	in/hr	
					1.47	in	
					4.08	ac-ft	

Lake Area - acres	0.75
Lake normal WSE	957
Lake 100yr WSE	962.4



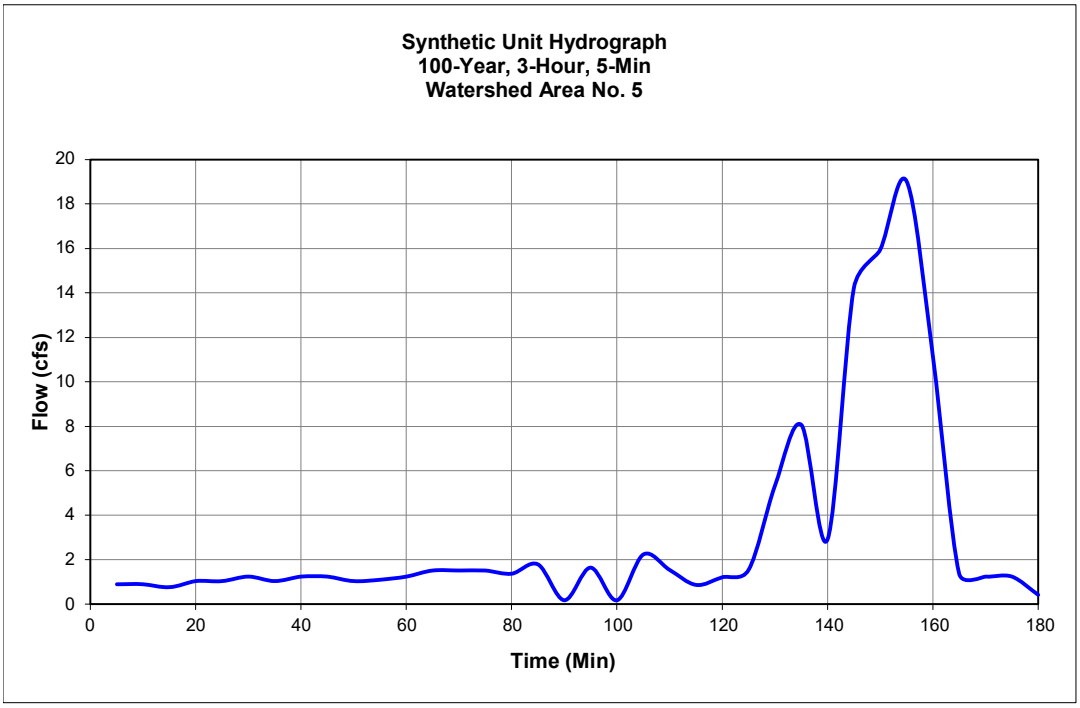
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	5	
Drainage Area - acres	35.7	
Unit Time - minutes	5	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.25	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.3	0.351	0.25	0.28	0.10	3.4	5
2	1.3	0.351	0.25	0.28	0.10	3.4	10
3	1.1	0.297	0.25	0.24	0.04	1.5	15
4	1.5	0.405	0.25	0.32	0.15	5.4	20
5	1.5	0.405	0.25	0.32	0.15	5.4	25
6	1.8	0.486	0.25	0.39	0.23	8.3	30
7	1.5	0.405	0.25	0.32	0.15	5.4	35
8	1.8	0.486	0.25	0.39	0.23	8.3	40
9	1.8	0.486	0.25	0.39	0.23	8.3	45
10	1.5	0.405	0.25	0.32	0.15	5.4	50
11	1.6	0.432	0.25	0.35	0.18	6.3	55
12	1.8	0.486	0.25	0.39	0.23	8.3	60
13	2.2	0.594	0.25	0.48	0.34	12.1	65
14	2.2	0.594	0.25	0.48	0.34	12.1	70
15	2.2	0.594	0.25	0.48	0.34	12.1	75
16	2	0.540	0.25	0.43	0.29	10.2	80
17	2.6	0.702	0.25	0.56	0.45	16.0	85
18	2.7	0.729	0.25	0.58	0.47	16.9	90
19	2.4	0.648	0.25	0.52	0.39	14.1	95
20	2.7	0.729	0.25	0.58	0.47	16.9	100
21	3.3	0.891	0.25	0.71	0.64	22.7	105
22	3.1	0.837	0.25	0.67	0.58	20.8	110
23	2.9	0.783	0.25	0.63	0.53	18.9	115
24	3	0.810	0.25	0.65	0.56	19.8	120
25	3.1	0.837	0.25	0.67	0.58	20.8	125
26	4.2	1.134	0.25	0.91	0.88	31.4	130
27	5	1.350	0.25	1.08	1.10	39.1	135
28	3.5	0.945	0.25	0.76	0.69	24.7	140
29	6.8	1.836	0.25	1.47	1.58	56.5	145
30	7.3	1.971	0.25	1.58	1.72	61.3	150
31	8.2	2.214	0.25	1.77	1.96	70.0	155
32	5.9	1.593	0.25	1.27	1.34	47.8	160
33	2	0.540	0.25	0.43	0.29	10.2	165
34	1.8	0.486	0.25	0.39	0.23	8.3	170
35	1.8	0.486	0.25	0.39	0.23	8.3	175
36	0.6	0.162	0.25	0.13	0.03	1.2	180
	100				17.97	in/hr	
					1.50	in	
					4.45	ac-ft	

Lake Area - acres	0
Lake normal WSE	955
Lake 100yr WSE	#DIV/0!

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

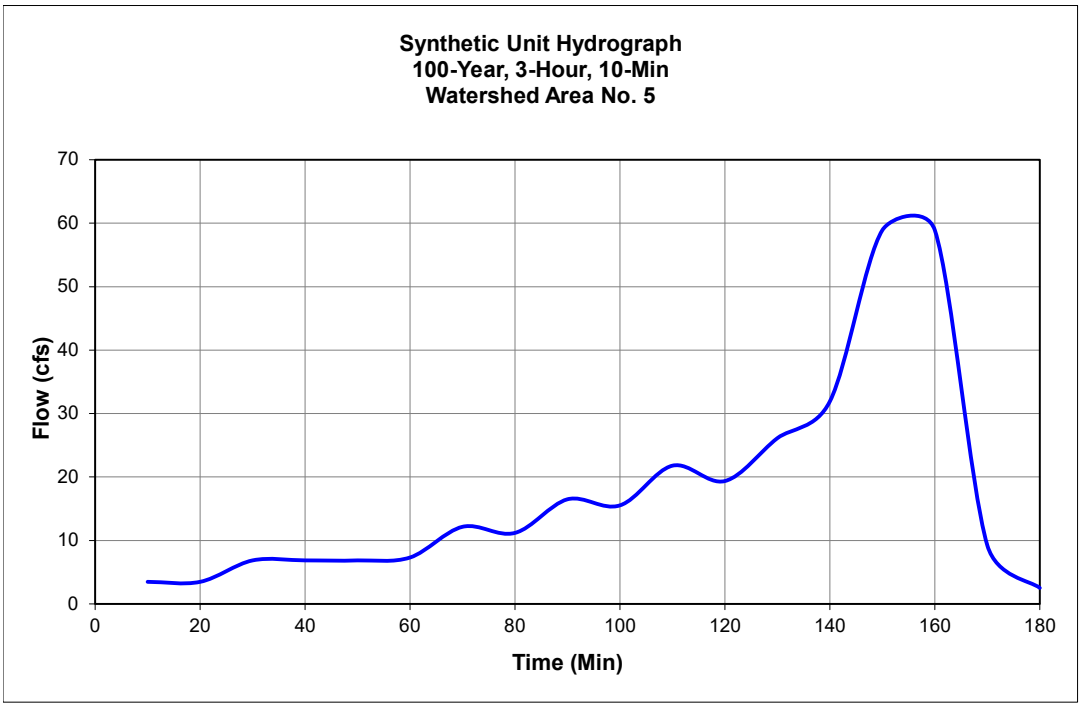


Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	5	
Drainage Area - acres	35.7	
Unit Time - minutes	10	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.25	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	2.6	0.351	0.25	0.28	0.10	3.4	10
2	2.6	0.351	0.25	0.28	0.10	3.4	20
3	3.3	0.446	0.25	0.36	0.19	6.8	30
4	3.3	0.446	0.25	0.36	0.19	6.8	40
5	3.3	0.446	0.25	0.36	0.19	6.8	50
6	3.4	0.459	0.25	0.37	0.20	7.3	60
7	4.4	0.594	0.25	0.48	0.34	12.1	70
8	4.2	0.567	0.25	0.45	0.31	11.2	80
9	5.3	0.716	0.25	0.57	0.46	16.5	90
10	5.1	0.689	0.25	0.55	0.43	15.5	100
11	6.4	0.864	0.25	0.69	0.61	21.8	110
12	5.9	0.797	0.25	0.64	0.54	19.4	120
13	7.3	0.986	0.25	0.79	0.73	26.1	130
14	8.5	1.148	0.25	0.92	0.89	31.9	140
15	14.1	1.904	0.25	1.52	1.65	58.9	150
16	14.1	1.904	0.25	1.52	1.65	58.9	160
17	3.8	0.513	0.25	0.41	0.26	9.2	170
18	2.4	0.324	0.25	0.26	0.07	2.5	180
	100				8.92	in/hr	
					1.49	in	
					4.42	ac-ft	

Lake Area - acres	0
Lake normal WSE	955
Lake 100yr WSE	#DIV/0!



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

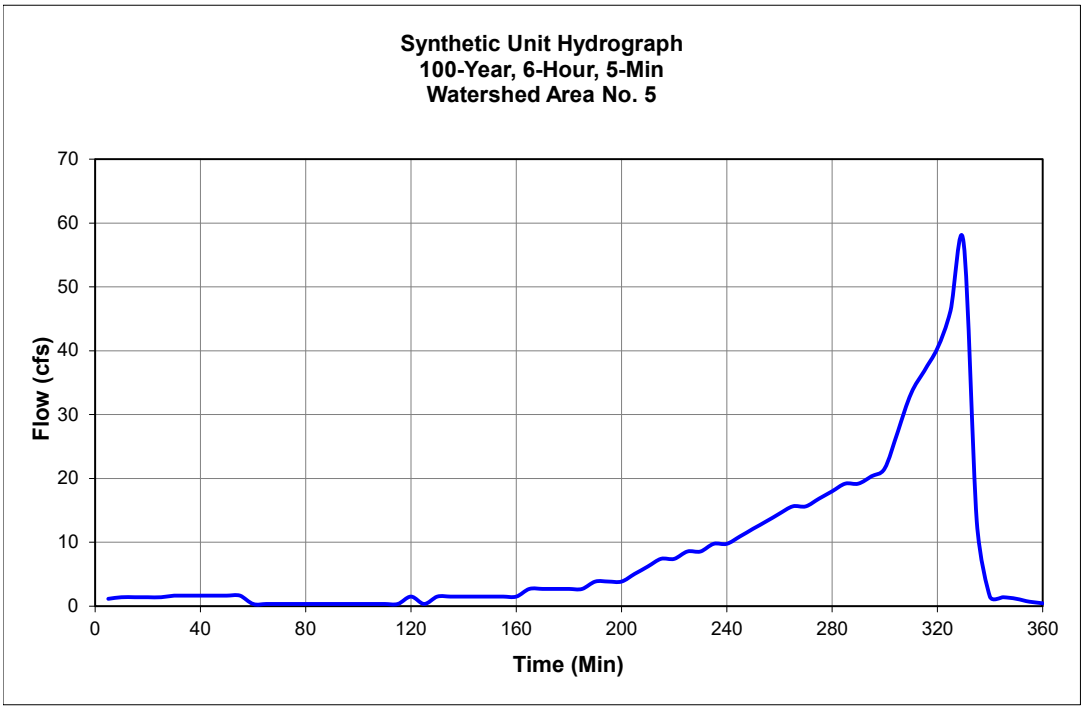
Watersehd Area Designation	5	
Drainage Area - acres	35.7	
Unit Time - minutes	5	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.25	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	0.5	0.165	0.25	0.13	0.03	1.2	5
2	0.6	0.198	0.25	0.16	0.04	1.4	10
3	0.6	0.198	0.25	0.16	0.04	1.4	15
4	0.6	0.198	0.25	0.16	0.04	1.4	20
5	0.6	0.198	0.25	0.16	0.04	1.4	25
6	0.7	0.231	0.25	0.18	0.05	1.6	30
7	0.7	0.231	0.25	0.18	0.05	1.6	35
8	0.7	0.231	0.25	0.18	0.05	1.6	40
9	0.7	0.231	0.25	0.18	0.05	1.6	45
10	0.7	0.231	0.25	0.18	0.05	1.6	50
11	0.7	0.231	0.25	0.18	0.05	1.6	55
12	0.8	0.264	0.25	0.21	0.01	0.3	60
13	0.8	0.264	0.25	0.21	0.01	0.3	65
14	0.8	0.264	0.25	0.21	0.01	0.3	70
15	0.8	0.264	0.25	0.21	0.01	0.3	75
16	0.8	0.264	0.25	0.21	0.01	0.3	80
17	0.8	0.264	0.25	0.21	0.01	0.3	85
18	0.8	0.264	0.25	0.21	0.01	0.3	90
19	0.8	0.264	0.25	0.21	0.01	0.3	95
20	0.8	0.264	0.25	0.21	0.01	0.3	100
21	0.8	0.264	0.25	0.21	0.01	0.3	105
22	0.8	0.264	0.25	0.21	0.01	0.3	110
23	0.8	0.264	0.25	0.21	0.01	0.3	115
24	0.9	0.297	0.25	0.24	0.04	1.5	120
25	0.8	0.264	0.25	0.21	0.01	0.3	125
26	0.9	0.297	0.25	0.24	0.04	1.5	130
27	0.9	0.297	0.25	0.24	0.04	1.5	135
28	0.9	0.297	0.25	0.24	0.04	1.5	140
29	0.9	0.297	0.25	0.24	0.04	1.5	145
30	0.9	0.297	0.25	0.24	0.04	1.5	150
31	0.9	0.297	0.25	0.24	0.04	1.5	155
32	0.9	0.297	0.25	0.24	0.04	1.5	160
33	1	0.330	0.25	0.26	0.08	2.7	165
34	1	0.330	0.25	0.26	0.08	2.7	170
35	1	0.330	0.25	0.26	0.08	2.7	175
36	1	0.330	0.25	0.26	0.08	2.7	180
37	1	0.330	0.25	0.26	0.08	2.7	185
38	1.1	0.363	0.25	0.29	0.11	3.9	190
39	1.1	0.363	0.25	0.29	0.11	3.9	195
40	1.1	0.363	0.25	0.29	0.11	3.9	200
41	1.2	0.396	0.25	0.32	0.14	5.1	205
42	1.3	0.429	0.25	0.34	0.17	6.2	210
43	1.4	0.462	0.25	0.37	0.21	7.4	215
44	1.4	0.462	0.25	0.37	0.21	7.4	220
45	1.5	0.495	0.25	0.40	0.24	8.6	225
46	1.5	0.495	0.25	0.40	0.24	8.6	230
47	1.6	0.528	0.25	0.42	0.27	9.8	235
48	1.6	0.528	0.25	0.42	0.27	9.8	240
49	1.7	0.561	0.25	0.45	0.31	10.9	245
50	1.8	0.594	0.25	0.48	0.34	12.1	250
51	1.9	0.627	0.25	0.50	0.37	13.3	255
52	2	0.660	0.25	0.53	0.41	14.5	260
53	2.1	0.693	0.25	0.55	0.44	15.7	265
54	2.1	0.693	0.25	0.55	0.44	15.7	270
55	2.2	0.726	0.25	0.58	0.47	16.8	275
56	2.3	0.759	0.25	0.61	0.50	18.0	280
57	2.4	0.792	0.25	0.63	0.54	19.2	285
58	2.4	0.792	0.25	0.63	0.54	19.2	290
59	2.5	0.825	0.25	0.66	0.57	20.4	295
60	2.6	0.858	0.25	0.69	0.60	21.5	300
61	3.1	1.023	0.25	0.82	0.77	27.4	305
62	3.6	1.188	0.25	0.95	0.93	33.3	310
63	3.9	1.287	0.25	1.03	1.03	36.9	315

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

64	4.2	1.386	0.25	1.11	1.13	40.4	320
65	4.7	1.551	0.25	1.24	1.30	46.3	325
66	5.6	1.848	0.25	1.48	1.59	56.9	330
67	1.9	0.627	0.25	0.50	0.37	13.3	335
68	0.9	0.297	0.25	0.24	0.04	1.5	340
69	0.6	0.198	0.25	0.16	0.04	1.4	345
70	0.5	0.165	0.25	0.13	0.03	1.2	350
71	0.3	0.099	0.25	0.08	0.02	0.7	355
72	0.2	0.066	0.25	0.05	0.01	0.5	360
	100				16.20	in/hr	
					1.35	in	
					4.02	ac-ft	

Lake Area - acres	0
Lake normal WSE	955
Lake 100yr WSE	#DIV/0!



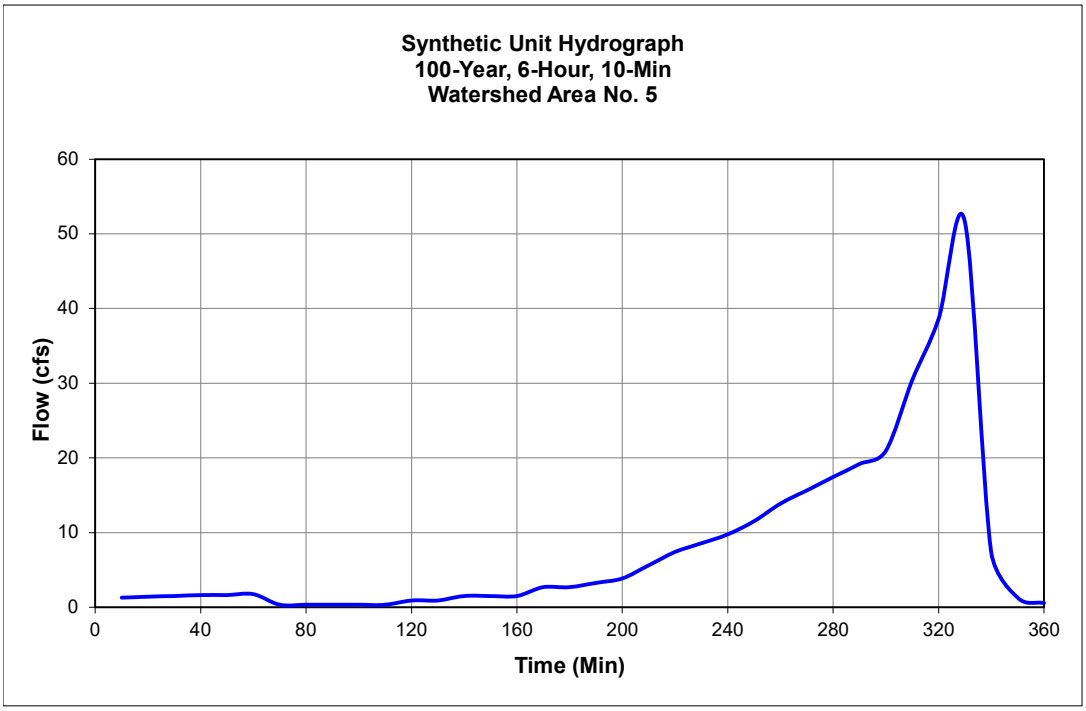
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	5	
Drainage Area - acres	35.7	
Unit Time - minutes	10	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.25	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.1	0.182	0.25	0.15	0.04	1.3	10
2	1.2	0.198	0.25	0.16	0.04	1.4	20
3	1.3	0.215	0.25	0.17	0.04	1.5	30
4	1.4	0.231	0.25	0.18	0.05	1.6	40
5	1.4	0.231	0.25	0.18	0.05	1.6	50
6	1.5	0.248	0.25	0.20	0.05	1.8	60
7	1.6	0.264	0.25	0.21	0.01	0.3	70
8	1.6	0.264	0.25	0.21	0.01	0.3	80
9	1.6	0.264	0.25	0.21	0.01	0.3	90
10	1.6	0.264	0.25	0.21	0.01	0.3	100
11	1.6	0.264	0.25	0.21	0.01	0.3	110
12	1.7	0.281	0.25	0.22	0.03	0.9	120
13	1.7	0.281	0.25	0.22	0.03	0.9	130
14	1.8	0.297	0.25	0.24	0.04	1.5	140
15	1.8	0.297	0.25	0.24	0.04	1.5	150
16	1.8	0.297	0.25	0.24	0.04	1.5	160
17	2	0.330	0.25	0.26	0.08	2.7	170
18	2	0.330	0.25	0.26	0.08	2.7	180
19	2.1	0.347	0.25	0.28	0.09	3.3	190
20	2.2	0.363	0.25	0.29	0.11	3.9	200
21	2.5	0.413	0.25	0.33	0.16	5.6	210
22	2.8	0.462	0.25	0.37	0.21	7.4	220
23	3	0.495	0.25	0.40	0.24	8.6	230
24	3.2	0.528	0.25	0.42	0.27	9.8	240
25	3.5	0.578	0.25	0.46	0.32	11.5	250
26	3.9	0.644	0.25	0.51	0.39	13.9	260
27	4.2	0.693	0.25	0.55	0.44	15.7	270
28	4.5	0.743	0.25	0.59	0.49	17.4	280
29	4.8	0.792	0.25	0.63	0.54	19.2	290
30	5.1	0.842	0.25	0.67	0.59	21.0	300
31	6.7	1.106	0.25	0.88	0.85	30.4	310
32	8.1	1.337	0.25	1.07	1.08	38.6	320
33	10.3	1.700	0.25	1.36	1.45	51.6	330
34	2.8	0.462	0.25	0.37	0.21	7.4	340
35	1.1	0.182	0.25	0.15	0.04	1.3	350
36	0.5	0.083	0.25	0.07	0.02	0.6	360
	100				8.12	in/hr	
					1.35	in	
					4.03	ac-ft	

Lake Area - acres	0
Lake normal WSE	955
Lake 100yr WSE	#DIV/0!

Riverside County
Synthetic Unit Hydrograph
Short Cut Method



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

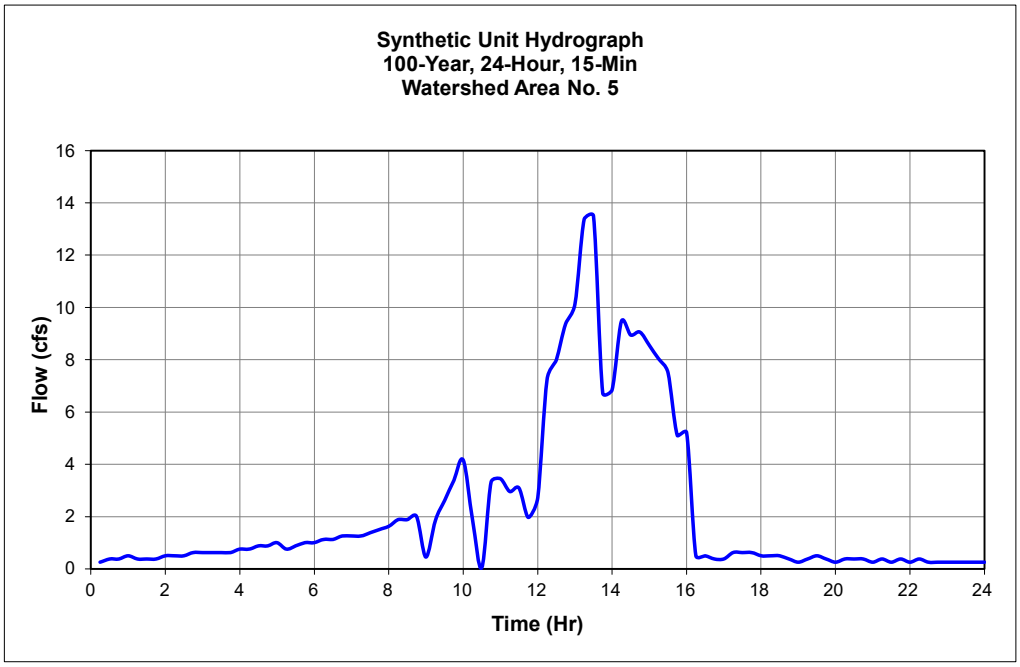
Watershed Area Designation	5	
Drainage Area - acres	35.7	
Unit Time - minutes	15	
Lag Time - minutes	5	
Storm Frequency & Duration - yr/hr	100	24
Total Adjusted Storm Rain-Inches	4.39	
Constant Loss Rate - in/hr	per calc	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (hr)
1	0.2	0.035	0.45	0.03	0.01	0.3	0.25
2	0.3	0.053	0.44	0.04	0.01	0.4	0.5
3	0.3	0.053	0.44	0.04	0.01	0.4	0.75
4	0.4	0.070	0.43	0.06	0.01	0.5	1
5	0.3	0.053	0.43	0.04	0.01	0.4	1.25
6	0.3	0.053	0.42	0.04	0.01	0.4	1.5
7	0.3	0.053	0.42	0.04	0.01	0.4	1.75
8	0.4	0.070	0.41	0.06	0.01	0.5	2
9	0.4	0.070	0.41	0.06	0.01	0.5	2.25
10	0.4	0.070	0.40	0.06	0.01	0.5	2.5
11	0.5	0.088	0.40	0.07	0.02	0.6	2.75
12	0.5	0.088	0.39	0.07	0.02	0.6	3
13	0.5	0.088	0.39	0.07	0.02	0.6	3.25
14	0.5	0.088	0.38	0.07	0.02	0.6	3.5
15	0.5	0.088	0.38	0.07	0.02	0.6	3.75
16	0.6	0.105	0.37	0.08	0.02	0.8	4
17	0.6	0.105	0.37	0.08	0.02	0.8	4.25
18	0.7	0.123	0.36	0.10	0.02	0.9	4.5
19	0.7	0.123	0.36	0.10	0.02	0.9	4.75
20	0.8	0.140	0.36	0.11	0.03	1.0	5
21	0.6	0.105	0.35	0.08	0.02	0.8	5.25
22	0.7	0.123	0.35	0.10	0.02	0.9	5.5
23	0.8	0.140	0.34	0.11	0.03	1.0	5.75
24	0.8	0.140	0.34	0.11	0.03	1.0	6
25	0.9	0.158	0.33	0.13	0.03	1.1	6.25
26	0.9	0.158	0.33	0.13	0.03	1.1	6.5
27	1	0.176	0.32	0.14	0.04	1.3	6.75
28	1	0.176	0.32	0.14	0.04	1.3	7
29	1	0.176	0.32	0.14	0.04	1.3	7.25
30	1.1	0.193	0.31	0.15	0.04	1.4	7.5
31	1.2	0.211	0.31	0.17	0.04	1.5	7.75
32	1.3	0.228	0.30	0.18	0.05	1.6	8
33	1.5	0.263	0.30	0.21	0.05	1.9	8.25
34	1.5	0.263	0.29	0.21	0.05	1.9	8.5
35	1.6	0.281	0.29	0.22	0.06	2.0	8.75
36	1.7	0.299	0.29	0.24	0.01	0.5	9
37	1.9	0.334	0.28	0.27	0.05	1.8	9.25
38	2	0.351	0.28	0.28	0.07	2.6	9.5
39	2.1	0.369	0.27	0.30	0.09	3.4	9.75
40	2.2	0.386	0.27	0.31	0.12	4.2	10
41	1.5	0.263	0.27	0.21	0.05	1.9	10.25
42	1.5	0.263	0.26	0.21	0.00	0.0	10.5
43	2	0.351	0.26	0.28	0.09	3.3	10.75
44	2	0.351	0.25	0.28	0.10	3.4	11
45	1.9	0.334	0.25	0.27	0.08	3.0	11.25
46	1.9	0.334	0.25	0.27	0.09	3.1	11.5
47	1.7	0.299	0.24	0.24	0.06	2.0	11.75
48	1.8	0.316	0.24	0.25	0.08	2.7	12
49	2.5	0.439	0.24	0.35	0.20	7.2	12.25
50	2.6	0.457	0.23	0.37	0.22	8.0	12.5
51	2.8	0.492	0.23	0.39	0.26	9.4	12.75
52	2.9	0.509	0.23	0.41	0.28	10.1	13
53	3.4	0.597	0.22	0.48	0.37	13.4	13.25
54	3.4	0.597	0.22	0.48	0.38	13.5	13.5
55	2.3	0.404	0.22	0.32	0.19	6.7	13.75
56	2.3	0.404	0.21	0.32	0.19	6.8	14
57	2.7	0.474	0.21	0.38	0.26	9.5	14.25
58	2.6	0.457	0.21	0.37	0.25	8.9	14.5
59	2.6	0.457	0.20	0.37	0.25	9.1	14.75
60	2.5	0.439	0.20	0.35	0.24	8.5	15
61	2.4	0.421	0.20	0.34	0.22	8.0	15.25
62	2.3	0.404	0.19	0.32	0.21	7.5	15.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

63	1.9	0.334	0.19	0.27	0.14	5.1	15.75
64	1.9	0.334	0.19	0.27	0.15	5.2	16
65	0.4	0.070	0.18	0.06	0.01	0.5	16.25
66	0.4	0.070	0.18	0.06	0.01	0.5	16.5
67	0.3	0.053	0.18	0.04	0.01	0.4	16.75
68	0.3	0.053	0.18	0.04	0.01	0.4	17
69	0.5	0.088	0.17	0.07	0.02	0.6	17.25
70	0.5	0.088	0.17	0.07	0.02	0.6	17.5
71	0.5	0.088	0.17	0.07	0.02	0.6	17.75
72	0.4	0.070	0.17	0.06	0.01	0.5	18
73	0.4	0.070	0.16	0.06	0.01	0.5	18.25
74	0.4	0.070	0.16	0.06	0.01	0.5	18.5
75	0.3	0.053	0.16	0.04	0.01	0.4	18.75
76	0.2	0.035	0.16	0.03	0.01	0.3	19
77	0.3	0.053	0.15	0.04	0.01	0.4	19.25
78	0.4	0.070	0.15	0.06	0.01	0.5	19.5
79	0.3	0.053	0.15	0.04	0.01	0.4	19.75
80	0.2	0.035	0.15	0.03	0.01	0.3	20
81	0.3	0.053	0.15	0.04	0.01	0.4	20.25
82	0.3	0.053	0.14	0.04	0.01	0.4	20.5
83	0.3	0.053	0.14	0.04	0.01	0.4	20.75
84	0.2	0.035	0.14	0.03	0.01	0.3	21
85	0.3	0.053	0.14	0.04	0.01	0.4	21.25
86	0.2	0.035	0.14	0.03	0.01	0.3	21.5
87	0.3	0.053	0.14	0.04	0.01	0.4	21.75
88	0.2	0.035	0.13	0.03	0.01	0.3	22
89	0.3	0.053	0.13	0.04	0.01	0.4	22.25
90	0.2	0.035	0.13	0.03	0.01	0.3	22.5
91	0.2	0.035	0.13	0.03	0.01	0.3	22.75
92	0.2	0.035	0.13	0.03	0.01	0.3	23
93	0.2	0.035	0.13	0.03	0.01	0.3	23.25
94	0.2	0.035	0.13	0.03	0.01	0.3	23.5
95	0.2	0.035	0.13	0.03	0.01	0.3	23.75
96	0.2	0.035	0.13	0.03	0.01	0.3	24
	100				5.95	**in/hr**	
					1.49	**in**	
					4.42	**ac-ft**	

Lake Area - acres	0
Lake normal WSE	955
Lake 100yr WSE	#DIV/0!



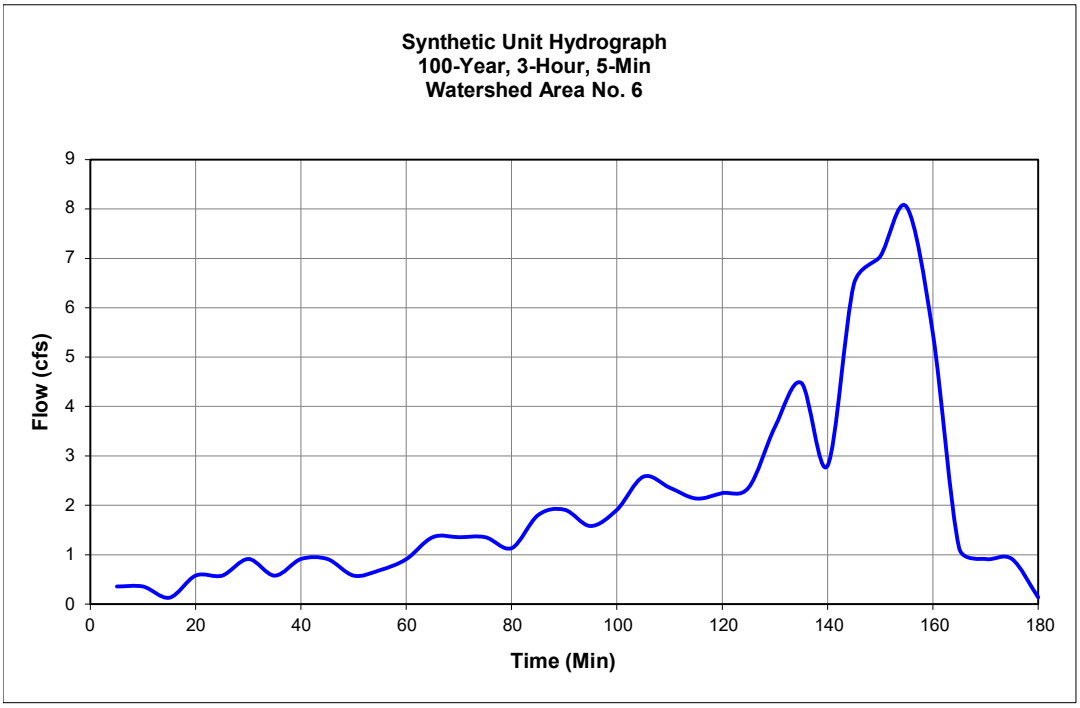
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	6	
Drainage Area - acres	11.6	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.09	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.3	0.351	0.09	0.28	0.26	3.0	5
2	1.3	0.351	0.09	0.28	0.26	3.0	10
3	1.1	0.297	0.09	0.24	0.20	2.4	15
4	1.5	0.405	0.09	0.32	0.31	3.6	20
5	1.5	0.405	0.09	0.32	0.31	3.6	25
6	1.8	0.486	0.09	0.39	0.39	4.5	30
7	1.5	0.405	0.09	0.32	0.31	3.6	35
8	1.8	0.486	0.09	0.39	0.39	4.5	40
9	1.8	0.486	0.09	0.39	0.39	4.5	45
10	1.5	0.405	0.09	0.32	0.31	3.6	50
11	1.6	0.432	0.09	0.35	0.34	3.9	55
12	1.8	0.486	0.09	0.39	0.39	4.5	60
13	2.2	0.594	0.09	0.48	0.50	5.8	65
14	2.2	0.594	0.09	0.48	0.50	5.8	70
15	2.2	0.594	0.09	0.48	0.50	5.8	75
16	2	0.540	0.09	0.43	0.45	5.2	80
17	2.6	0.702	0.09	0.56	0.61	7.0	85
18	2.7	0.729	0.09	0.58	0.63	7.4	90
19	2.4	0.648	0.09	0.52	0.55	6.4	95
20	2.7	0.729	0.09	0.58	0.63	7.4	100
21	3.3	0.891	0.09	0.71	0.80	9.2	105
22	3.1	0.837	0.09	0.67	0.74	8.6	110
23	2.9	0.783	0.09	0.63	0.69	8.0	115
24	3	0.810	0.09	0.65	0.72	8.3	120
25	3.1	0.837	0.09	0.67	0.74	8.6	125
26	4.2	1.134	0.09	0.91	1.04	12.1	130
27	5	1.350	0.09	1.08	1.26	14.6	135
28	3.5	0.945	0.09	0.76	0.85	9.9	140
29	6.8	1.836	0.09	1.47	1.74	20.2	145
30	7.3	1.971	0.09	1.58	1.88	21.8	150
31	8.2	2.214	0.09	1.77	2.12	24.6	155
32	5.9	1.593	0.09	1.27	1.50	17.4	160
33	2	0.540	0.09	0.43	0.45	5.2	165
34	1.8	0.486	0.09	0.39	0.39	4.5	170
35	1.8	0.486	0.09	0.39	0.39	4.5	175
36	0.6	0.162	0.09	0.13	0.07	0.8	180
	100				23.61	in/hr	
					1.97	in	
					1.90	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

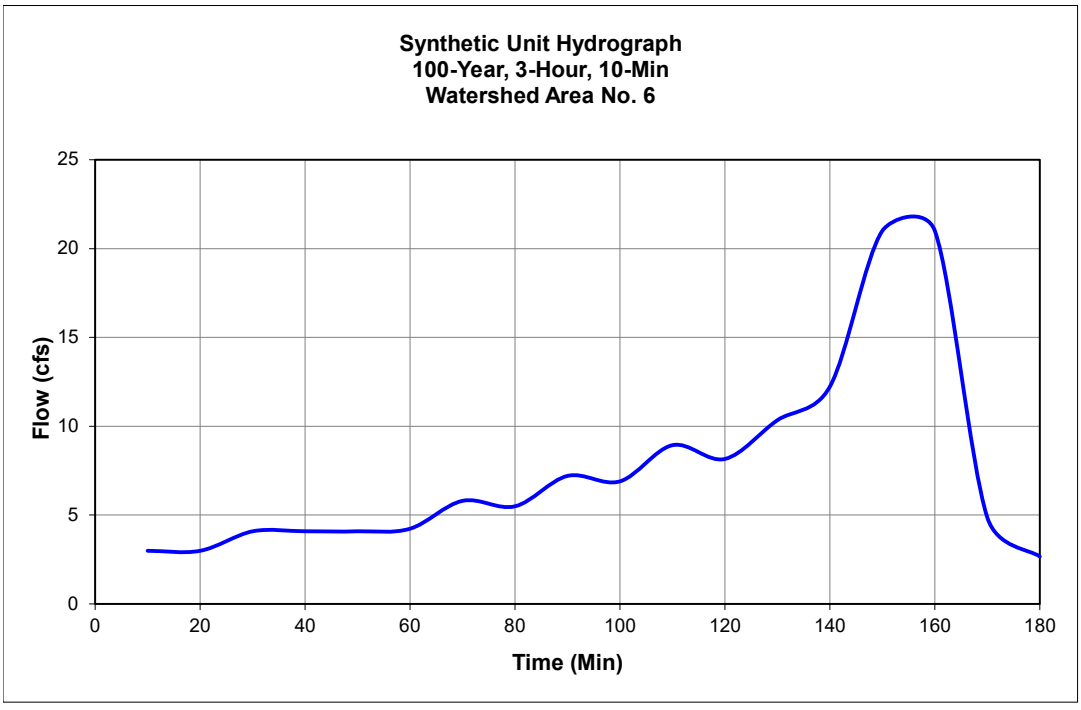


Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	6	
Drainage Area - acres	11.6	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.09	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	2.6	0.351	0.09	0.28	0.26	3.0	10
2	2.6	0.351	0.09	0.28	0.26	3.0	20
3	3.3	0.446	0.09	0.36	0.35	4.1	30
4	3.3	0.446	0.09	0.36	0.35	4.1	40
5	3.3	0.446	0.09	0.36	0.35	4.1	50
6	3.4	0.459	0.09	0.37	0.36	4.2	60
7	4.4	0.594	0.09	0.48	0.50	5.8	70
8	4.2	0.567	0.09	0.45	0.47	5.5	80
9	5.3	0.716	0.09	0.57	0.62	7.2	90
10	5.1	0.689	0.09	0.55	0.59	6.9	100
11	6.4	0.864	0.09	0.69	0.77	8.9	110
12	5.9	0.797	0.09	0.64	0.70	8.1	120
13	7.3	0.986	0.09	0.79	0.89	10.3	130
14	8.5	1.148	0.09	0.92	1.05	12.2	140
15	14.1	1.904	0.09	1.52	1.81	21.0	150
16	14.1	1.904	0.09	1.52	1.81	21.0	160
17	3.8	0.513	0.09	0.41	0.42	4.9	170
18	2.4	0.324	0.09	0.26	0.23	2.7	180
	100				11.80	in/hr	
					1.97	in	
					1.90	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

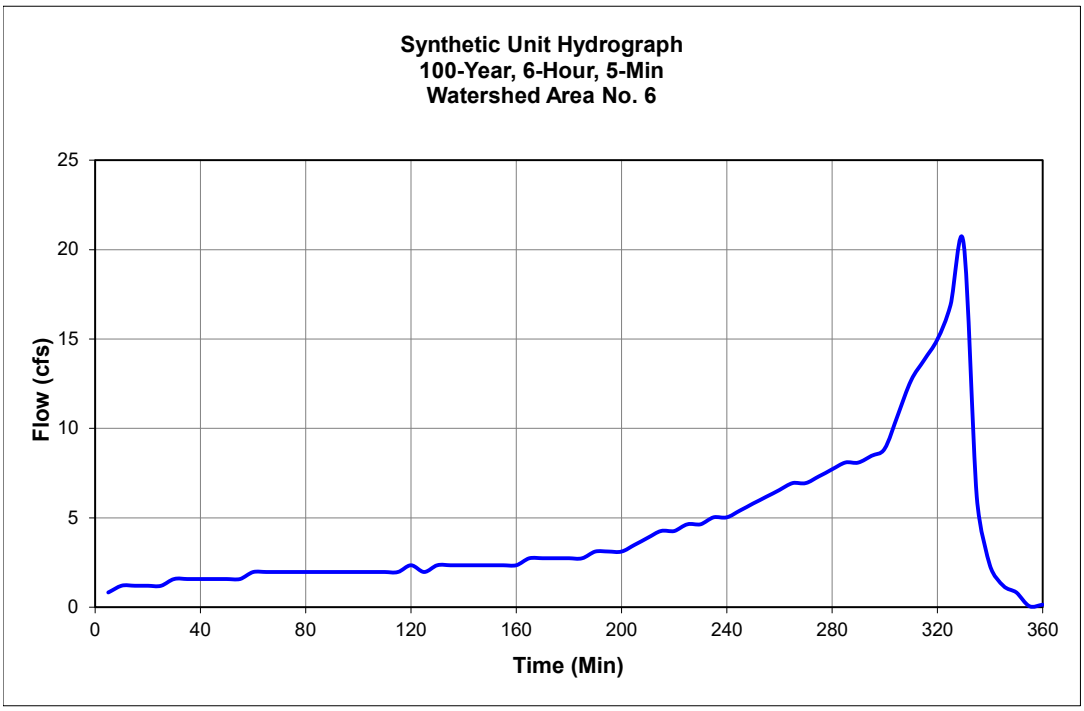
Watersehd Area Designation	6	
Drainage Area - acres	11.6	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.09	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	0.5	0.165	0.09	0.13	0.07	0.8	5
2	0.6	0.198	0.09	0.16	0.10	1.2	10
3	0.6	0.198	0.09	0.16	0.10	1.2	15
4	0.6	0.198	0.09	0.16	0.10	1.2	20
5	0.6	0.198	0.09	0.16	0.10	1.2	25
6	0.7	0.231	0.09	0.18	0.14	1.6	30
7	0.7	0.231	0.09	0.18	0.14	1.6	35
8	0.7	0.231	0.09	0.18	0.14	1.6	40
9	0.7	0.231	0.09	0.18	0.14	1.6	45
10	0.7	0.231	0.09	0.18	0.14	1.6	50
11	0.7	0.231	0.09	0.18	0.14	1.6	55
12	0.8	0.264	0.09	0.21	0.17	2.0	60
13	0.8	0.264	0.09	0.21	0.17	2.0	65
14	0.8	0.264	0.09	0.21	0.17	2.0	70
15	0.8	0.264	0.09	0.21	0.17	2.0	75
16	0.8	0.264	0.09	0.21	0.17	2.0	80
17	0.8	0.264	0.09	0.21	0.17	2.0	85
18	0.8	0.264	0.09	0.21	0.17	2.0	90
19	0.8	0.264	0.09	0.21	0.17	2.0	95
20	0.8	0.264	0.09	0.21	0.17	2.0	100
21	0.8	0.264	0.09	0.21	0.17	2.0	105
22	0.8	0.264	0.09	0.21	0.17	2.0	110
23	0.8	0.264	0.09	0.21	0.17	2.0	115
24	0.9	0.297	0.09	0.24	0.20	2.4	120
25	0.8	0.264	0.09	0.21	0.17	2.0	125
26	0.9	0.297	0.09	0.24	0.20	2.4	130
27	0.9	0.297	0.09	0.24	0.20	2.4	135
28	0.9	0.297	0.09	0.24	0.20	2.4	140
29	0.9	0.297	0.09	0.24	0.20	2.4	145
30	0.9	0.297	0.09	0.24	0.20	2.4	150
31	0.9	0.297	0.09	0.24	0.20	2.4	155
32	0.9	0.297	0.09	0.24	0.20	2.4	160
33	1	0.330	0.09	0.26	0.24	2.7	165
34	1	0.330	0.09	0.26	0.24	2.7	170
35	1	0.330	0.09	0.26	0.24	2.7	175
36	1	0.330	0.09	0.26	0.24	2.7	180
37	1	0.330	0.09	0.26	0.24	2.7	185
38	1.1	0.363	0.09	0.29	0.27	3.1	190
39	1.1	0.363	0.09	0.29	0.27	3.1	195
40	1.1	0.363	0.09	0.29	0.27	3.1	200
41	1.2	0.396	0.09	0.32	0.30	3.5	205
42	1.3	0.429	0.09	0.34	0.33	3.9	210
43	1.4	0.462	0.09	0.37	0.37	4.3	215
44	1.4	0.462	0.09	0.37	0.37	4.3	220
45	1.5	0.495	0.09	0.40	0.40	4.6	225
46	1.5	0.495	0.09	0.40	0.40	4.6	230
47	1.6	0.528	0.09	0.42	0.43	5.0	235
48	1.6	0.528	0.09	0.42	0.43	5.0	240
49	1.7	0.561	0.09	0.45	0.47	5.4	245
50	1.8	0.594	0.09	0.48	0.50	5.8	250
51	1.9	0.627	0.09	0.50	0.53	6.2	255
52	2	0.660	0.09	0.53	0.57	6.6	260
53	2.1	0.693	0.09	0.55	0.60	6.9	265
54	2.1	0.693	0.09	0.55	0.60	6.9	270
55	2.2	0.726	0.09	0.58	0.63	7.3	275
56	2.3	0.759	0.09	0.61	0.66	7.7	280
57	2.4	0.792	0.09	0.63	0.70	8.1	285
58	2.4	0.792	0.09	0.63	0.70	8.1	290
59	2.5	0.825	0.09	0.66	0.73	8.5	295
60	2.6	0.858	0.09	0.69	0.76	8.9	300
61	3.1	1.023	0.09	0.82	0.93	10.8	305
62	3.6	1.188	0.09	0.95	1.09	12.7	310
63	3.9	1.287	0.09	1.03	1.19	13.8	315

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

64	4.2	1.386	0.09	1.11	1.29	15.0	320
65	4.7	1.551	0.09	1.24	1.46	16.9	325
66	5.6	1.848	0.09	1.48	1.75	20.3	330
67	1.9	0.627	0.09	0.50	0.53	6.2	335
68	0.9	0.297	0.09	0.24	0.20	2.4	340
69	0.6	0.198	0.09	0.16	0.10	1.2	345
70	0.5	0.165	0.09	0.13	0.07	0.8	350
71	0.3	0.099	0.09	0.08	0.00	0.1	355
72	0.2	0.066	0.09	0.05	0.01	0.2	360
	100				26.25	in/hr	
					2.19	in	
					2.11	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



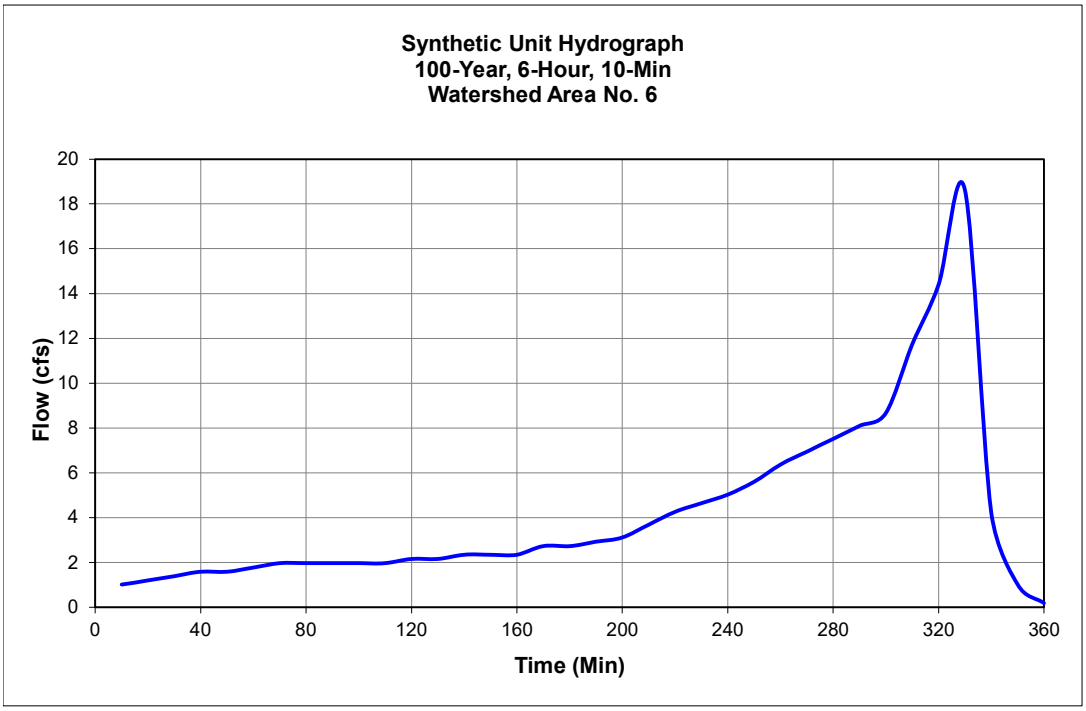
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	6	
Drainage Area - acres	11.6	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.09	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.1	0.182	0.09	0.15	0.09	1.0	10
2	1.2	0.198	0.09	0.16	0.10	1.2	20
3	1.3	0.215	0.09	0.17	0.12	1.4	30
4	1.4	0.231	0.09	0.18	0.14	1.6	40
5	1.4	0.231	0.09	0.18	0.14	1.6	50
6	1.5	0.248	0.09	0.20	0.15	1.8	60
7	1.6	0.264	0.09	0.21	0.17	2.0	70
8	1.6	0.264	0.09	0.21	0.17	2.0	80
9	1.6	0.264	0.09	0.21	0.17	2.0	90
10	1.6	0.264	0.09	0.21	0.17	2.0	100
11	1.6	0.264	0.09	0.21	0.17	2.0	110
12	1.7	0.281	0.09	0.22	0.19	2.2	120
13	1.7	0.281	0.09	0.22	0.19	2.2	130
14	1.8	0.297	0.09	0.24	0.20	2.4	140
15	1.8	0.297	0.09	0.24	0.20	2.4	150
16	1.8	0.297	0.09	0.24	0.20	2.4	160
17	2	0.330	0.09	0.26	0.24	2.7	170
18	2	0.330	0.09	0.26	0.24	2.7	180
19	2.1	0.347	0.09	0.28	0.25	2.9	190
20	2.2	0.363	0.09	0.29	0.27	3.1	200
21	2.5	0.413	0.09	0.33	0.32	3.7	210
22	2.8	0.462	0.09	0.37	0.37	4.3	220
23	3	0.495	0.09	0.40	0.40	4.6	230
24	3.2	0.528	0.09	0.42	0.43	5.0	240
25	3.5	0.578	0.09	0.46	0.48	5.6	250
26	3.9	0.644	0.09	0.51	0.55	6.4	260
27	4.2	0.693	0.09	0.55	0.60	6.9	270
28	4.5	0.743	0.09	0.59	0.65	7.5	280
29	4.8	0.792	0.09	0.63	0.70	8.1	290
30	5.1	0.842	0.09	0.67	0.75	8.7	300
31	6.7	1.106	0.09	0.88	1.01	11.7	310
32	8.1	1.337	0.09	1.07	1.24	14.4	320
33	10.3	1.700	0.09	1.36	1.61	18.6	330
34	2.8	0.462	0.09	0.37	0.37	4.3	340
35	1.1	0.182	0.09	0.15	0.09	1.0	350
36	0.5	0.083	0.09	0.07	0.02	0.2	360
	100				13.13	in/hr	
					2.19	in	
					2.12	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!

Riverside County
Synthetic Unit Hydrograph
Short Cut Method



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

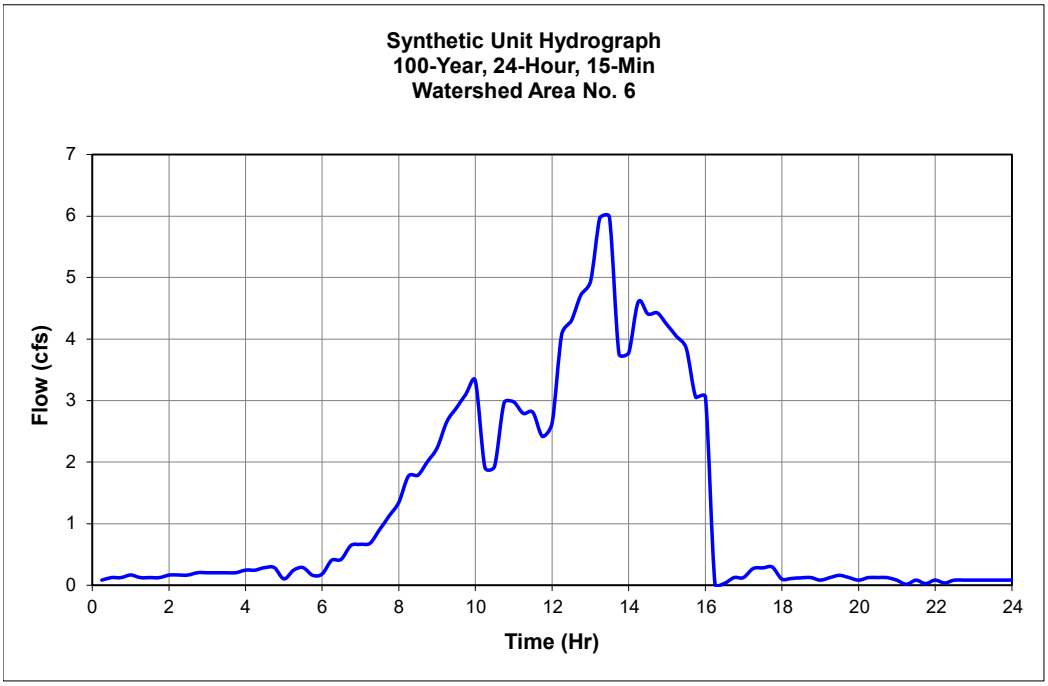
Watershed Area Designation	6	
Drainage Area - acres	11.6	
Unit Time - minutes	15	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	24
Total Adjusted Storm Rain-Inches	4.39	
Constant Loss Rate - in/hr	per calc	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (hr)
1	0.2	0.035	0.17	0.03	0.01	0.1	0.25
2	0.3	0.053	0.16	0.04	0.01	0.1	0.5
3	0.3	0.053	0.16	0.04	0.01	0.1	0.75
4	0.4	0.070	0.16	0.06	0.01	0.2	1
5	0.3	0.053	0.16	0.04	0.01	0.1	1.25
6	0.3	0.053	0.16	0.04	0.01	0.1	1.5
7	0.3	0.053	0.16	0.04	0.01	0.1	1.75
8	0.4	0.070	0.15	0.06	0.01	0.2	2
9	0.4	0.070	0.15	0.06	0.01	0.2	2.25
10	0.4	0.070	0.15	0.06	0.01	0.2	2.5
11	0.5	0.088	0.15	0.07	0.02	0.2	2.75
12	0.5	0.088	0.15	0.07	0.02	0.2	3
13	0.5	0.088	0.14	0.07	0.02	0.2	3.25
14	0.5	0.088	0.14	0.07	0.02	0.2	3.5
15	0.5	0.088	0.14	0.07	0.02	0.2	3.75
16	0.6	0.105	0.14	0.08	0.02	0.2	4
17	0.6	0.105	0.14	0.08	0.02	0.2	4.25
18	0.7	0.123	0.14	0.10	0.02	0.3	4.5
19	0.7	0.123	0.13	0.10	0.02	0.3	4.75
20	0.8	0.140	0.13	0.11	0.01	0.1	5
21	0.6	0.105	0.13	0.08	0.02	0.2	5.25
22	0.7	0.123	0.13	0.10	0.02	0.3	5.5
23	0.8	0.140	0.13	0.11	0.01	0.2	5.75
24	0.8	0.140	0.13	0.11	0.02	0.2	6
25	0.9	0.158	0.12	0.13	0.03	0.4	6.25
26	0.9	0.158	0.12	0.13	0.04	0.4	6.5
27	1	0.176	0.12	0.14	0.06	0.6	6.75
28	1	0.176	0.12	0.14	0.06	0.7	7
29	1	0.176	0.12	0.14	0.06	0.7	7.25
30	1.1	0.193	0.12	0.15	0.08	0.9	7.5
31	1.2	0.211	0.11	0.17	0.10	1.1	7.75
32	1.3	0.228	0.11	0.18	0.12	1.3	8
33	1.5	0.263	0.11	0.21	0.15	1.8	8.25
34	1.5	0.263	0.11	0.21	0.15	1.8	8.5
35	1.6	0.281	0.11	0.22	0.17	2.0	8.75
36	1.7	0.299	0.11	0.24	0.19	2.2	9
37	1.9	0.334	0.10	0.27	0.23	2.7	9.25
38	2	0.351	0.10	0.28	0.25	2.9	9.5
39	2.1	0.369	0.10	0.30	0.27	3.1	9.75
40	2.2	0.386	0.10	0.31	0.29	3.3	10
41	1.5	0.263	0.10	0.21	0.16	1.9	10.25
42	1.5	0.263	0.10	0.21	0.17	1.9	10.5
43	2	0.351	0.10	0.28	0.26	3.0	10.75
44	2	0.351	0.09	0.28	0.26	3.0	11
45	1.9	0.334	0.09	0.27	0.24	2.8	11.25
46	1.9	0.334	0.09	0.27	0.24	2.8	11.5
47	1.7	0.299	0.09	0.24	0.21	2.4	11.75
48	1.8	0.316	0.09	0.25	0.23	2.6	12
49	2.5	0.439	0.09	0.35	0.35	4.1	12.25
50	2.6	0.457	0.09	0.37	0.37	4.3	12.5
51	2.8	0.492	0.08	0.39	0.41	4.7	12.75
52	2.9	0.509	0.08	0.41	0.43	4.9	13
53	3.4	0.597	0.08	0.48	0.51	6.0	13.25
54	3.4	0.597	0.08	0.48	0.52	6.0	13.5
55	2.3	0.404	0.08	0.32	0.32	3.8	13.75
56	2.3	0.404	0.08	0.32	0.33	3.8	14
57	2.7	0.474	0.08	0.38	0.40	4.6	14.25
58	2.6	0.457	0.08	0.37	0.38	4.4	14.5
59	2.6	0.457	0.08	0.37	0.38	4.4	14.75
60	2.5	0.439	0.07	0.35	0.36	4.2	15
61	2.4	0.421	0.07	0.34	0.35	4.0	15.25
62	2.3	0.404	0.07	0.32	0.33	3.9	15.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

63	1.9	0.334	0.07	0.27	0.26	3.1	15.75
64	1.9	0.334	0.07	0.27	0.26	3.1	16
65	0.4	0.070	0.07	0.06	0.00	0.0	16.25
66	0.4	0.070	0.07	0.06	0.00	0.0	16.5
67	0.3	0.053	0.07	0.04	0.01	0.1	16.75
68	0.3	0.053	0.07	0.04	0.01	0.1	17
69	0.5	0.088	0.06	0.07	0.02	0.3	17.25
70	0.5	0.088	0.06	0.07	0.02	0.3	17.5
71	0.5	0.088	0.06	0.07	0.03	0.3	17.75
72	0.4	0.070	0.06	0.06	0.01	0.1	18
73	0.4	0.070	0.06	0.06	0.01	0.1	18.25
74	0.4	0.070	0.06	0.06	0.01	0.1	18.5
75	0.3	0.053	0.06	0.04	0.01	0.1	18.75
76	0.2	0.035	0.06	0.03	0.01	0.1	19
77	0.3	0.053	0.06	0.04	0.01	0.1	19.25
78	0.4	0.070	0.06	0.06	0.01	0.2	19.5
79	0.3	0.053	0.06	0.04	0.01	0.1	19.75
80	0.2	0.035	0.06	0.03	0.01	0.1	20
81	0.3	0.053	0.05	0.04	0.01	0.1	20.25
82	0.3	0.053	0.05	0.04	0.01	0.1	20.5
83	0.3	0.053	0.05	0.04	0.01	0.1	20.75
84	0.2	0.035	0.05	0.03	0.01	0.1	21
85	0.3	0.053	0.05	0.04	0.00	0.0	21.25
86	0.2	0.035	0.05	0.03	0.01	0.1	21.5
87	0.3	0.053	0.05	0.04	0.00	0.0	21.75
88	0.2	0.035	0.05	0.03	0.01	0.1	22
89	0.3	0.053	0.05	0.04	0.00	0.0	22.25
90	0.2	0.035	0.05	0.03	0.01	0.1	22.5
91	0.2	0.035	0.05	0.03	0.01	0.1	22.75
92	0.2	0.035	0.05	0.03	0.01	0.1	23
93	0.2	0.035	0.05	0.03	0.01	0.1	23.25
94	0.2	0.035	0.05	0.03	0.01	0.1	23.5
95	0.2	0.035	0.05	0.03	0.01	0.1	23.75
96	0.2	0.035	0.05	0.03	0.01	0.1	24
	100				10.64	in/hr	
					2.66	in	
					2.57	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



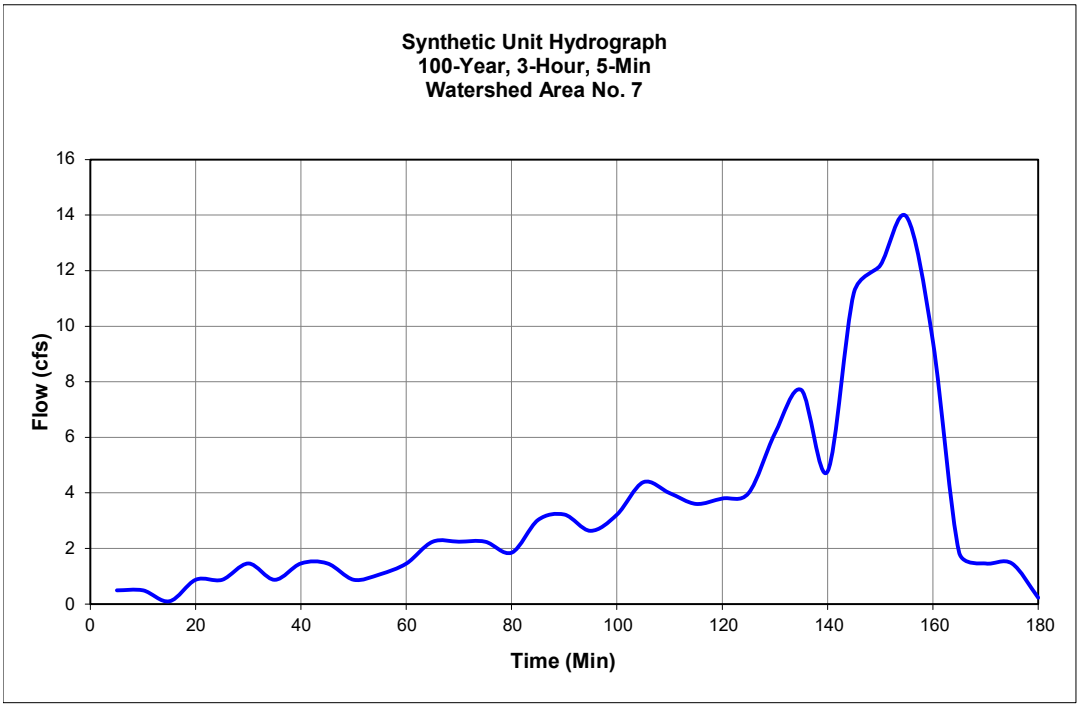
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	7	
Drainage Area - acres	20.3	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.10	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.3	0.351	0.10	0.28	0.25	5.1	5
2	1.3	0.351	0.10	0.28	0.25	5.1	10
3	1.1	0.297	0.10	0.24	0.20	4.0	15
4	1.5	0.405	0.10	0.32	0.30	6.2	20
5	1.5	0.405	0.10	0.32	0.30	6.2	25
6	1.8	0.486	0.10	0.39	0.39	7.8	30
7	1.5	0.405	0.10	0.32	0.30	6.2	35
8	1.8	0.486	0.10	0.39	0.39	7.8	40
9	1.8	0.486	0.10	0.39	0.39	7.8	45
10	1.5	0.405	0.10	0.32	0.30	6.2	50
11	1.6	0.432	0.10	0.35	0.33	6.7	55
12	1.8	0.486	0.10	0.39	0.39	7.8	60
13	2.2	0.594	0.10	0.48	0.49	10.0	65
14	2.2	0.594	0.10	0.48	0.49	10.0	70
15	2.2	0.594	0.10	0.48	0.49	10.0	75
16	2	0.540	0.10	0.43	0.44	8.9	80
17	2.6	0.702	0.10	0.56	0.60	12.2	85
18	2.7	0.729	0.10	0.58	0.63	12.8	90
19	2.4	0.648	0.10	0.52	0.55	11.1	95
20	2.7	0.729	0.10	0.58	0.63	12.8	100
21	3.3	0.891	0.10	0.71	0.79	16.0	105
22	3.1	0.837	0.10	0.67	0.74	14.9	110
23	2.9	0.783	0.10	0.63	0.68	13.9	115
24	3	0.810	0.10	0.65	0.71	14.4	120
25	3.1	0.837	0.10	0.67	0.74	14.9	125
26	4.2	1.134	0.10	0.91	1.03	21.0	130
27	5	1.350	0.10	1.08	1.25	25.4	135
28	3.5	0.945	0.10	0.76	0.84	17.1	140
29	6.8	1.836	0.10	1.47	1.74	35.2	145
30	7.3	1.971	0.10	1.58	1.87	38.0	150
31	8.2	2.214	0.10	1.77	2.11	42.9	155
32	5.9	1.593	0.10	1.27	1.49	30.3	160
33	2	0.540	0.10	0.43	0.44	8.9	165
34	1.8	0.486	0.10	0.39	0.39	7.8	170
35	1.8	0.486	0.10	0.39	0.39	7.8	175
36	0.6	0.162	0.10	0.13	0.06	1.2	180
	100				23.38	in/hr	
					1.95	in	
					3.30	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

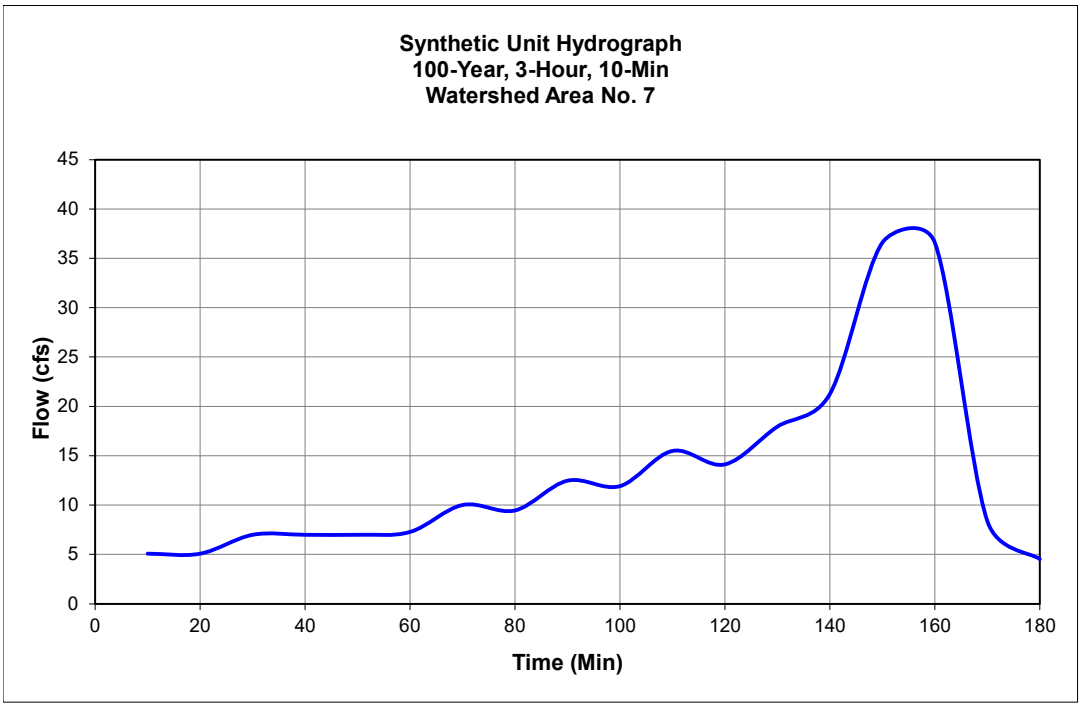


Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	7	
Drainage Area - acres	20.3	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.10	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	2.6	0.351	0.10	0.28	0.25	5.1	10
2	2.6	0.351	0.10	0.28	0.25	5.1	20
3	3.3	0.446	0.10	0.36	0.34	7.0	30
4	3.3	0.446	0.10	0.36	0.34	7.0	40
5	3.3	0.446	0.10	0.36	0.34	7.0	50
6	3.4	0.459	0.10	0.37	0.36	7.3	60
7	4.4	0.594	0.10	0.48	0.49	10.0	70
8	4.2	0.567	0.10	0.45	0.47	9.5	80
9	5.3	0.716	0.10	0.57	0.61	12.5	90
10	5.1	0.689	0.10	0.55	0.59	11.9	100
11	6.4	0.864	0.10	0.69	0.76	15.5	110
12	5.9	0.797	0.10	0.64	0.70	14.1	120
13	7.3	0.986	0.10	0.79	0.88	18.0	130
14	8.5	1.148	0.10	0.92	1.05	21.3	140
15	14.1	1.904	0.10	1.52	1.80	36.6	150
16	14.1	1.904	0.10	1.52	1.80	36.6	160
17	3.8	0.513	0.10	0.41	0.41	8.4	170
18	2.4	0.324	0.10	0.26	0.22	4.5	180
	100				11.69	in/hr	
					1.95	in	
					3.30	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

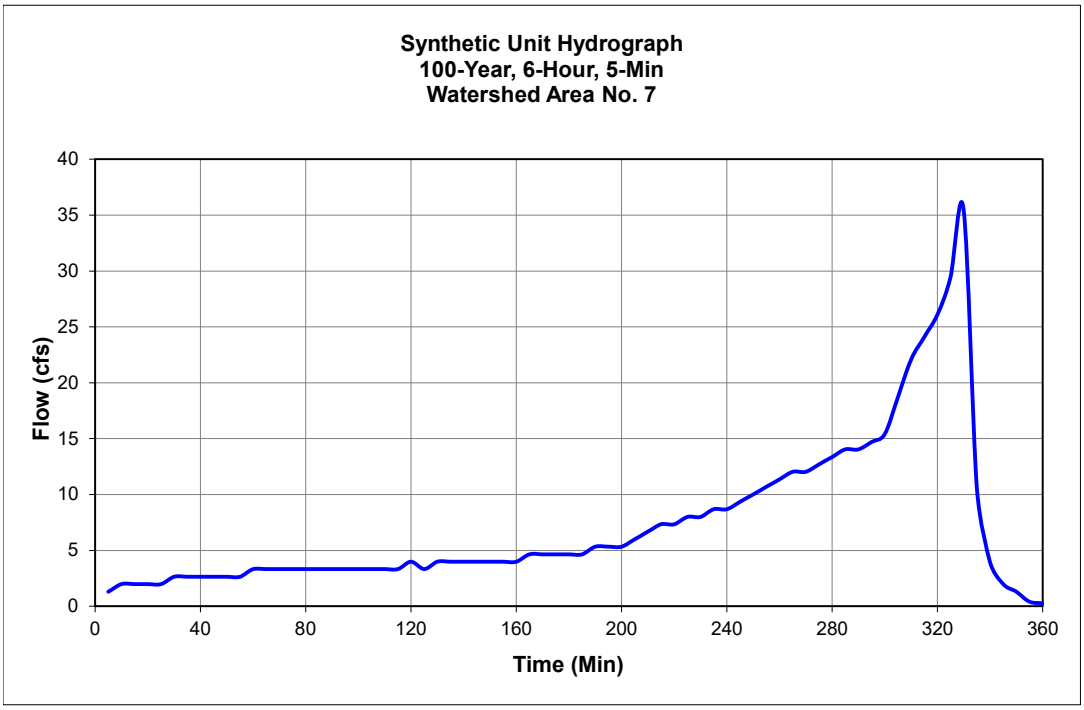
Watersehd Area Designation	7	
Drainage Area - acres	20.3	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.10	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	0.5	0.165	0.10	0.13	0.06	1.3	5
2	0.6	0.198	0.10	0.16	0.10	2.0	10
3	0.6	0.198	0.10	0.16	0.10	2.0	15
4	0.6	0.198	0.10	0.16	0.10	2.0	20
5	0.6	0.198	0.10	0.16	0.10	2.0	25
6	0.7	0.231	0.10	0.18	0.13	2.6	30
7	0.7	0.231	0.10	0.18	0.13	2.6	35
8	0.7	0.231	0.10	0.18	0.13	2.6	40
9	0.7	0.231	0.10	0.18	0.13	2.6	45
10	0.7	0.231	0.10	0.18	0.13	2.6	50
11	0.7	0.231	0.10	0.18	0.13	2.6	55
12	0.8	0.264	0.10	0.21	0.16	3.3	60
13	0.8	0.264	0.10	0.21	0.16	3.3	65
14	0.8	0.264	0.10	0.21	0.16	3.3	70
15	0.8	0.264	0.10	0.21	0.16	3.3	75
16	0.8	0.264	0.10	0.21	0.16	3.3	80
17	0.8	0.264	0.10	0.21	0.16	3.3	85
18	0.8	0.264	0.10	0.21	0.16	3.3	90
19	0.8	0.264	0.10	0.21	0.16	3.3	95
20	0.8	0.264	0.10	0.21	0.16	3.3	100
21	0.8	0.264	0.10	0.21	0.16	3.3	105
22	0.8	0.264	0.10	0.21	0.16	3.3	110
23	0.8	0.264	0.10	0.21	0.16	3.3	115
24	0.9	0.297	0.10	0.24	0.20	4.0	120
25	0.8	0.264	0.10	0.21	0.16	3.3	125
26	0.9	0.297	0.10	0.24	0.20	4.0	130
27	0.9	0.297	0.10	0.24	0.20	4.0	135
28	0.9	0.297	0.10	0.24	0.20	4.0	140
29	0.9	0.297	0.10	0.24	0.20	4.0	145
30	0.9	0.297	0.10	0.24	0.20	4.0	150
31	0.9	0.297	0.10	0.24	0.20	4.0	155
32	0.9	0.297	0.10	0.24	0.20	4.0	160
33	1	0.330	0.10	0.26	0.23	4.7	165
34	1	0.330	0.10	0.26	0.23	4.7	170
35	1	0.330	0.10	0.26	0.23	4.7	175
36	1	0.330	0.10	0.26	0.23	4.7	180
37	1	0.330	0.10	0.26	0.23	4.7	185
38	1.1	0.363	0.10	0.29	0.26	5.3	190
39	1.1	0.363	0.10	0.29	0.26	5.3	195
40	1.1	0.363	0.10	0.29	0.26	5.3	200
41	1.2	0.396	0.10	0.32	0.30	6.0	205
42	1.3	0.429	0.10	0.34	0.33	6.7	210
43	1.4	0.462	0.10	0.37	0.36	7.3	215
44	1.4	0.462	0.10	0.37	0.36	7.3	220
45	1.5	0.495	0.10	0.40	0.39	8.0	225
46	1.5	0.495	0.10	0.40	0.39	8.0	230
47	1.6	0.528	0.10	0.42	0.43	8.7	235
48	1.6	0.528	0.10	0.42	0.43	8.7	240
49	1.7	0.561	0.10	0.45	0.46	9.3	245
50	1.8	0.594	0.10	0.48	0.49	10.0	250
51	1.9	0.627	0.10	0.50	0.53	10.7	255
52	2	0.660	0.10	0.53	0.56	11.4	260
53	2.1	0.693	0.10	0.55	0.59	12.0	265
54	2.1	0.693	0.10	0.55	0.59	12.0	270
55	2.2	0.726	0.10	0.58	0.63	12.7	275
56	2.3	0.759	0.10	0.61	0.66	13.4	280
57	2.4	0.792	0.10	0.63	0.69	14.0	285
58	2.4	0.792	0.10	0.63	0.69	14.0	290
59	2.5	0.825	0.10	0.66	0.72	14.7	295
60	2.6	0.858	0.10	0.69	0.76	15.4	300
61	3.1	1.023	0.10	0.82	0.92	18.7	305
62	3.6	1.188	0.10	0.95	1.09	22.1	310
63	3.9	1.287	0.10	1.03	1.19	24.1	315

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

64	4.2	1.386	0.10	1.11	1.29	26.1	320
65	4.7	1.551	0.10	1.24	1.45	29.4	325
66	5.6	1.848	0.10	1.48	1.75	35.5	330
67	1.9	0.627	0.10	0.50	0.53	10.7	335
68	0.9	0.297	0.10	0.24	0.20	4.0	340
69	0.6	0.198	0.10	0.16	0.10	2.0	345
70	0.5	0.165	0.10	0.13	0.06	1.3	350
71	0.3	0.099	0.10	0.08	0.02	0.4	355
72	0.2	0.066	0.10	0.05	0.01	0.3	360
	100				25.82	in/hr	
					2.15	in	
					3.64	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



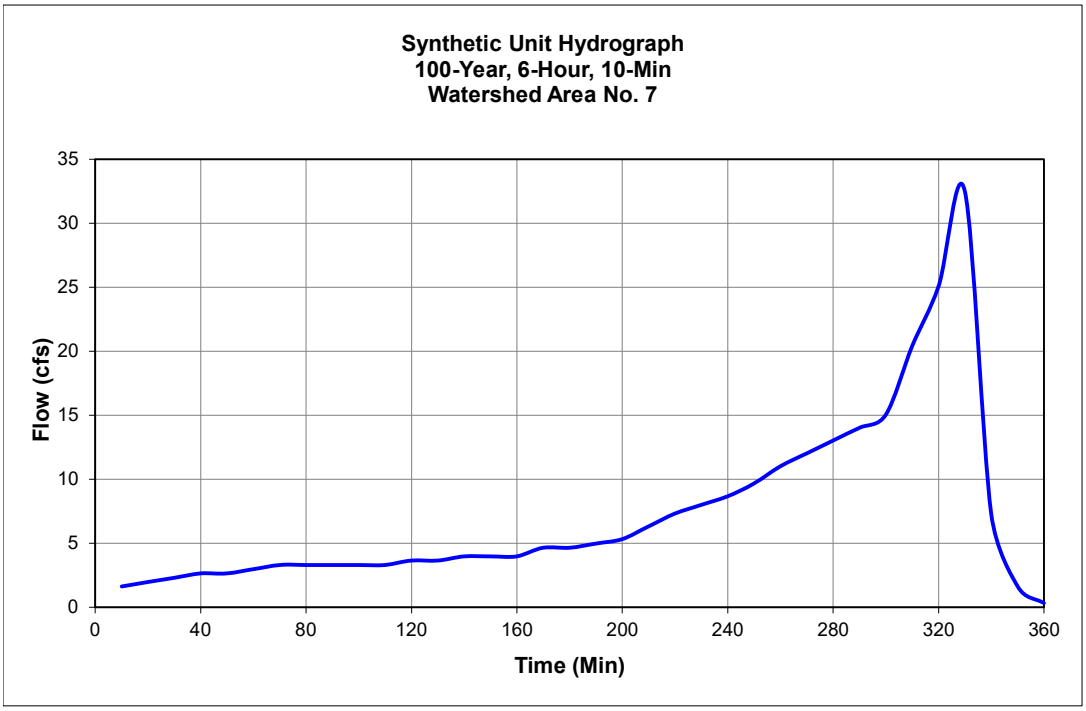
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	7	
Drainage Area - acres	20.3	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.10	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.1	0.182	0.10	0.15	0.08	1.6	10
2	1.2	0.198	0.10	0.16	0.10	2.0	20
3	1.3	0.215	0.10	0.17	0.11	2.3	30
4	1.4	0.231	0.10	0.18	0.13	2.6	40
5	1.4	0.231	0.10	0.18	0.13	2.6	50
6	1.5	0.248	0.10	0.20	0.15	3.0	60
7	1.6	0.264	0.10	0.21	0.16	3.3	70
8	1.6	0.264	0.10	0.21	0.16	3.3	80
9	1.6	0.264	0.10	0.21	0.16	3.3	90
10	1.6	0.264	0.10	0.21	0.16	3.3	100
11	1.6	0.264	0.10	0.21	0.16	3.3	110
12	1.7	0.281	0.10	0.22	0.18	3.7	120
13	1.7	0.281	0.10	0.22	0.18	3.7	130
14	1.8	0.297	0.10	0.24	0.20	4.0	140
15	1.8	0.297	0.10	0.24	0.20	4.0	150
16	1.8	0.297	0.10	0.24	0.20	4.0	160
17	2	0.330	0.10	0.26	0.23	4.7	170
18	2	0.330	0.10	0.26	0.23	4.7	180
19	2.1	0.347	0.10	0.28	0.25	5.0	190
20	2.2	0.363	0.10	0.29	0.26	5.3	200
21	2.5	0.413	0.10	0.33	0.31	6.3	210
22	2.8	0.462	0.10	0.37	0.36	7.3	220
23	3	0.495	0.10	0.40	0.39	8.0	230
24	3.2	0.528	0.10	0.42	0.43	8.7	240
25	3.5	0.578	0.10	0.46	0.48	9.7	250
26	3.9	0.644	0.10	0.51	0.54	11.0	260
27	4.2	0.693	0.10	0.55	0.59	12.0	270
28	4.5	0.743	0.10	0.59	0.64	13.0	280
29	4.8	0.792	0.10	0.63	0.69	14.0	290
30	5.1	0.842	0.10	0.67	0.74	15.0	300
31	6.7	1.106	0.10	0.88	1.00	20.4	310
32	8.1	1.337	0.10	1.07	1.24	25.1	320
33	10.3	1.700	0.10	1.36	1.60	32.5	330
34	2.8	0.462	0.10	0.37	0.36	7.3	340
35	1.1	0.182	0.10	0.15	0.08	1.6	350
36	0.5	0.083	0.10	0.07	0.02	0.3	360
	100				12.91	in/hr	
					2.15	in	
					3.64	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!

Riverside County
Synthetic Unit Hydrograph
Short Cut Method



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

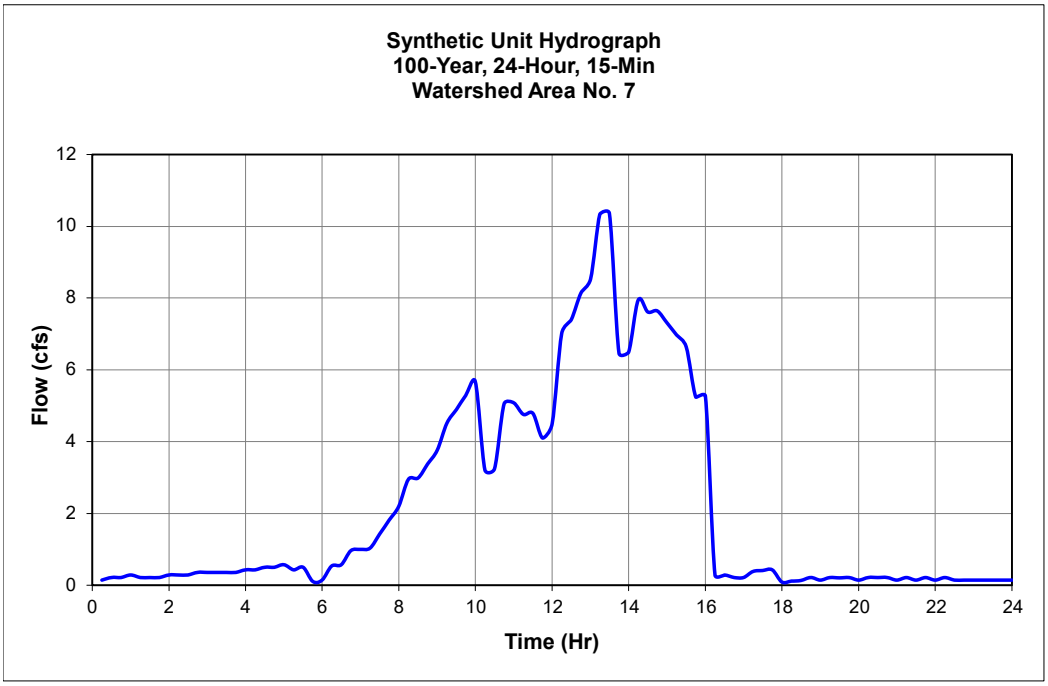
Watershed Area Designation	7	
Drainage Area - acres	20.3	
Unit Time - minutes	15	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	24
Total Adjusted Storm Rain-Inches	4.39	
Constant Loss Rate - in/hr	per calc	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (hr)
1	0.2	0.035	0.18	0.03	0.01	0.1	0.25
2	0.3	0.053	0.18	0.04	0.01	0.2	0.5
3	0.3	0.053	0.17	0.04	0.01	0.2	0.75
4	0.4	0.070	0.17	0.06	0.01	0.3	1
5	0.3	0.053	0.17	0.04	0.01	0.2	1.25
6	0.3	0.053	0.17	0.04	0.01	0.2	1.5
7	0.3	0.053	0.17	0.04	0.01	0.2	1.75
8	0.4	0.070	0.16	0.06	0.01	0.3	2
9	0.4	0.070	0.16	0.06	0.01	0.3	2.25
10	0.4	0.070	0.16	0.06	0.01	0.3	2.5
11	0.5	0.088	0.16	0.07	0.02	0.4	2.75
12	0.5	0.088	0.16	0.07	0.02	0.4	3
13	0.5	0.088	0.15	0.07	0.02	0.4	3.25
14	0.5	0.088	0.15	0.07	0.02	0.4	3.5
15	0.5	0.088	0.15	0.07	0.02	0.4	3.75
16	0.6	0.105	0.15	0.08	0.02	0.4	4
17	0.6	0.105	0.15	0.08	0.02	0.4	4.25
18	0.7	0.123	0.14	0.10	0.02	0.5	4.5
19	0.7	0.123	0.14	0.10	0.02	0.5	4.75
20	0.8	0.140	0.14	0.11	0.03	0.6	5
21	0.6	0.105	0.14	0.08	0.02	0.4	5.25
22	0.7	0.123	0.14	0.10	0.02	0.5	5.5
23	0.8	0.140	0.14	0.11	0.01	0.1	5.75
24	0.8	0.140	0.13	0.11	0.01	0.1	6
25	0.9	0.158	0.13	0.13	0.03	0.5	6.25
26	0.9	0.158	0.13	0.13	0.03	0.6	6.5
27	1	0.176	0.13	0.14	0.05	1.0	6.75
28	1	0.176	0.13	0.14	0.05	1.0	7
29	1	0.176	0.12	0.14	0.05	1.0	7.25
30	1.1	0.193	0.12	0.15	0.07	1.4	7.5
31	1.2	0.211	0.12	0.17	0.09	1.8	7.75
32	1.3	0.228	0.12	0.18	0.11	2.2	8
33	1.5	0.263	0.12	0.21	0.15	3.0	8.25
34	1.5	0.263	0.12	0.21	0.15	3.0	8.5
35	1.6	0.281	0.11	0.22	0.17	3.4	8.75
36	1.7	0.299	0.11	0.24	0.19	3.8	9
37	1.9	0.334	0.11	0.27	0.22	4.5	9.25
38	2	0.351	0.11	0.28	0.24	4.9	9.5
39	2.1	0.369	0.11	0.30	0.26	5.3	9.75
40	2.2	0.386	0.11	0.31	0.28	5.7	10
41	1.5	0.263	0.11	0.21	0.16	3.2	10.25
42	1.5	0.263	0.10	0.21	0.16	3.2	10.5
43	2	0.351	0.10	0.28	0.25	5.1	10.75
44	2	0.351	0.10	0.28	0.25	5.1	11
45	1.9	0.334	0.10	0.27	0.23	4.8	11.25
46	1.9	0.334	0.10	0.27	0.24	4.8	11.5
47	1.7	0.299	0.10	0.24	0.20	4.1	11.75
48	1.8	0.316	0.09	0.25	0.22	4.5	12
49	2.5	0.439	0.09	0.35	0.35	7.0	12.25
50	2.6	0.457	0.09	0.37	0.36	7.4	12.5
51	2.8	0.492	0.09	0.39	0.40	8.1	12.75
52	2.9	0.509	0.09	0.41	0.42	8.5	13
53	3.4	0.597	0.09	0.48	0.51	10.3	13.25
54	3.4	0.597	0.09	0.48	0.51	10.4	13.5
55	2.3	0.404	0.09	0.32	0.32	6.5	13.75
56	2.3	0.404	0.08	0.32	0.32	6.5	14
57	2.7	0.474	0.08	0.38	0.39	7.9	14.25
58	2.6	0.457	0.08	0.37	0.38	7.6	14.5
59	2.6	0.457	0.08	0.37	0.38	7.6	14.75
60	2.5	0.439	0.08	0.35	0.36	7.3	15
61	2.4	0.421	0.08	0.34	0.34	7.0	15.25
62	2.3	0.404	0.08	0.32	0.33	6.6	15.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

63	1.9	0.334	0.08	0.27	0.26	5.2	15.75
64	1.9	0.334	0.07	0.27	0.26	5.3	16
65	0.4	0.070	0.07	0.06	0.01	0.3	16.25
66	0.4	0.070	0.07	0.06	0.01	0.3	16.5
67	0.3	0.053	0.07	0.04	0.01	0.2	16.75
68	0.3	0.053	0.07	0.04	0.01	0.2	17
69	0.5	0.088	0.07	0.07	0.02	0.4	17.25
70	0.5	0.088	0.07	0.07	0.02	0.4	17.5
71	0.5	0.088	0.07	0.07	0.02	0.4	17.75
72	0.4	0.070	0.07	0.06	0.00	0.1	18
73	0.4	0.070	0.06	0.06	0.01	0.1	18.25
74	0.4	0.070	0.06	0.06	0.01	0.1	18.5
75	0.3	0.053	0.06	0.04	0.01	0.2	18.75
76	0.2	0.035	0.06	0.03	0.01	0.1	19
77	0.3	0.053	0.06	0.04	0.01	0.2	19.25
78	0.4	0.070	0.06	0.06	0.01	0.2	19.5
79	0.3	0.053	0.06	0.04	0.01	0.2	19.75
80	0.2	0.035	0.06	0.03	0.01	0.1	20
81	0.3	0.053	0.06	0.04	0.01	0.2	20.25
82	0.3	0.053	0.06	0.04	0.01	0.2	20.5
83	0.3	0.053	0.06	0.04	0.01	0.2	20.75
84	0.2	0.035	0.06	0.03	0.01	0.1	21
85	0.3	0.053	0.06	0.04	0.01	0.2	21.25
86	0.2	0.035	0.05	0.03	0.01	0.1	21.5
87	0.3	0.053	0.05	0.04	0.01	0.2	21.75
88	0.2	0.035	0.05	0.03	0.01	0.1	22
89	0.3	0.053	0.05	0.04	0.01	0.2	22.25
90	0.2	0.035	0.05	0.03	0.01	0.1	22.5
91	0.2	0.035	0.05	0.03	0.01	0.1	22.75
92	0.2	0.035	0.05	0.03	0.01	0.1	23
93	0.2	0.035	0.05	0.03	0.01	0.1	23.25
94	0.2	0.035	0.05	0.03	0.01	0.1	23.5
95	0.2	0.035	0.05	0.03	0.01	0.1	23.75
96	0.2	0.035	0.05	0.03	0.01	0.1	24
	100				10.40	in/hr	
					2.60	in	
					4.40	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



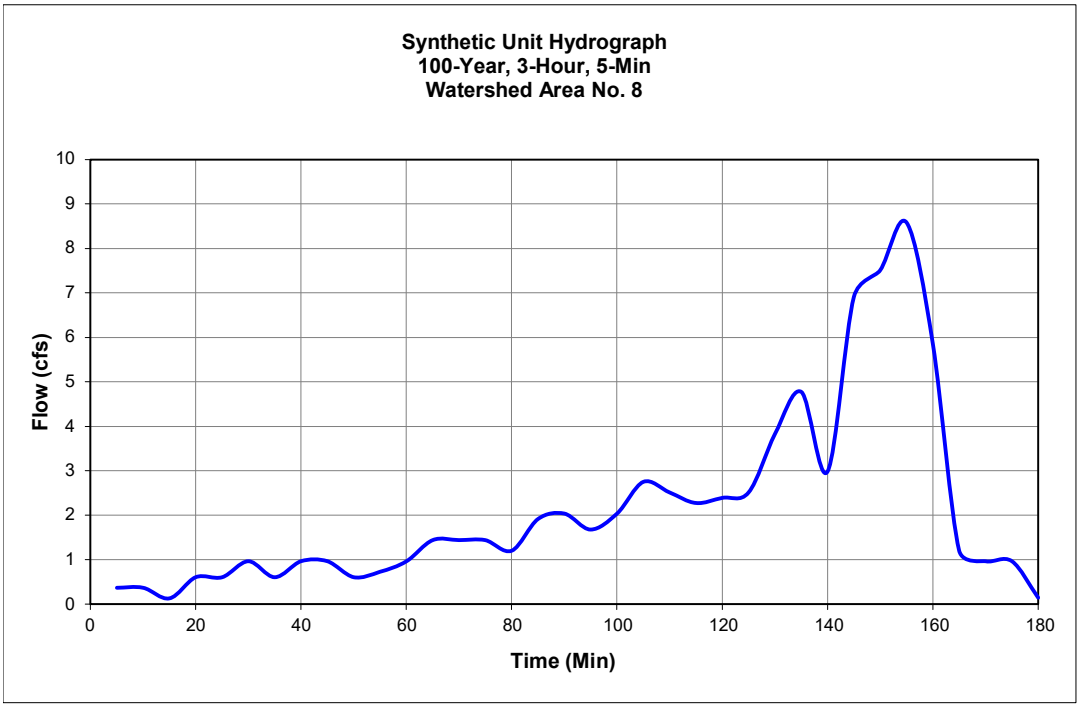
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	8	
Drainage Area - acres	12.4	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.10	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.3	0.351	0.10	0.28	0.26	3.2	5
2	1.3	0.351	0.10	0.28	0.26	3.2	10
3	1.1	0.297	0.10	0.24	0.20	2.5	15
4	1.5	0.405	0.10	0.32	0.31	3.8	20
5	1.5	0.405	0.10	0.32	0.31	3.8	25
6	1.8	0.486	0.10	0.39	0.39	4.8	30
7	1.5	0.405	0.10	0.32	0.31	3.8	35
8	1.8	0.486	0.10	0.39	0.39	4.8	40
9	1.8	0.486	0.10	0.39	0.39	4.8	45
10	1.5	0.405	0.10	0.32	0.31	3.8	50
11	1.6	0.432	0.10	0.35	0.34	4.2	55
12	1.8	0.486	0.10	0.39	0.39	4.8	60
13	2.2	0.594	0.10	0.48	0.50	6.2	65
14	2.2	0.594	0.10	0.48	0.50	6.2	70
15	2.2	0.594	0.10	0.48	0.50	6.2	75
16	2	0.540	0.10	0.43	0.44	5.5	80
17	2.6	0.702	0.10	0.56	0.61	7.5	85
18	2.7	0.729	0.10	0.58	0.63	7.9	90
19	2.4	0.648	0.10	0.52	0.55	6.9	95
20	2.7	0.729	0.10	0.58	0.63	7.9	100
21	3.3	0.891	0.10	0.71	0.80	9.9	105
22	3.1	0.837	0.10	0.67	0.74	9.2	110
23	2.9	0.783	0.10	0.63	0.69	8.5	115
24	3	0.810	0.10	0.65	0.71	8.9	120
25	3.1	0.837	0.10	0.67	0.74	9.2	125
26	4.2	1.134	0.10	0.91	1.04	12.9	130
27	5	1.350	0.10	1.08	1.25	15.6	135
28	3.5	0.945	0.10	0.76	0.85	10.5	140
29	6.8	1.836	0.10	1.47	1.74	21.6	145
30	7.3	1.971	0.10	1.58	1.88	23.3	150
31	8.2	2.214	0.10	1.77	2.12	26.3	155
32	5.9	1.593	0.10	1.27	1.50	18.6	160
33	2	0.540	0.10	0.43	0.44	5.5	165
34	1.8	0.486	0.10	0.39	0.39	4.8	170
35	1.8	0.486	0.10	0.39	0.39	4.8	175
36	0.6	0.162	0.10	0.13	0.07	0.8	180
	100				23.57	in/hr	
					1.96	in	
					2.03	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

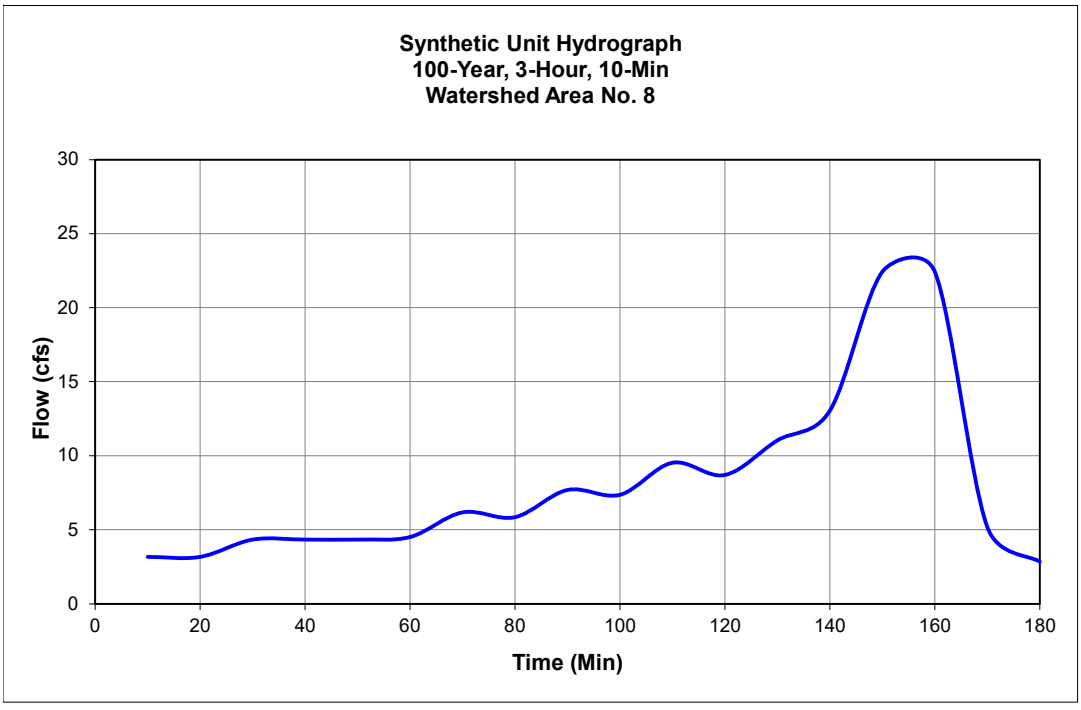


Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	8	
Drainage Area - acres	12.4	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	3
Total Adjusted Storm Rain-Inches	2.25	
Constant Loss Rate - in/hr	0.10	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	2.6	0.351	0.10	0.28	0.26	3.2	10
2	2.6	0.351	0.10	0.28	0.26	3.2	20
3	3.3	0.446	0.10	0.36	0.35	4.3	30
4	3.3	0.446	0.10	0.36	0.35	4.3	40
5	3.3	0.446	0.10	0.36	0.35	4.3	50
6	3.4	0.459	0.10	0.37	0.36	4.5	60
7	4.4	0.594	0.10	0.48	0.50	6.2	70
8	4.2	0.567	0.10	0.45	0.47	5.8	80
9	5.3	0.716	0.10	0.57	0.62	7.7	90
10	5.1	0.689	0.10	0.55	0.59	7.4	100
11	6.4	0.864	0.10	0.69	0.77	9.5	110
12	5.9	0.797	0.10	0.64	0.70	8.7	120
13	7.3	0.986	0.10	0.79	0.89	11.0	130
14	8.5	1.148	0.10	0.92	1.05	13.0	140
15	14.1	1.904	0.10	1.52	1.81	22.4	150
16	14.1	1.904	0.10	1.52	1.81	22.4	160
17	3.8	0.513	0.10	0.41	0.42	5.2	170
18	2.4	0.324	0.10	0.26	0.23	2.8	180
	100				11.79	in/hr	
					1.96	in	
					2.03	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

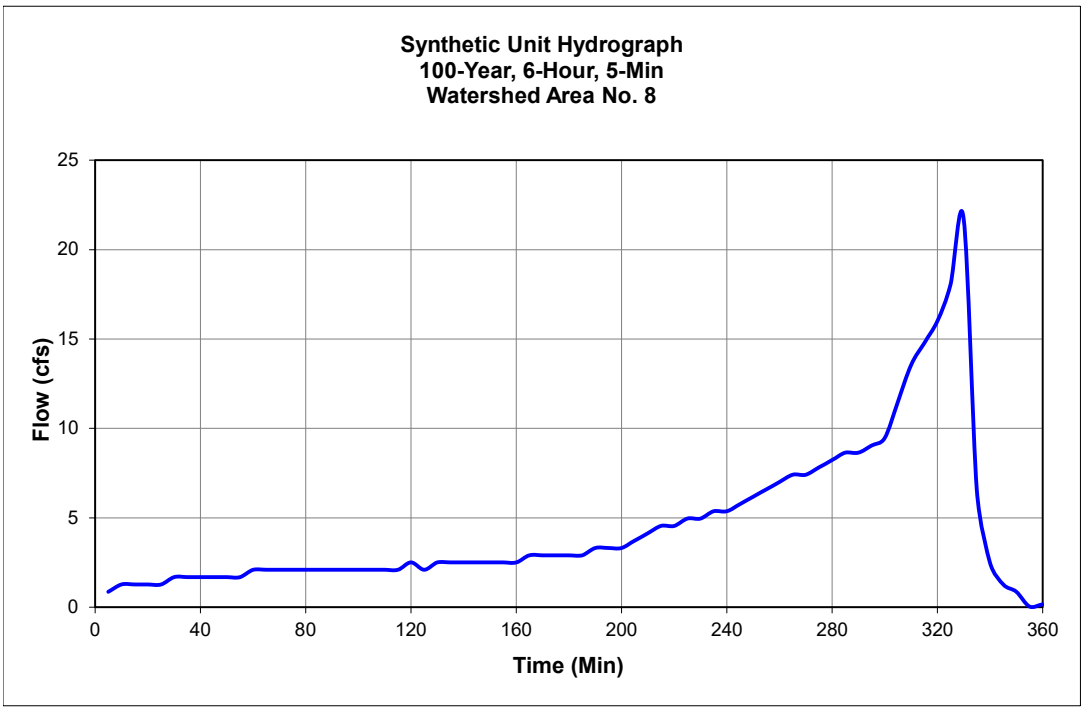
Watersehd Area Designation	8	
Drainage Area - acres	12.4	
Unit Time - minutes	5	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.10	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	0.5	0.165	0.10	0.13	0.07	0.9	5
2	0.6	0.198	0.10	0.16	0.10	1.3	10
3	0.6	0.198	0.10	0.16	0.10	1.3	15
4	0.6	0.198	0.10	0.16	0.10	1.3	20
5	0.6	0.198	0.10	0.16	0.10	1.3	25
6	0.7	0.231	0.10	0.18	0.14	1.7	30
7	0.7	0.231	0.10	0.18	0.14	1.7	35
8	0.7	0.231	0.10	0.18	0.14	1.7	40
9	0.7	0.231	0.10	0.18	0.14	1.7	45
10	0.7	0.231	0.10	0.18	0.14	1.7	50
11	0.7	0.231	0.10	0.18	0.14	1.7	55
12	0.8	0.264	0.10	0.21	0.17	2.1	60
13	0.8	0.264	0.10	0.21	0.17	2.1	65
14	0.8	0.264	0.10	0.21	0.17	2.1	70
15	0.8	0.264	0.10	0.21	0.17	2.1	75
16	0.8	0.264	0.10	0.21	0.17	2.1	80
17	0.8	0.264	0.10	0.21	0.17	2.1	85
18	0.8	0.264	0.10	0.21	0.17	2.1	90
19	0.8	0.264	0.10	0.21	0.17	2.1	95
20	0.8	0.264	0.10	0.21	0.17	2.1	100
21	0.8	0.264	0.10	0.21	0.17	2.1	105
22	0.8	0.264	0.10	0.21	0.17	2.1	110
23	0.8	0.264	0.10	0.21	0.17	2.1	115
24	0.9	0.297	0.10	0.24	0.20	2.5	120
25	0.8	0.264	0.10	0.21	0.17	2.1	125
26	0.9	0.297	0.10	0.24	0.20	2.5	130
27	0.9	0.297	0.10	0.24	0.20	2.5	135
28	0.9	0.297	0.10	0.24	0.20	2.5	140
29	0.9	0.297	0.10	0.24	0.20	2.5	145
30	0.9	0.297	0.10	0.24	0.20	2.5	150
31	0.9	0.297	0.10	0.24	0.20	2.5	155
32	0.9	0.297	0.10	0.24	0.20	2.5	160
33	1	0.330	0.10	0.26	0.23	2.9	165
34	1	0.330	0.10	0.26	0.23	2.9	170
35	1	0.330	0.10	0.26	0.23	2.9	175
36	1	0.330	0.10	0.26	0.23	2.9	180
37	1	0.330	0.10	0.26	0.23	2.9	185
38	1.1	0.363	0.10	0.29	0.27	3.3	190
39	1.1	0.363	0.10	0.29	0.27	3.3	195
40	1.1	0.363	0.10	0.29	0.27	3.3	200
41	1.2	0.396	0.10	0.32	0.30	3.7	205
42	1.3	0.429	0.10	0.34	0.33	4.1	210
43	1.4	0.462	0.10	0.37	0.37	4.5	215
44	1.4	0.462	0.10	0.37	0.37	4.5	220
45	1.5	0.495	0.10	0.40	0.40	5.0	225
46	1.5	0.495	0.10	0.40	0.40	5.0	230
47	1.6	0.528	0.10	0.42	0.43	5.4	235
48	1.6	0.528	0.10	0.42	0.43	5.4	240
49	1.7	0.561	0.10	0.45	0.47	5.8	245
50	1.8	0.594	0.10	0.48	0.50	6.2	250
51	1.9	0.627	0.10	0.50	0.53	6.6	255
52	2	0.660	0.10	0.53	0.56	7.0	260
53	2.1	0.693	0.10	0.55	0.60	7.4	265
54	2.1	0.693	0.10	0.55	0.60	7.4	270
55	2.2	0.726	0.10	0.58	0.63	7.8	275
56	2.3	0.759	0.10	0.61	0.66	8.2	280
57	2.4	0.792	0.10	0.63	0.70	8.6	285
58	2.4	0.792	0.10	0.63	0.70	8.6	290
59	2.5	0.825	0.10	0.66	0.73	9.0	295
60	2.6	0.858	0.10	0.69	0.76	9.5	300
61	3.1	1.023	0.10	0.82	0.93	11.5	305
62	3.6	1.188	0.10	0.95	1.09	13.5	310
63	3.9	1.287	0.10	1.03	1.19	14.8	315

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

64	4.2	1.386	0.10	1.11	1.29	16.0	320
65	4.7	1.551	0.10	1.24	1.46	18.1	325
66	5.6	1.848	0.10	1.48	1.75	21.7	330
67	1.9	0.627	0.10	0.50	0.53	6.6	335
68	0.9	0.297	0.10	0.24	0.20	2.5	340
69	0.6	0.198	0.10	0.16	0.10	1.3	345
70	0.5	0.165	0.10	0.13	0.07	0.9	350
71	0.3	0.099	0.10	0.08	0.00	0.0	355
72	0.2	0.066	0.10	0.05	0.01	0.2	360
	100				26.18	in/hr	
					2.18	in	
					2.25	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



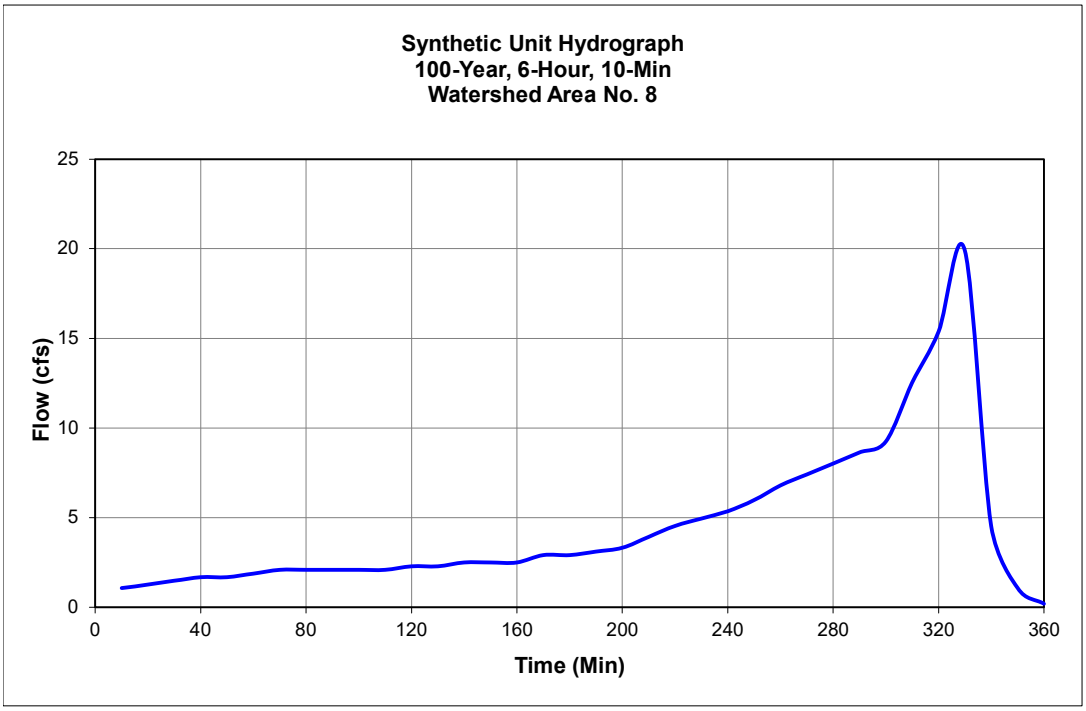
Riverside County
Synthetic Unit Hydrograph
Short Cut Method

Watershed Area Designation	8	
Drainage Area - acres	12.4	
Unit Time - minutes	10	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	6
Total Adjusted Storm Rain-Inches	2.75	
Constant Loss Rate - in/hr	0.10	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (min)
1	1.1	0.182	0.10	0.15	0.09	1.1	10
2	1.2	0.198	0.10	0.16	0.10	1.3	20
3	1.3	0.215	0.10	0.17	0.12	1.5	30
4	1.4	0.231	0.10	0.18	0.14	1.7	40
5	1.4	0.231	0.10	0.18	0.14	1.7	50
6	1.5	0.248	0.10	0.20	0.15	1.9	60
7	1.6	0.264	0.10	0.21	0.17	2.1	70
8	1.6	0.264	0.10	0.21	0.17	2.1	80
9	1.6	0.264	0.10	0.21	0.17	2.1	90
10	1.6	0.264	0.10	0.21	0.17	2.1	100
11	1.6	0.264	0.10	0.21	0.17	2.1	110
12	1.7	0.281	0.10	0.22	0.19	2.3	120
13	1.7	0.281	0.10	0.22	0.19	2.3	130
14	1.8	0.297	0.10	0.24	0.20	2.5	140
15	1.8	0.297	0.10	0.24	0.20	2.5	150
16	1.8	0.297	0.10	0.24	0.20	2.5	160
17	2	0.330	0.10	0.26	0.23	2.9	170
18	2	0.330	0.10	0.26	0.23	2.9	180
19	2.1	0.347	0.10	0.28	0.25	3.1	190
20	2.2	0.363	0.10	0.29	0.27	3.3	200
21	2.5	0.413	0.10	0.33	0.32	3.9	210
22	2.8	0.462	0.10	0.37	0.37	4.5	220
23	3	0.495	0.10	0.40	0.40	5.0	230
24	3.2	0.528	0.10	0.42	0.43	5.4	240
25	3.5	0.578	0.10	0.46	0.48	6.0	250
26	3.9	0.644	0.10	0.51	0.55	6.8	260
27	4.2	0.693	0.10	0.55	0.60	7.4	270
28	4.5	0.743	0.10	0.59	0.65	8.0	280
29	4.8	0.792	0.10	0.63	0.70	8.6	290
30	5.1	0.842	0.10	0.67	0.75	9.3	300
31	6.7	1.106	0.10	0.88	1.01	12.5	310
32	8.1	1.337	0.10	1.07	1.24	15.4	320
33	10.3	1.700	0.10	1.36	1.60	19.9	330
34	2.8	0.462	0.10	0.37	0.37	4.5	340
35	1.1	0.182	0.10	0.15	0.09	1.1	350
36	0.5	0.083	0.10	0.07	0.02	0.2	360
	100				13.10	in/hr	
					2.18	in	
					2.26	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!

Riverside County
Synthetic Unit Hydrograph
Short Cut Method



Riverside County
Synthetic Unit Hydrograph
Short Cut Method

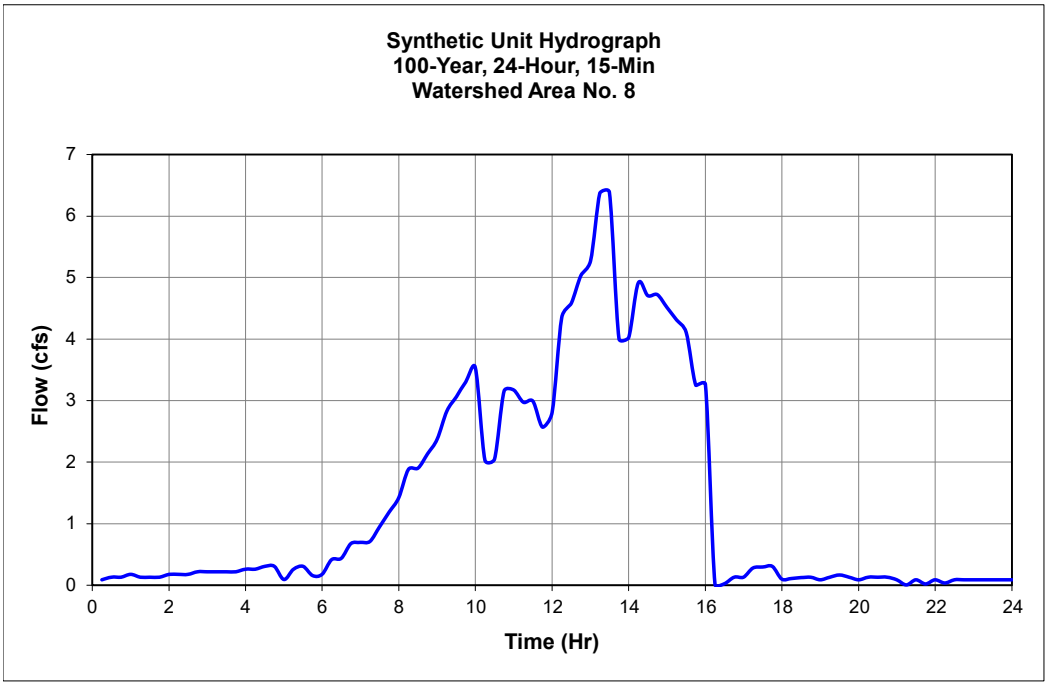
Watershed Area Designation	8	
Drainage Area - acres	12.4	
Unit Time - minutes	15	
Lag Time - minutes	3	
Storm Frequency & Duration - yr/hr	100	24
Total Adjusted Storm Rain-Inches	4.39	
Constant Loss Rate - in/hr	per calc	
Low Loss Rate-Percentage	80	

Unit Time Period	Pattern Percent	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow cfs	Time (hr)
1	0.2	0.035	0.17	0.03	0.01	0.1	0.25
2	0.3	0.053	0.17	0.04	0.01	0.1	0.5
3	0.3	0.053	0.16	0.04	0.01	0.1	0.75
4	0.4	0.070	0.16	0.06	0.01	0.2	1
5	0.3	0.053	0.16	0.04	0.01	0.1	1.25
6	0.3	0.053	0.16	0.04	0.01	0.1	1.5
7	0.3	0.053	0.16	0.04	0.01	0.1	1.75
8	0.4	0.070	0.15	0.06	0.01	0.2	2
9	0.4	0.070	0.15	0.06	0.01	0.2	2.25
10	0.4	0.070	0.15	0.06	0.01	0.2	2.5
11	0.5	0.088	0.15	0.07	0.02	0.2	2.75
12	0.5	0.088	0.15	0.07	0.02	0.2	3
13	0.5	0.088	0.15	0.07	0.02	0.2	3.25
14	0.5	0.088	0.14	0.07	0.02	0.2	3.5
15	0.5	0.088	0.14	0.07	0.02	0.2	3.75
16	0.6	0.105	0.14	0.08	0.02	0.3	4
17	0.6	0.105	0.14	0.08	0.02	0.3	4.25
18	0.7	0.123	0.14	0.10	0.02	0.3	4.5
19	0.7	0.123	0.13	0.10	0.02	0.3	4.75
20	0.8	0.140	0.13	0.11	0.01	0.1	5
21	0.6	0.105	0.13	0.08	0.02	0.3	5.25
22	0.7	0.123	0.13	0.10	0.02	0.3	5.5
23	0.8	0.140	0.13	0.11	0.01	0.2	5.75
24	0.8	0.140	0.13	0.11	0.01	0.2	6
25	0.9	0.158	0.12	0.13	0.03	0.4	6.25
26	0.9	0.158	0.12	0.13	0.04	0.4	6.5
27	1	0.176	0.12	0.14	0.05	0.7	6.75
28	1	0.176	0.12	0.14	0.06	0.7	7
29	1	0.176	0.12	0.14	0.06	0.7	7.25
30	1.1	0.193	0.12	0.15	0.08	1.0	7.5
31	1.2	0.211	0.11	0.17	0.10	1.2	7.75
32	1.3	0.228	0.11	0.18	0.12	1.4	8
33	1.5	0.263	0.11	0.21	0.15	1.9	8.25
34	1.5	0.263	0.11	0.21	0.15	1.9	8.5
35	1.6	0.281	0.11	0.22	0.17	2.1	8.75
36	1.7	0.299	0.11	0.24	0.19	2.4	9
37	1.9	0.334	0.11	0.27	0.23	2.8	9.25
38	2	0.351	0.10	0.28	0.25	3.1	9.5
39	2.1	0.369	0.10	0.30	0.27	3.3	9.75
40	2.2	0.386	0.10	0.31	0.29	3.5	10
41	1.5	0.263	0.10	0.21	0.16	2.0	10.25
42	1.5	0.263	0.10	0.21	0.17	2.0	10.5
43	2	0.351	0.10	0.28	0.25	3.2	10.75
44	2	0.351	0.10	0.28	0.26	3.2	11
45	1.9	0.334	0.09	0.27	0.24	3.0	11.25
46	1.9	0.334	0.09	0.27	0.24	3.0	11.5
47	1.7	0.299	0.09	0.24	0.21	2.6	11.75
48	1.8	0.316	0.09	0.25	0.23	2.8	12
49	2.5	0.439	0.09	0.35	0.35	4.3	12.25
50	2.6	0.457	0.09	0.37	0.37	4.6	12.5
51	2.8	0.492	0.09	0.39	0.41	5.0	12.75
52	2.9	0.509	0.08	0.41	0.42	5.3	13
53	3.4	0.597	0.08	0.48	0.51	6.4	13.25
54	3.4	0.597	0.08	0.48	0.52	6.4	13.5
55	2.3	0.404	0.08	0.32	0.32	4.0	13.75
56	2.3	0.404	0.08	0.32	0.32	4.0	14
57	2.7	0.474	0.08	0.38	0.40	4.9	14.25
58	2.6	0.457	0.08	0.37	0.38	4.7	14.5
59	2.6	0.457	0.08	0.37	0.38	4.7	14.75
60	2.5	0.439	0.07	0.35	0.36	4.5	15
61	2.4	0.421	0.07	0.34	0.35	4.3	15.25
62	2.3	0.404	0.07	0.32	0.33	4.1	15.5

Riverside County
Synthetic Unit Hydrograph
Short Cut Method

63	1.9	0.334	0.07	0.27	0.26	3.3	15.75
64	1.9	0.334	0.07	0.27	0.26	3.3	16
65	0.4	0.070	0.07	0.06	0.00	0.0	16.25
66	0.4	0.070	0.07	0.06	0.00	0.0	16.5
67	0.3	0.053	0.07	0.04	0.01	0.1	16.75
68	0.3	0.053	0.07	0.04	0.01	0.1	17
69	0.5	0.088	0.07	0.07	0.02	0.3	17.25
70	0.5	0.088	0.06	0.07	0.02	0.3	17.5
71	0.5	0.088	0.06	0.07	0.02	0.3	17.75
72	0.4	0.070	0.06	0.06	0.01	0.1	18
73	0.4	0.070	0.06	0.06	0.01	0.1	18.25
74	0.4	0.070	0.06	0.06	0.01	0.1	18.5
75	0.3	0.053	0.06	0.04	0.01	0.1	18.75
76	0.2	0.035	0.06	0.03	0.01	0.1	19
77	0.3	0.053	0.06	0.04	0.01	0.1	19.25
78	0.4	0.070	0.06	0.06	0.01	0.2	19.5
79	0.3	0.053	0.06	0.04	0.01	0.1	19.75
80	0.2	0.035	0.06	0.03	0.01	0.1	20
81	0.3	0.053	0.05	0.04	0.01	0.1	20.25
82	0.3	0.053	0.05	0.04	0.01	0.1	20.5
83	0.3	0.053	0.05	0.04	0.01	0.1	20.75
84	0.2	0.035	0.05	0.03	0.01	0.1	21
85	0.3	0.053	0.05	0.04	0.00	0.0	21.25
86	0.2	0.035	0.05	0.03	0.01	0.1	21.5
87	0.3	0.053	0.05	0.04	0.00	0.0	21.75
88	0.2	0.035	0.05	0.03	0.01	0.1	22
89	0.3	0.053	0.05	0.04	0.00	0.0	22.25
90	0.2	0.035	0.05	0.03	0.01	0.1	22.5
91	0.2	0.035	0.05	0.03	0.01	0.1	22.75
92	0.2	0.035	0.05	0.03	0.01	0.1	23
93	0.2	0.035	0.05	0.03	0.01	0.1	23.25
94	0.2	0.035	0.05	0.03	0.01	0.1	23.5
95	0.2	0.035	0.05	0.03	0.01	0.1	23.75
96	0.2	0.035	0.05	0.03	0.01	0.1	24
	100				10.59	in/hr	
					2.65	in	
					2.73	ac-ft	

Lake Area - acres	0
Lake normal WSE	0
Lake 100yr WSE	#DIV/0!



APPENDIX C

Lake Sizing

DMA-1

TOTAL AREA	51.5 AC					
IMP.	20.4 AC					
PERVIOUS	31.1 AC					
PATH	1090 FT	0.21 MILES				
HP	990 FT		100YR-24HR	5.7 AC-FT		
LP	975 FT				+ 10%	
SLOPE	0.014	72.66 FT/MILE			**6.3 AC-FT**	
LAKE	2.24 AC					
STORMWATER DEPTH		2.8 FT				

DMA-2

TOTAL AREA	39.8 AC					
IMP.	10.7 AC					
PERVIOUS	29.1 AC					
PATH	880 FT	0.17 MILES				
HP	990 FT		100YR-24HR	4.5 AC-FT		
LP	957 FT				+ 10%	
SLOPE	0.038	198.00 FT/MILE			**5.0 AC-FT**	
LAKE	2.05 AC					
STORMWATER DEPTH		2.4 FT				

DMA-3

TOTAL AREA	19.5 AC					
IMP.	9.9 AC					
PERVIOUS	9.6 AC					
PATH	1240 FT	0.23 MILES				
HP	990 FT		100YR-24HR	2.6 AC-FT		
LP	957 FT				+ 10%	
SLOPE	0.027	140.52 FT/MILE			**2.9 AC-FT**	
LAKE	0.96 AC					
STORMWATER DEPTH		3.0 FT				

DMA-4

TOTAL AREA	33.2	AC					
IMP.	20.2	AC					
PERVIOUS	13	AC					
PATH	2190	FT	0.41	MILES			
HP	987	FT			100YR-24HR	4.1	AC-FT
LP	957	FT					+ 10%
SLOPE	0.014		79.56	FT/MILE			**4.5 AC-FT**
LAKE	0.75	AC					
STORMWATER DEPTH			6.0	FT			

DMA-5

TOTAL AREA	35.7	AC					
IMP.	21.1	AC					
PERVIOUS	14.6	AC					
PATH	2280	FT	0.43	MILES			
HP	975	FT			100YR-24HR	4.4	AC-FT
LP	955	FT					+ 10%
SLOPE	0.009		46.32	FT/MILE			**4.8 AC-FT**
RETENTION	0.82	AC					
STORMWATER DEPTH			5.9	FT			

DMA-6 (OFFSITE)

TOTAL AREA	11.6	AC					
IMP.	0	AC					
PERVIOUS	11.6	AC					
PATH	1320	FT	0.25	MILES			
HP	988	FT			100YR-24HR	2.6	AC-FT
LP	980	FT					+ 10%
SLOPE	0.006		132.00	FT/MILE			**2.9 AC-FT**
LAKE	0	AC					
STORMWATER DEPTH			0.0	FT			

DMA-7 (OFFSITE)

TOTAL AREA	20.3	AC					
IMP.	0	AC					
PERVIOUS	20.3	AC					
PATH	1380	FT	0.26	MILES			
HP	988	FT			100YR-24HR	4.4 AC-FT	
LP	980	FT					+ 10%
SLOPE	0.006		114.78	FT/MILE			**4.8 AC-FT**
LAKE	0	AC					
STORMWATER DEPTH			0.0	FT			

DMA-8 (OFFSITE)

TOTAL AREA	12.4	AC					
IMP.	0	AC					
PERVIOUS	12.4	AC					
PATH	1340	FT	0.25	MILES			
HP	988	FT			100YR-24HR	2.7 AC-FT	
LP	980	FT					+ 10%
SLOPE	0.006		78.81	FT/MILE			**3.0 AC-FT**
LAKE	0	AC					
STORMWATER DEPTH			0.0	FT			

OVERALL SUMMARY

VOLUME REQUIRED	**34.1 AC-FT**
VOLUME PROVIDED	**40.8 AC-FT**

APPENDIX D

Geotechnical Report

Geotechnical Report

APN 780-010-014
Vista Santa Rosa, California

Prepared for:

Bravo Properties, Inc.
P.O. Box 820
Palm Desert, CA 92240



LANDMARK
Geo-Engineers and Geologists

Prepared by:

LandMark Consultants, Inc.
77-948 Wildcat Drive
Palm Desert, CA 92211
(760) 360-0665

April 2022

LANDMARK
Geo-Engineers and Geologists
a MBE Company

780 N. 4th Street
El Centro, CA 92243
(760) 370-3000
landmark@landmark-ca.com

77-948 Wildcat Drive
Palm Desert, CA 92211
(760) 360-0665
gchandra@landmark-ca.com

April 20, 2022

Mr. Pablo Bravo
MBG Construction, LLC
72670 Fred Waring Drive
Palm Desert, CA 92260

Geotechnical Report
APN 780-010-014
Vista Santa Rosa, California
LCI Report No.: LP22032

Dear Mr. Bravo:

As per your request, ***LandMark Consultants, Inc.*** is providing the following geotechnical report for the proposed single-family residential project located along Avenue 53, east of Monroe Street, Vista Santa Rosa, County of Riverside, California. The proposed development will consist of nine (9) new single-family residential homes that are planned to be one story, wood/metal-frame structures with shallow reinforced concrete foundations and slab-on-grade concrete floors.

Purpose of Work

The purpose of this study was to investigate the upper 50 feet of subsurface soil at selected locations within the site for evaluation of physical/engineering properties. From the analysis of the field and laboratory data, professional opinions were developed and are provided in this report regarding geotechnical conditions at this site and the effect on design and construction.

Authorization

Mr. Pablo Bravo of MBG Construction, LLC provided authorization by written agreement to proceed with our work on February 3, 2022. We conducted our work in general accordance with our written proposal dated January 11, 2022.

Field Exploration

Initial subsurface exploration was performed on March 14, 2022 using Cal Pac Drilling of Yucaipa, California to advance five (5) borings to a depth of 20 to 50 feet below existing ground surface. The borings were advanced with a truck-mounted, Mobile B-61 drill rig using 8-inch diameter, hollow-stem, continuous-flight augers. The approximate boring locations were established in the field and plotted on the site map by sighting to discernable site features. The boring locations are shown on the Site and Exploration Plan (Plate A-2).

Our geo-technician observed the drilling operations and maintained a log of the soil encountered and sampling depths, visually classified the soil encountered during drilling in accordance with the Unified Soil Classification System, and obtained drive tube and bulk samples of the subsurface materials at selected intervals. Relatively undisturbed soil samples were retrieved using a 2-inch outside diameter (OD) split-spoon sampler or a 3-inch OD Modified California Split-Barrel (ring) sampler. The samples were obtained by driving the sampler ahead of the auger tip at selected depths.

The drill rig was equipped with a 140-pound CME automatic hammer with a 30-inch drop for conducting Standard Penetration Tests (SPT) in accordance with ASTM D1586. The number of blows required to drive the samplers the last 12 inches of an 18-inch drive length into the soil is recorded on the boring logs as "blows per foot". Blow counts reported on the boring logs represent the field blow counts. No corrections have been applied for effects of overburden pressure, automatic hammer drive energy, drill rod lengths, liners, and sampler diameter. When samples were not able to be driven an 18 inches depth, sampler penetration depth was recorded for 50 blows with a 140-lbs drive hammer.

After logging and sampling the soil, the exploratory borings were backfilled with the excavated material. The backfill was loosely placed and was not compacted to the requirements specified for engineered fill.

The subsurface logs are presented on Plates B-1 thru B-5 in Appendix B. A key to the log symbols is presented on Plate B-6. The stratification lines shown on the subsurface logs represent the approximate boundaries between the various strata. However, the transition from one stratum to another may be gradual over some range of depth.

Laboratory Testing

Laboratory tests were conducted on selected bulk soil samples to aid in classification and evaluation of selected properties of the site soils. The tests were conducted in general conformance to the procedures of the American Society for Testing and Materials (ASTM) or other standardized methods as referenced below. The laboratory testing program consisted of the following tests:

- Particle Size Analyses (ASTM D422)
- Unit Dry Densities (ASTM D2937)
- Moisture Contents (ASTM D2216)
- Moisture-Density Relationship (ASTM D1557)
- Chemical Analyses (soluble sulfates & chlorides, pH, and resistivity) (Caltrans Methods)

The laboratory test results are presented on the subsurface logs (Appendix B) and Appendix C. Engineering parameters of soil strength, compressibility, and relative density utilized for developing design criteria provided within this report were extrapolated from data obtained from the field and laboratory testing program.

Site Conditions

The project site is rectangular shaped in plan view, elongated in the north-south direction, and is relatively flat-lying. The site currently is vacant. The project site is bounded by Avenue 53rd on the south. Adjacent properties are flat-lying and are approximately at the same elevation with this site. Vacant lots, farming and single-family residences are located to around the subject site. The Cahuilla Desert Academy is located to the northeast.

The project site lies at an elevation of approximately 25 to 30 feet below mean sea level (AMSL) in the Coachella Valley region of the California low desert. Annual rainfall in this arid region is less than 4 inches per year with four months of average summertime temperatures above 100 ^{o}F. Winter temperatures are mild, seldom reaching freezing.

Geologic Setting

The project site is located in the Coachella Valley portion of the Salton Trough physiographic province. The Salton Trough is a geologic structural depression resulting from large scale regional faulting. The trough is bounded on the northeast by the San Andreas Fault and Chocolate Mountains and the southwest by the Peninsular Range and faults of the San Jacinto Fault Zone.

The Salton Trough represents the northward extension of the Gulf of California, containing both marine and non-marine sediments since the Miocene Epoch. Tectonic activity that formed the trough continues at a high rate as evidenced by deformed young sedimentary deposits and high levels of seismicity. Figure 1 shows the location of the site in relation to regional faults and physiographic features.

The surrounding regional geology includes the Peninsular Ranges (Santa Rosa and San Jacinto Mountains) to the south and west, the Salton Basin to the southeast, and the Transverse Ranges (Little San Bernardino and Orocopia Mountains) to the north and east. Hundreds of feet to several thousand feet of Quaternary fluvial, lacustrine, and aeolian soil deposits underlie the Coachella Valley. The southeastern part of the Coachella Valley lies below sea level. In the geologic past, the ancient Lake Cahuilla submerged the area. Calcareous tufa deposits may be observed along the ancient shoreline as high as elevation 45 feet above mean seal level (AMSL) along the Santa Rosa Mountains from La Quinta southward. Lacustrine (lake bed) deposits comprise the subsurface soils over much of the eastern Coachella Valley with alluvial outwash along the flanks of the valley.

Subsurface Soils

Subsurface soils encountered during the field exploration conducted on March 14, 2022 consist of surficial silty sand (SM), sandy silt (ML) and sand (SP) overlying medium dense to dense sands (SP) and silty sands (SM) to a depth of 50 feet, the maximum depth of exploration. The near surface soils are non-expansive in nature. The subsurface logs (Plates B-1 thru B-5) depict the stratigraphic relationships of the various soil types.

Groundwater

Groundwater was not encountered in the borings during the time of exploration. Groundwater well information collected near the subject site (Well 336848N1162328W001), indicated that the ground water level ranges from 79 feet to 80 feet below the ground surfaces in the last 5 years. Groundwater levels may fluctuate with precipitation, irrigation of adjacent properties, drainage, and site grading. The groundwater level noted should not be interpreted to represent an accurate or permanent condition. Based on the regional topography, groundwater flow is assumed to be generally towards the southeast within the site area. Flow directions may vary locally in the vicinity of the site.

Faulting

The project site is located in the seismically active Coachella Valley of southern California with numerous mapped faults of the San Andreas Fault System traversing the region. We have performed a computer-aided search of known faults or seismic zones that lie within a 46-mile radius of the project site (Table 1). A fault map illustrating known active faults relative to the site is presented on Figure 1, *Regional Fault Map*. Figure 2 shows the project site in relation to local faults.

The criterion for fault classification adopted by the California Geological Survey defines Earthquake Fault Zones along active or potentially active faults. An active fault is one that has ruptured during Holocene time (roughly within the last 11,000 years). A fault that has ruptured during the last 1.8 million years (Quaternary time), but has not been proven by direct evidence to have not moved within Holocene time is considered to be potentially active. A fault that has not moved during Quaternary time is considered to be inactive.

Review of the current Alquist-Priolo Earthquake Fault Zone maps (CGS, 2000a) indicates that the nearest mapped Earthquake Fault Zone is the San Andreas – Coachella faults located approximately 5.4 miles northeast of the project site.

General Ground Motion Analysis

The project site is considered likely to be subjected to moderate to strong ground motion from earthquakes in the region. Ground motions are dependent primarily on the earthquake magnitude and distance to the seismogenic (rupture) zone. Acceleration magnitudes also are dependent upon attenuation by rock and soil deposits, direction of rupture and type of fault; therefore, ground motions may vary considerably in the same general area.

2019 CBC General Ground Motion Parameters: The California Building Code (CBC) requires that a site-specific ground motion hazard analysis be performed in accordance with ASCE 7-16 Section 11.4.8 for structures on Site Class D and E sites with S_1 greater than or equal to 0.2 and Site Class E sites with S_s greater than or equal to 1.0. ***This project site has been classified as Site Class D and has a S_1 value of 0.67, which would require a site-specific ground motion hazard analysis***. However, ASCE 7-16 Section 11.4.8 provides three exceptions which permit the use of conservative values of design parameters for certain conditions for Site Class D and E sites in lieu of a site-specific hazard analysis.

The exceptions are:

- Exception 1: Structures on Site Class E sites with S_s greater than or equal to 1.0, provided the site coefficient F_a is taken as equal to that of Site Class C.
- Exception 2: Structures on Site Class D sites with S_1 greater than or equal to 0.2, provided the value of the seismic response coefficient C_s is determined by Equations 12.8-2 for values of $T \leq 1.5T_S$ and taken as equal to 1.5 times the value computed in accordance with either Equation 12.8-3 for $T_L \geq T > 1.5T_S$ or Equation 12.8-4 for $T > T_L$.
- Exception 3: Structures on Site Class E sites with S_1 greater than or equal to 0.2, provided that T is less than or equal to T_S and the equivalent static force procedure is used for design.

Based on our understanding of the proposed development, the seismic design parameters presented in Table 2 were calculated assuming that one of the exceptions listed above applies to the proposed structures at this site. **However, the structural engineer should verify that one of the exceptions is applicable to the proposed structures.** If none of the exceptions apply, our office should be consulted to perform a site-specific ground motion hazard analysis.

The 2019 CBC general ground motion parameters are based on the Risk-Targeted Maximum Considered Earthquake (MCE_R). The Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps Web Application (SEAOC, 2020) was used to obtain the site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters.

Design spectral response acceleration parameters are defined as the earthquake ground motions that are two-thirds (2/3) of the corresponding MCE_R ground motions. The Maximum Considered Earthquake Geometric Mean (MCE_G) peak ground acceleration adjusted for soil site class effects (PGA_M) value to be used for liquefaction and seismic settlement analysis in accordance with 2019 CBC Section 1803A.5.12 ($PGA_M = F_{PGA}*PGA$) is estimated at 0.79g for the project site. ***Design earthquake ground motion parameters are provided in Table 2.***

Seismic and Other Hazards

► **Groundshaking.** The primary seismic hazard at the project site is the potential for strong groundshaking during earthquakes along the San Andreas fault. A further discussion of groundshaking mentioned above.

► **Surface Rupture.** The project site does not lie within a State of California, Alquist-Priolo Earthquake Fault Zone or County of Riverside Fault Zone. Surface fault rupture is considered to be unlikely at the project site because of the well-delineated fault lines through the Coachella Valley as shown on USGS and CDMG maps. However, because of the high tectonic activity and deep alluvium of the region, we cannot preclude the potential for surface rupture on undiscovered or new faults that may underlie the site.

► **Liquefaction.** Liquefaction is a not a potential design consideration because of the depth to groundwater.

Other Potential Geologic Hazards.

► **Landsliding.** The hazard of landsliding is unlikely due to the regional planar topography. No ancient landslides are shown on geologic maps of the region and no indications of landslides were observed during our site investigation.

► **Volcanic hazards.** The site is not located in proximity to any known volcanically active area and the risk of volcanic hazards is considered very low.

► **Tsunamis, sieches, and flooding.** The site does not lie near any large bodies of water, so the threat of tsunami, sieches, or other seismically-induced flooding is unlikely.

► **Expansive soil.** The near surface soils at the project site consist of sands which are non-expansive.

Seismic Settlement

An evaluation of the non-liquefaction seismic settlement potential was performed using the relationships developed by Tokimatsu and Seed (1984, 1987) for dry sands. This method is an empirical approach to quantify seismic settlement using SPT blow counts and PGA estimates from the probabilistic seismic hazard analysis.

The soils beneath the site consist primarily of medium dense to dense sands. Based on the empirical relationships, total induced settlements are estimated to be less than ½ inch in the event of a MCE_G earthquake (0.79g peak ground acceleration). Should settlement occur, buried utility lines and the buildings may not settle equally. Therefore, we recommend that utilities, especially at the points of entry to the buildings, be designed to accommodate differential movement. The computer printouts for the estimates of induced settlement are included in Appendix D.

Hydroconsolidation

In arid climatic regions, granular soils have a potential to collapse upon wetting. This collapse (hydro-consolidation) phenomena is the result of the lubrication of soluble cements (carbonates) in the soil matrix causing the soil to densify from its loose configuration during deposition. Based on our experience in the vicinity of the project site, there is a slight risk of collapse upon inundation from at the site. Therefore, development of building foundation is not required to include provisions for mitigating the hydro-consolidation caused by soil saturation from landscape irrigation or broken utility lines.

Soil Infiltration Rate

A total of two (2) infiltration tests were conducted on April 14, 2022 at the proposed location for the on-site storm-water retention basin as shown on the Site and Exploration Plan (Plate A-2). The infiltration tests were performed to the guideline from Design Handbook for Low Impact Development Best Management Practices, prepared by Riverside County Flood Control and Water Conservation District, Appendix A, Section 2.3, dated September 2011.

The tests were performed using perforated pipes inside a 6-inch diameter hand auger borehole made to depths of approximately 5.0 feet below the existing ground surface, corresponding to the anticipated bottom depth of the stormwater retention basin. The pipes were filled with water and successive readings of drop in water levels were made every 10 minutes for a total elapsed time of 60 minutes, until a stabilization drop was recorded.

The test results indicate that the stabilized soil infiltration rate for the soil ranges from 4.8 to 5.8 inches per hour. A maximum soil infiltration rate of 4.8 inches per hour may be used for the on-site storm-water retention basin design. An oil/water separator should be installed at inlets to the stormwater retention basin to prevent sealing of the basin bottom with silt and oil residues. The field and conversion calculation worksheets are included in Appendix E.

We recommend additional testing should be performed after the completion of rough grading operations, to verify the soil infiltration rate.

Site Preparation

Pre-grade Meeting: Prior to site preparation, a meeting should be held at the site with as a minimum, the owner's representative, grading contractor and geotechnical engineer in attendance.

Clearing and Grubbing: Any surface improvements, debris or vegetation including grass, trees, and weeds on the site at the time of construction should be removed from the construction area. Root balls should be completely excavated. Organic stripping should be hauled from the site and not used as fill.

Any trash, construction debris, concrete slabs, old pavement, landfill, and buried obstructions such as old foundations, un-controlled fills and utility lines exposed during rough grading should be traced to the limits of the foreign material by the grading contractor and removed under our supervision. Any excavations resulting from site clearing should be dish-shaped to the lowest depth of disturbance and backfilled under the observation of the geotechnical engineer's representative.

Mass Grading: Prior to placing any fills, the surface 12 inches of soil should be removed, the exposed surface should be scarified to a depth of 8 inches, uniformly moisture conditioned to ±2% over optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density. Native soils may be used for mass grading, placed in 6 inches maximum lifts, uniformly moisture conditioned to at least 2% over optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density

Building Pad Preparation: The existing surface soil within the proposed building pad areas should be removed to 18 inches below the original grade or 36 inches below the lowest foundation grade (whichever deeper), extending five feet beyond all exterior wall/column lines (including adjacent concrete areas). Exposed sub-grade should be scarified to a depth of 6 to 8 inches, uniformly moisture conditioned to at least 2% over optimum moisture content, and re-compacted a minimum of 90% of the maximum density determined in accordance with ASTM D1557 methods.

Auxiliary Structures Foundation Preparation: Auxiliary structures such as free standing or retaining walls should have footings extended to a minimum of 18 inches below grade. The existing soil beneath the structure foundation prepared in the manner described for the house pad except the preparation needs only to extend 18 inches below and beyond the footing.

Sidewalk and Concrete Hardscape Areas: In areas other than the building pad which are to receive concrete slabs, the ground surface should be over-excavated to a depth of 8 to 12 inches, uniformly moisture conditioned to least 2% of optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density.

The on-site soils are suitable for use as compacted fill and utility trench backfill. Imported fill soil (if required) should be similar to onsite soil or non-expansive, granular soil meeting the USCS classifications of SM, SP-SM, or SW-SM with a maximum rock size of 6 inches and no less than 5% passing the No. 200 sieve. ***The geotechnical engineer should approve imported fill soil sources before hauling material to the site.*** Native and imported materials should be placed in lifts no greater than 8 inches in loose thickness, uniformly moisture conditioned to ±2% of optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density.

Moisture Control and Drainage: The moisture condition of the house pad should be maintained during trenching and utility installation until concrete is placed or should be rewetted before initiating delayed construction. Adequate site drainage is essential to future performance of the project. Infiltration of excess irrigation water and stormwaters can adversely affect the performance of the subsurface soil at the site. Positive drainage should be maintained away from all structures (5% for 5 feet minimum across unpaved areas) to prevent ponding and subsequent saturation of the native soil.

Gutters and downspouts may be considered as a means to convey water away from foundations. If landscape irrigation is allowed next to the building, drip irrigation systems or lined planter boxes should be used. Drainage should be maintained without ponding.

Utility Trench Backfill

On-site soil free of debris, vegetation, and other deleterious matter may be suitable for use as utility trench backfill. Backfill within roadway should, at a minimum, conform to County of Riverside Standard No. 818 – Utility Trench Backfill (Appendix F).

Backfill within roadways should be placed in layers not more than 6 to 8 inches in thickness, uniformly moisture conditioned to least 2% of optimum moisture and mechanically compacted to a minimum of 90% of the ASTM D1557 maximum dry density except for the top 12 inches of the trench which shall be compacted to at least 95%. Native backfill should only be placed and compacted after encapsulating buried pipes with suitable bedding and pipe envelope material.

Pipe envelope/bedding should be clean sand (Sand Equivalent SE>30). Precautions should be taken in the compaction of the backfill to avoid damage to the pipes and structures.

Building Foundations and Settlements

Shallow Foundation: Shallow column footings and continuous wall footings are suitable to support the building structures provided they are founded on a layer of properly prepared and compacted soil as described above. The foundations may be designed using an allowable soil bearing pressure of 1,800 psf. The allowable soil pressure may be increased by 20% for each foot of embedment depth in excess of 18 inches and by one-third for short term loads induced by winds or seismic events. The maximum allowable soil pressure at increased embedment depths shall not exceed 2,800 psf.

All exterior and interior foundations should be embedded a minimum of 18 inches deep. Continuous wall footings should have a minimum width of 12 inches. Spread footings should have a minimum width of 24 inches and should not be structurally isolated. ***Recommended concrete reinforcement and sizing for all footings should be provided by the structural engineer.*** Resistance to horizontal loads will be developed by passive earth pressure on the sides of footings and frictional resistance developed along the bases of footings and concrete slabs.

Passive resistance to lateral earth pressure may be calculated using an equivalent fluid pressure of 320 pcf to resist lateral loadings. The top one foot of embedment should not be considered in computing passive resistance unless the adjacent area is confined by a slab or pavement. An allowable friction coefficient of 0.38 may also be used at the base of the footings to resist lateral loading.

Slabs-on-Grade

Concrete slabs and flatwork should be a minimum of 4 inches thick. The concrete floor slabs may either be monolithically placed with the foundation or dowelled after footing placement. The concrete slabs may be placed on granular subgrade that has been compacted at least 90% relative compaction (ASTM D1557). ***Slab thickness and steel reinforcement should be determined by the design engineer.***

American Concrete Institute (ACI) guidelines (ACI 302.1R-15 Chapter 5, Section 5.2.3) provide recommendations regarding the use of moisture barriers beneath concrete slabs. The concrete floor slabs should be underlain by a 10-mil polyethylene vapor retarder that works as a capillary break to reduce moisture migration into the slab section. All laps and seams should be overlapped 6-inches or as recommended by the manufacturer. The vapor retarder should be protected from puncture. The joints and penetrations should be sealed with the manufacturer's recommended adhesive, pressure-sensitive tape, or both. The vapor retarder should extend a minimum of 12 inches into the footing excavations. The vapor retarder may lie directly on the granular fill with 2 inches of clean sand cover.

Placing sand over the vapor retarder may increase moisture transmission through the slab, because it provides a reservoir for bleed water from the concrete to collect. The sand placed over the vapor retarder may also move and mound prior to concrete placement, resulting in an irregular slab thickness. For areas with moisture sensitive flooring materials, ACI recommends that concrete slabs be placed without a sand cover directly over the vapor retarder, provided that the concrete mix uses a low-water cement ratio and concrete curing methods are employed to compensate for release of bleed water through the top of the slab. The vapor retarder should have a minimum thickness of 15-mil (Stego-Wrap or equivalent). All independent concrete flatworks should be underlain by 12 inches of moisture conditioned and compacted soils. All flatwork should be jointed in square patterns and at irregularities in shape at a maximum spacing of 10 feet or the least width of the sidewalk.

Concrete Mixes and Corrosivity

Selected chemical analyses for corrosivity were conducted on bulk samples of the near surface soil from the project site (Plate C-2). The native soils have low levels of sulfate and low chloride ion concentrations. Resistivity determinations on the soil indicate a moderate potential for metal loss because of electrochemical corrosion processes. A minimum of 2,500 psi concrete of Type II Portland Cement with a maximum water/cement ratio of 0.6 (by weight) should be used for concrete placed in contact with native soil on this project (sitework including streets, sidewalks, driveways, hardscape, and foundations).

Landmark does not practice corrosion engineering. We recommend that a qualified corrosion engineer evaluate the corrosion potential on metal construction materials and concrete at the site.

Permanent Slopes

Cut and Fill slopes should be constructed generally no steeper than 3 (H):1(V) to permit slope maintenance with motor graders, and provide erosional stability from wind or rain while unprotected without landscape cover. Slopes with a 2(H):1(V) gradient are permitted, provided it is recognized that such slopes are more prone to erosion and do not permit maintenance by motorized riding equipment and require landscape cover to retard erosion.

Pavements

Pavements should be designed according to CALTRANS or other acceptable methods. Traffic indices were not provided by the project engineer or owner; therefore, we have provided structural sections for several traffic indices for comparative evaluation. The public agency or design engineer should decide the appropriate traffic index for the site. Maintenance of proper drainage is necessary to prolong the service life of the pavements. Based on the current State of California CALTRANS method, an estimated R-value of 50 for the subgrade soil and assumed traffic indices, the following table provides our estimates for asphaltic concrete (AC) pavement sections.

PAVEMENT STUCTURAL SECTIONS

R-Value of Subgrade Soil - 50 (minimum) Design Method - CALTRANS 2020

Traffic Index (assumed)	Flexible Pavements		Rigid (PCC) Pavements	
	Asphaltic Concrete Thickness (in.)	Aggregate Base Thickness (in.)	Concrete Thickness (in.)	Aggregate Base Thickness (in.)
4.0	2.5	4.0	4.0	4.0
5.0	3.0	4.0	6.0	4.0
6.0	3.0	4.0	6.0	6.0

Notes:

1) Asphaltic concrete shall be Caltrans, Type B, ¾ inch maximum medium grading, (½ inch for parking areas) medium grading with PG70-10 asphalt concrete, compacted to a minimum of 95% of the 50-blow Marshall density (ASTM D1559).
2) Aggregate base shall conform to Caltrans Class 2 (¾ in. maximum), compacted to a minimum of 95% of ASTM D1557 maximum dry density.
3) Place pavements on 12 inches of moisture conditioned (at least 2% of over optimum) native soil compacted to a minimum of 95% of the maximum dry density determined by ASTM D1557, or the governing agency requirements.
4) Portland cement concrete for pavements should have Type V cement, a minimum compressive strength of 3,250 psi at 28 days, and a maximum water-cement ratio of 0.55.

Final recommended pavement sections may need to be based on sampling and R-Value testing during grading operations when actual subgrade soils will be exposed.

Observation and Density Testing

Site preparation and fill placement should be continuously observed and tested by a representative of a qualified geotechnical engineering firm. Near full-time observation services during the excavation and scarification process is necessary to detect undesirable materials or conditions and soft areas that may be encountered in the construction area. The geotechnical firm that provides observation and testing during construction shall assume the responsibility of "***geotechnical engineer of record***" and, as such, shall perform additional tests and investigation as necessary to satisfy themselves as to the site conditions and the recommendations for site development.

Closure

We did not encounter soil conditions that would preclude implementation of the proposed project provided the recommendations contained in this report are implemented in the design and construction of this project.

We recommend that ***Landmark Consultants, Inc.*** be retained to provide the tests and observations services during construction. *The geotechnical engineering firm providing such tests and observations shall become the geotechnical engineer of record and assume responsibility for the project.*

Landmark Consultants, Inc. *recommendations for this site are, to a high degree, dependent upon appropriate quality control of subgrade preparation, fill placement, and foundation construction. Accordingly, the findings and professional opinions in this report are made contingent upon the opportunity for* ***Landmark Consultants, Inc.*** *to observe grading operations and foundation excavations for the proposed construction.*

If parties other than ***Landmark Consultants, Inc.*** *are engaged to provide observation and testing services during construction, such parties must be notified that they will be required to assume complete responsibility as the geotechnical engineer of record for the geotechnical phase of the project by concurring with the recommendations in this report and/or by providing alternative recommendations.*

Additional information concerning the scope and cost of these services can be obtained from our office.

We appreciate the opportunity to provide our findings and professional opinions regarding geotechnical conditions at the site. If you have any questions or comments regarding our findings, please call our office at (760) 360-0665.

Respectfully Submitted,
LandMark Consultants, Inc.



Greg M. Chandra, P.E., M.ASCE
Principal Engineer

Attachments:

Appendix A: Vicinity and Site Maps
Appendix B: Subsurface Soil Logs and Soil Key
Appendix C: Laboratory Test Results
Appendix D: Settlement Calculations
Appendix E: Soil Infiltration Test Results
Appendix F: Utility Trench Backfill

TABLES

Table 1
Summary of Characteristics of Closest Known Active Faults

Fault Name	Approximate Distance (miles)	Approximate Distance (km)	Maximum Moment Magnitude (Mw)	Fault Length (km)	Slip Rate (mm/yr)
San Andreas - Coachella	5.4	8.6	7.2	96 ± 10	25 ± 5
Indio Hills *	6.3	10.1			
San Andreas - San Bernardino (South)	7.8	12.5	7.4	103 ± 10	30 ± 7
San Andreas - San Bernardino (North)	7.9	12.7	7.5	103 ± 10	24 ± 6
Blue Cut *	16.8	26.9			
Garnet Hill *	18.1	29.0			
San Jacinto - Anza	19.4	31.1	7.2	91 ± 9	12 ± 6
Eureka Peak	21.0	33.6	6.4	19 ± 2	0.6 ± 0.4
San Jacinto - Coyote Creek	22.3	35.7	6.8	41 ± 4	4 ± 2
Hot Springs *	28.4	45.4			
Burnt Mtn.	29.1	46.6	6.5	21 ± 2	0.6 ± 0.4
San Jacinto - Borrego	32.2	51.5	6.6	29 ± 3	4 ± 2
Morongo *	32.9	52.6			
Pinto Mtn.	33.0	52.8	7.2	74 ± 7	2.5 ± 2
Pisgah Mtn. - Mesquite Lake	33.5	53.6	7.3	89 ± 9	0.6 ± 0.4
Landers	36.2	58.0	7.3	83 ± 8	0.6 ± 0.4
Earthquake Valley	39.5	63.2	6.5	20 ± 2	2 ± 1
San Jacinto - San Jacinto Valley	41.9	67.0	6.9	43 ± 4	12 ± 6
Elsinore - Julian	43.2	69.1	7.1	76 ± 8	5 ± 2
S. Emerson - Copper Mtn.	43.5	69.6	7	54 ± 5	0.6 ± 0.4
Elmore Ranch	44.4	71.0	6.6	29 ± 3	1 ± 0.5
Johnson Valley (northern)	45.5	72.8	6.7	35 ± 4	0.6 ± 0.4

* Note: Faults not included in CGS database.

Table 2
2019 California Building Code (CBC) and ASCE 7-16 Seismic Parameters

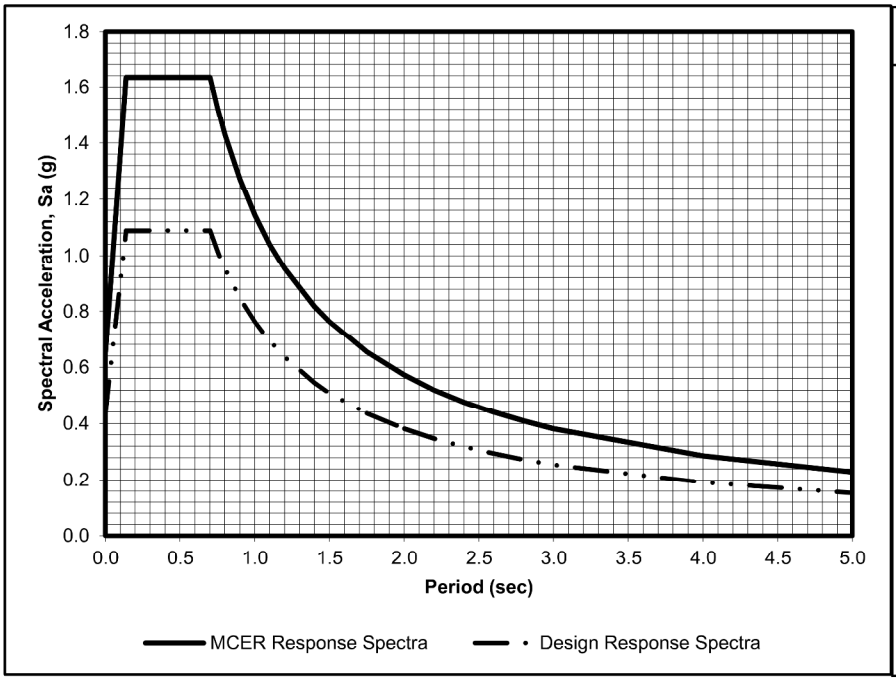
		ASCE 7-16 Reference
Soil Site Class:	**D**	Table 20.3-1
Latitude:	33.6657 N	
Longitude:	-116.2263 W	
Risk Category:	II	
Seismic Design Category:	D	

Maximum Considered Earthquake (MCE) Ground Motion

Mapped MCE_R Short Period Spectral Response	S_s	1.634 g	ASCE Figure 22-1	
Mapped MCE_R 1 second Spectral Response	S_1	0.673 g	ASCE Figure 22-2	
Short Period (0.2 s) Site Coefficient	F_a	1.00	ASCE Table 11.4-1	
Long Period (1.0 s) Site Coefficient	F_v	1.70	ASCE Table 11.4-2	
MCE_R Spectral Response Acceleration Parameter (0.2 s)	S_{MS}	1.634 g	= Fa * S_s	ASCE Equation 11.4-1
MCE_R Spectral Response Acceleration Parameter (1.0 s)	S_{M1}	1.144 g	= Fv * S_1	ASCE Equation 11.4-2

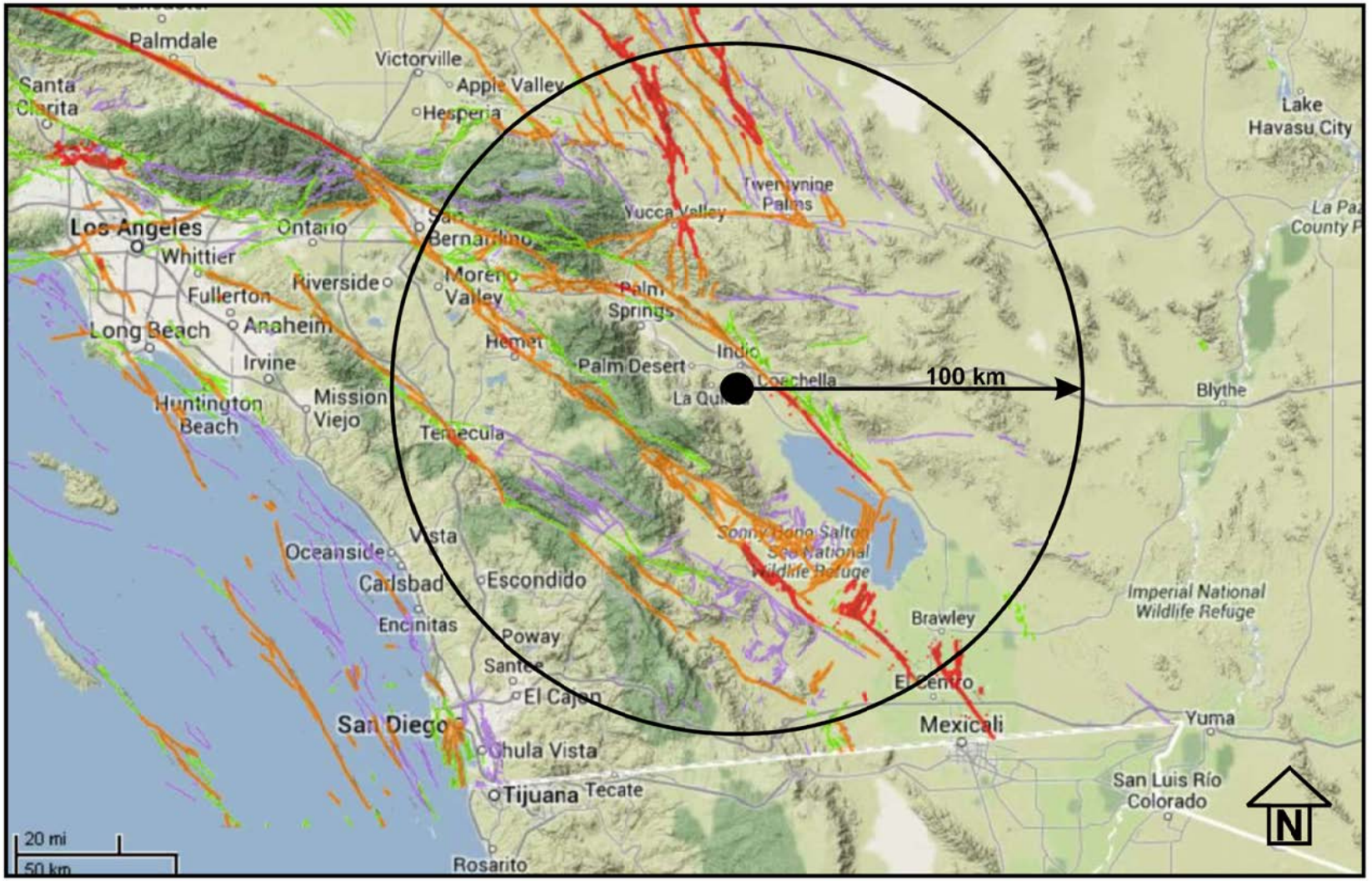
Design Earthquake Ground Motion

Design Spectral Response Acceleration Parameter (0.2 s)	S_{DS}	1.089 g	= 2/3*S_{MS}	ASCE Equation 11.4-3
Design Spectral Response Acceleration Parameter (1.0 s)	S_{D1}	0.763 g	= 2/3*S_{M1}	ASCE Equation 11.4-4
Risk Coefficient at Short Periods (less than 0.2 s)	C_{RS}	0.897		ASCE Figure 22-17
Risk Coefficient at Long Periods (greater than 1.0 s)	C_{R1}	0.883		ASCE Figure 22-18
	T_L	8.00 sec		ASCE Figure 22-12
	T_O	0.14 sec	=0.2*S_{D1}/S_{DS}	
	T_S	0.70 sec	=S_{D1}/S_{DS}	
Peak Ground Acceleration	PGA_M	0.79 g		ASCE Equation 11.8-1



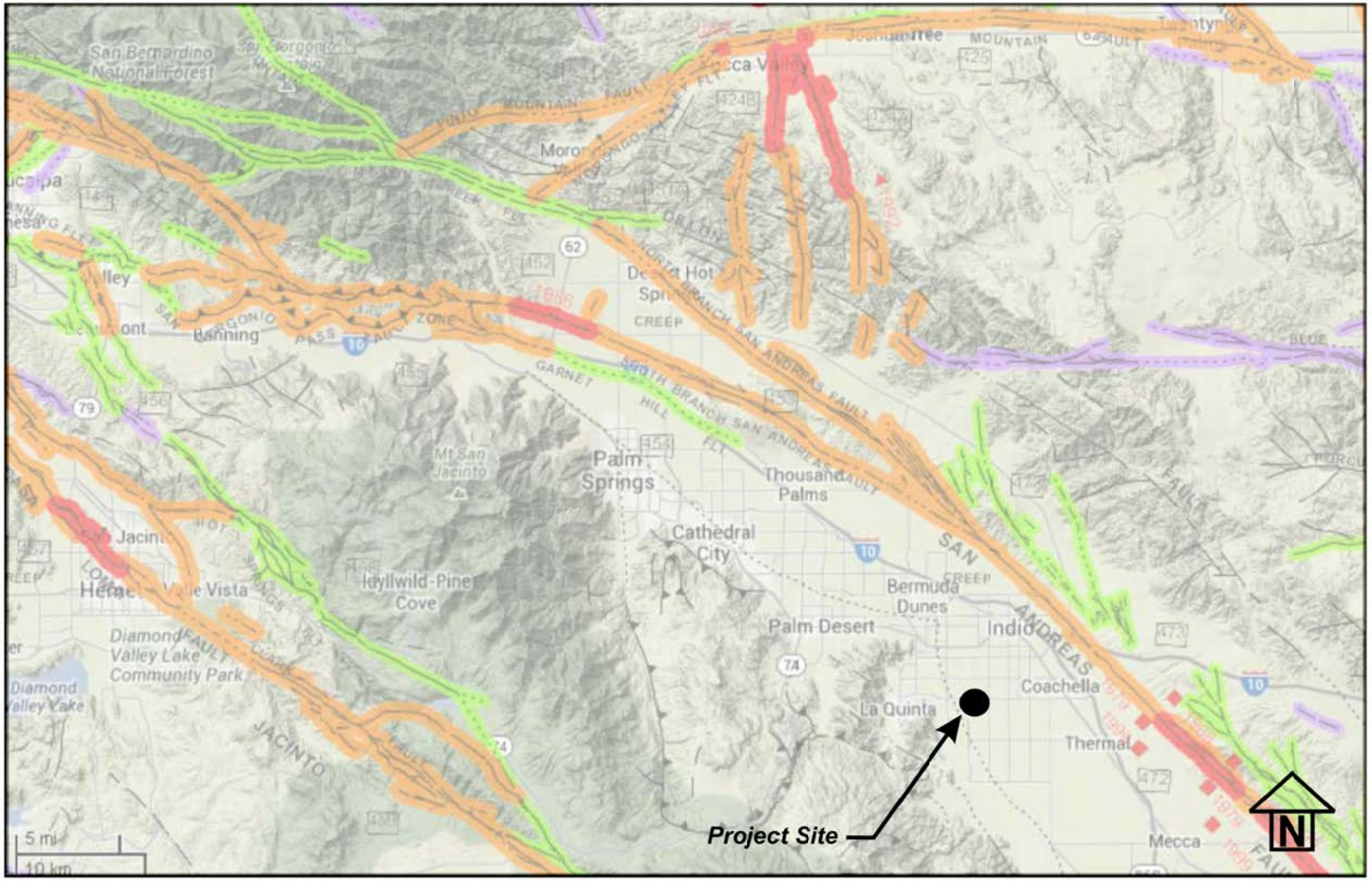
Period T (sec)	Sa (g)	MCE_R Sa (g)
0.00	0.44	0.65
0.14	1.09	1.63
0.70	1.09	1.63
0.75	1.02	1.53
0.80	0.95	1.43
0.90	0.85	1.27
1.00	0.76	1.14
1.10	0.69	1.04
1.20	0.64	0.95
1.20	0.64	0.95
1.40	0.54	0.82
1.50	0.51	0.76
1.75	0.44	0.65
2.00	0.38	0.57
2.20	0.35	0.52
2.40	0.32	0.48
2.60	0.29	0.44
2.80	0.27	0.41
3.00	0.25	0.38
4.00	0.19	0.29
5.00	0.15	0.23

FIGURES



Source: California Geological Survey 2010 Fault Activity Map of California
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html#

LANDMARK Geo-Engineers and Geologists Project No.: LP22032	Regional Fault Map	Figure 1



Source: California Geological Survey 2010 Fault Activity Map of California
http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html#

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Project No.: LP22032

Map of Local Faults

Figure 2

EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. Concealed faults in the Great Valley are based on maps of selected subsurface horizons, so locations shown are approximate and may indicate structural trend only. All offshore faults based on seismic reflection profile records are shown as solid lines where well defined, dashed where inferred, queried where uncertain.

FAULT CLASSIFICATION COLOR CODE
(Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred and is associated with one or more of the following:

(a) a recorded earthquake with surface rupture. (Also included are some well-defined surface breaks caused by ground shaking during earthquakes, e.g. extensive ground breakage, not on the White Wolf fault, caused by the Arvin-Tehachapi earthquake of 1952). The date of the associated earthquake is indicated. Where repeated surface ruptures on the same fault have occurred, only the date of the latest movement may be indicated, especially if earlier reports are not well documented as to location of ground breaks.

(b) fault creep slippage - slow ground displacement usually without accompanying earthquakes.

(c) displaced survey lines.

A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.

Date bracketed by triangles indicates local fault break.

No triangle by date indicates an intermediate point along fault break.

Fault that exhibits fault creep slippage. Hachures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.

Square on fault indicates where fault creep slippage has occured that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate terminal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).

Holocene fault displacement (during past 11,700 years) without historic record. Geomorphic evidence for Holocene faulting includes sag ponds, scarps showing little erosion, or the following features in Holocene age deposits: offset stream courses, linear scarps, shutter ridges, and triangular faceted spurs. Recency of faulting offshore is based on the interpreted age of the youngest strata displaced by faulting.

Late Quaternary fault displacement (during past 700,000 years). Geomorphic evidence similar to that described for Holocene faults except features are less distinct. Faulting may be younger, but lack of younger overlying deposits precludes more accurate age classification.

Quaternary fault (age undifferentiated). Most faults of this category show evidence of displacement sometime during the past 1.6 million years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age. Unnumbered Quaternary faults were based on Fault Map of California, 1975. See Bulletin 201, Appendix D for source data.

Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement. Some faults are shown in this category because the source of mapping used was of reconnaissnce nature, or was not done with the object of dating fault displacements. Faults in this category are not necessarily inactive.

ADDITIONAL FAULT SYMBOLS

Bar and ball on downthrown side (relative or apparent).

Arrows along fault indicate relative or apparent direction of lateral movement.

Arrow on fault indicates direction of dip.

Low angle fault (barbs on upper plate). Fault surface generally dips less than 45° but locally may have been subsequently steepened. On offshore faults, barbs simply indicate a reverse fault regardless of steepness of dip.

OTHER SYMBOLS

Numbers refer to annotations listed in the appendices of the accompanying report. Annotations include fault name, age of fault displacement, and pertinent references including Earthquake Fault Zone maps where a fault has been zoned by the Alquist-Priolo Earthquake Fault Zoning Act. This Act requires the State Geologist to delineate zones to encompass faults with Holocene displacement.

Structural discontinuity (offshore) separating differing Neogene structural domains. May indicate discontinuities between basement rocks.

Brawley Seismic Zone, a linear zone of seismicity locally up to 10 km wide associated with the releasing step between the Imperial and San Andreas faults.

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION: ON LAND	DESCRIPTION: OFFSHORE
Quaternary	Late Quaternary	Historic				Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	200			Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
			11,700			Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary	Pleistocene	700,000			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			1,600,000*			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.
			4.5 billion (Age of Earth)				

* Quaternary now recognized as extending to 2.6 Ma (Walker and Geissman, 2009). Quaternary faults in this map were established using the previous 1.6 Ma criterion.

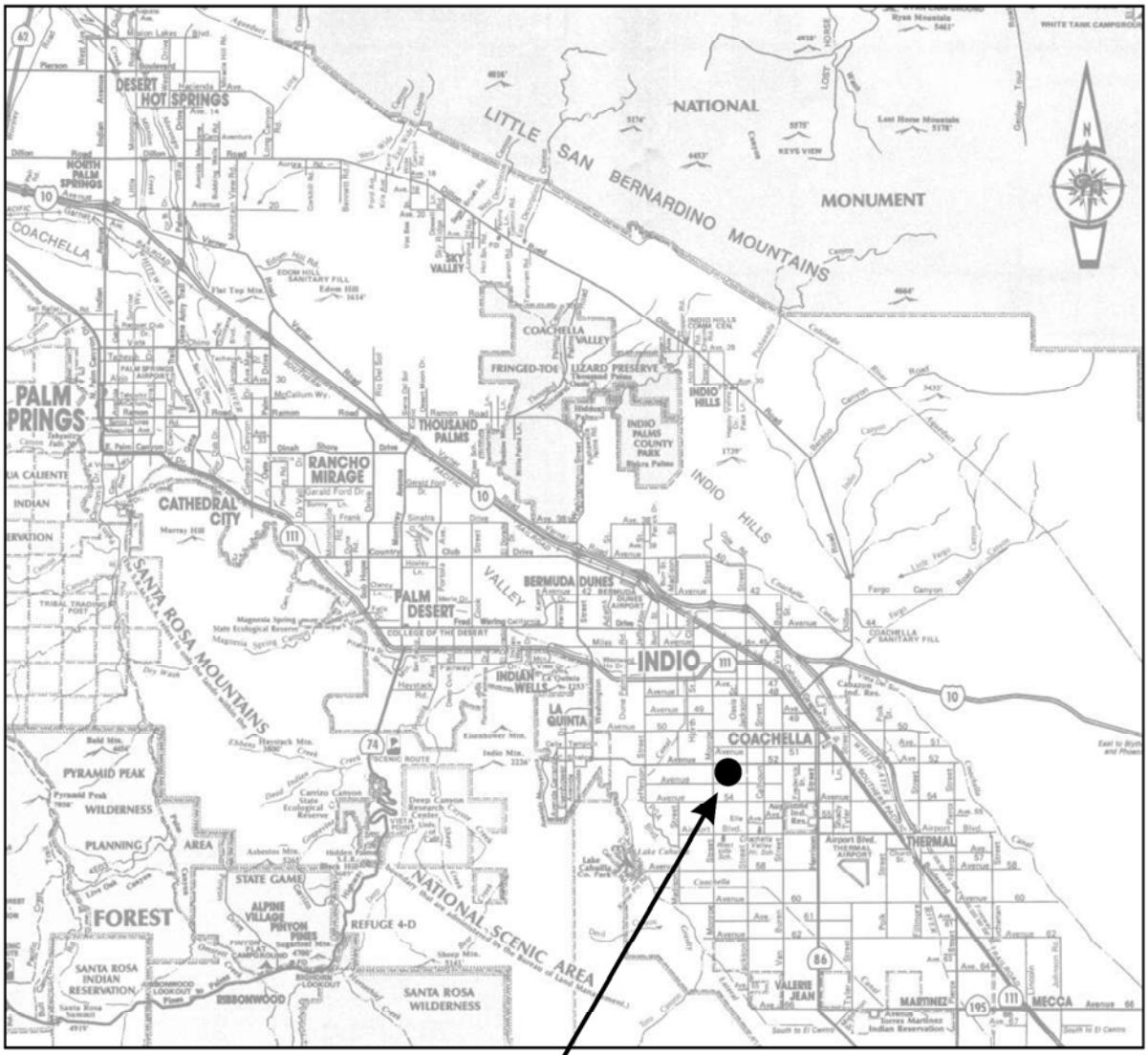
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Fault Map Legend

Figure 3

APPENDIX A

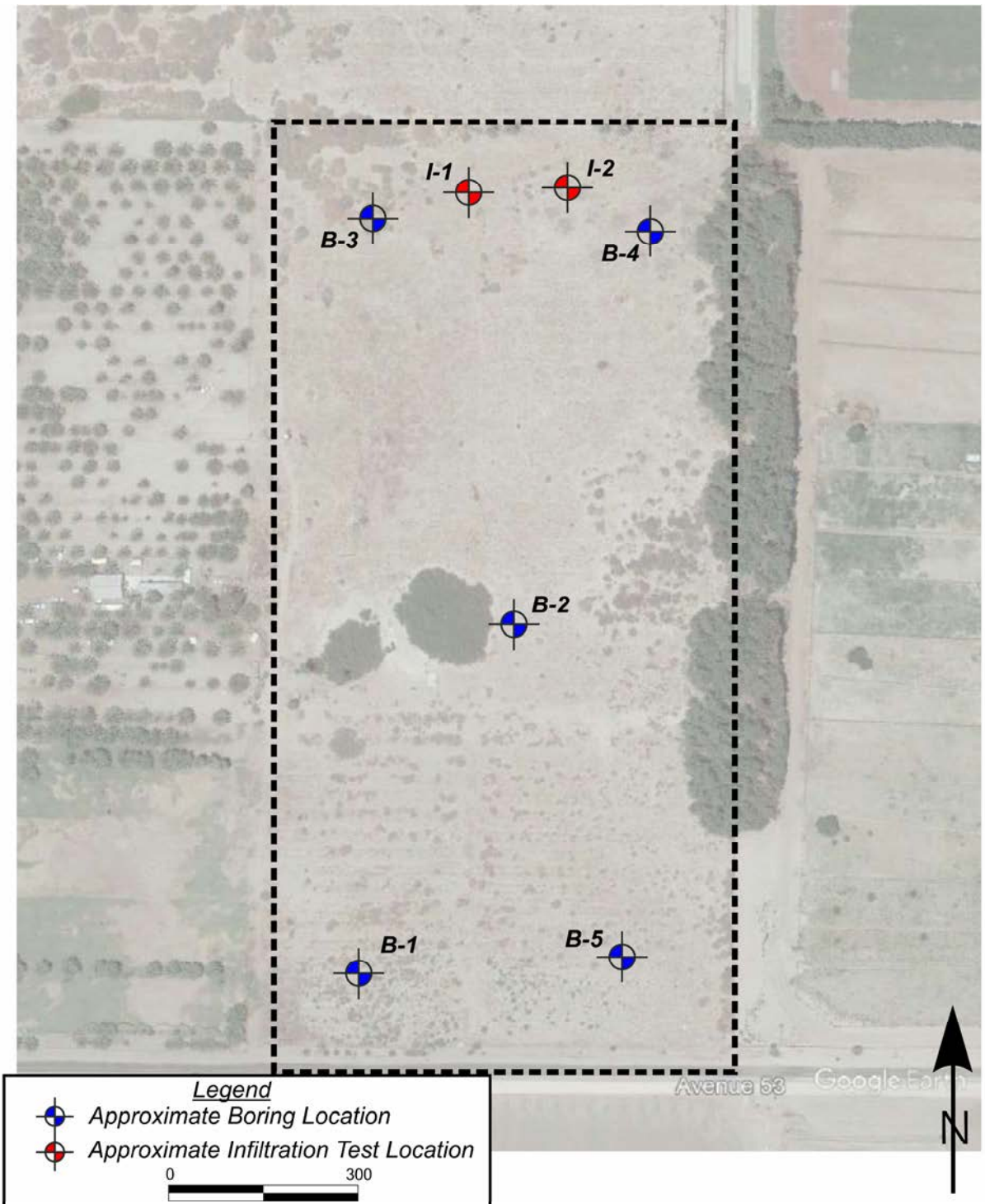


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Vicinity Map

Plate A-1

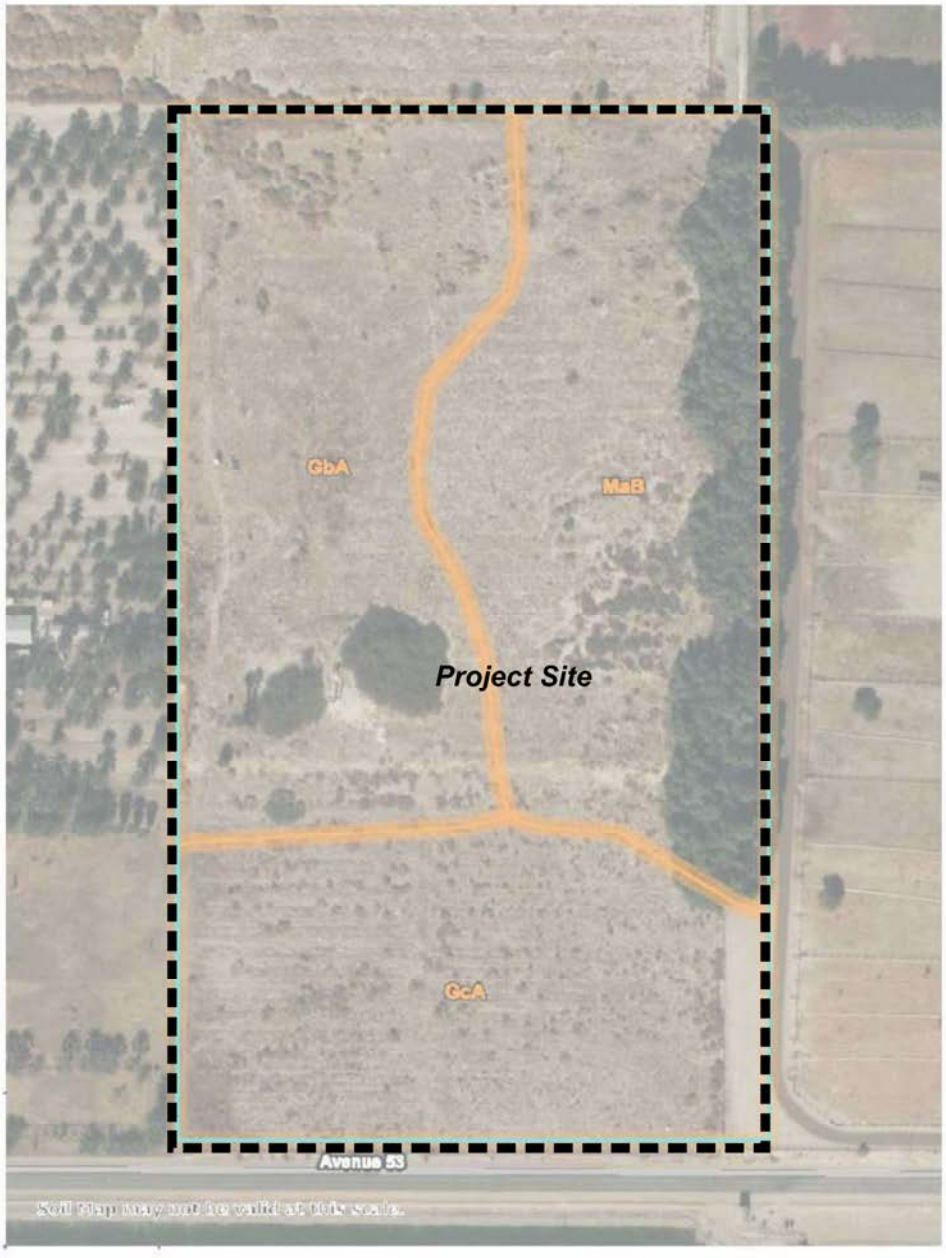


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Site and Exploration Plan

Plate
A-2



Map Scale: 1:2,250 f printed on A portrait (8.5" x 11") sheet.

Meters: 0, 30, 60, 120, 180

Feet: 0, 100, 200, 400, 600

Map projection: Web Mercator Corner coordinates: WGS84

USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

4/21/2022
Page 1 of 3

LANDMARK Geo-Engineers and Geologists Project No.: LP22032	USDA Soil Conservation Soil Service Map	Plate A-3

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

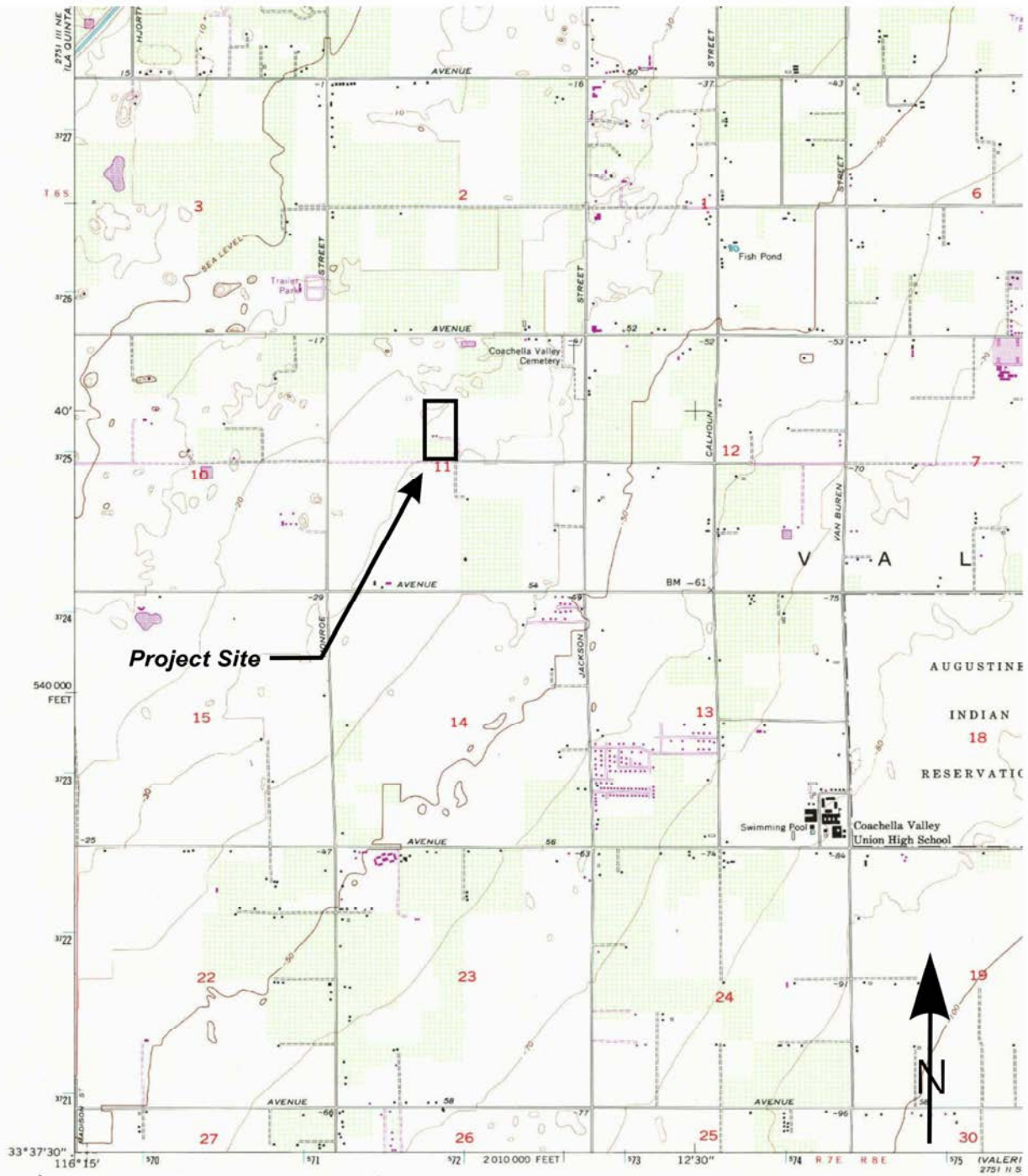
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GbA	Gilman fine sandy loam, 0 to 2 percent slopes	7.5	35.6%
GcA	Gilman fine sandy loam, wet, 0 to 2 percent slopes	6.1	28.8%
MaB	Myoma fine sand, 0 to 5 percent slopes	7.5	35.6%
Totals for Area of Interest		**21.0**	**100.0%**



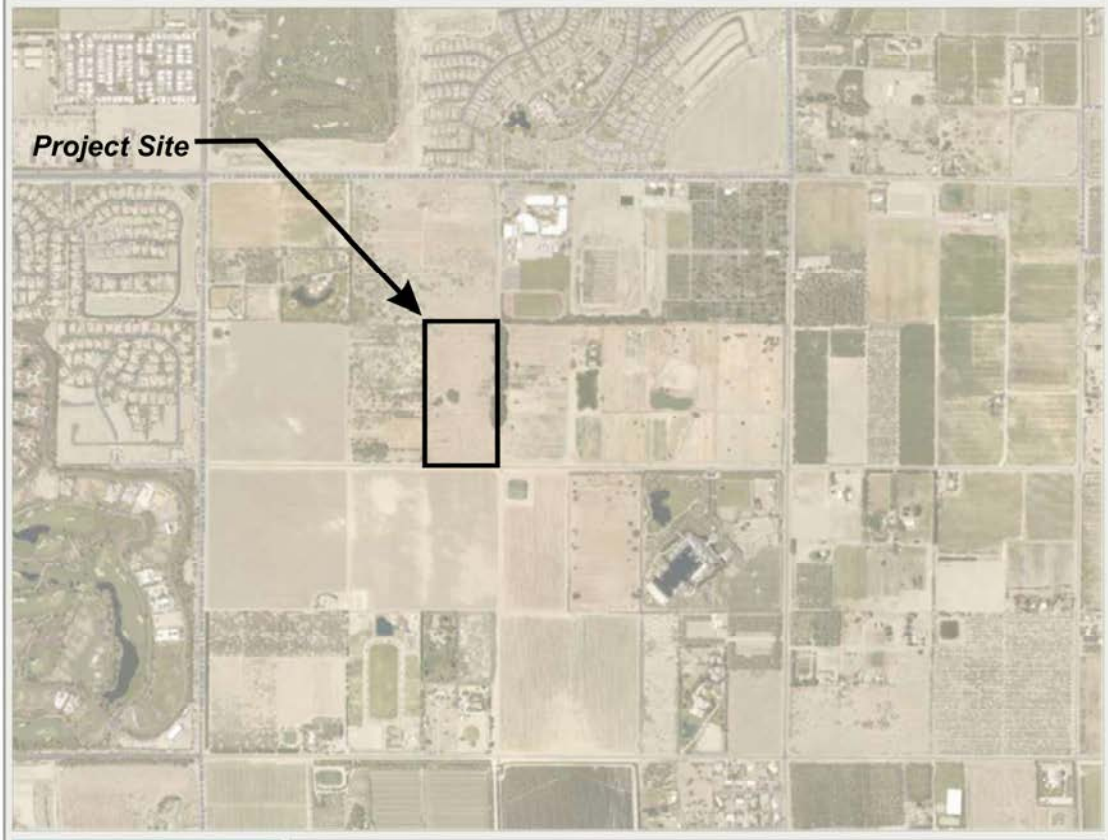
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Topographic Map

Plate A-4

Fault Map



Legend

Faults
- OTHER AUTHORITY
- ALQUIST-PRIOLO
- RIVERSIDE COUNTY

Notes

RCIT

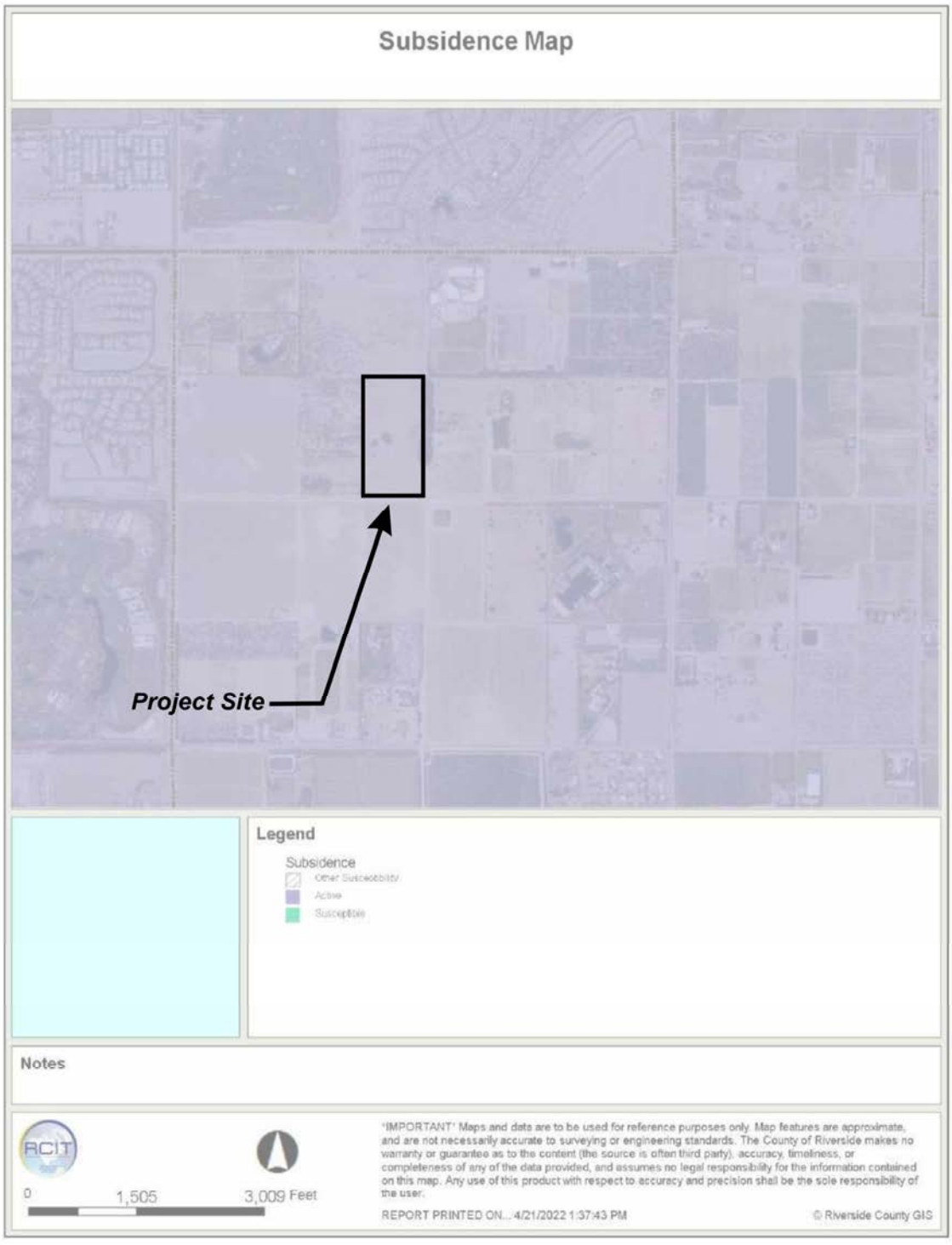
0 1,505 3,009 Feet

"IMPORTANT" Maps and data are to be used for reference purposes only. Map features are approximate, and are not necessarily accurate to surveying or engineering standards. The County of Riverside makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained on this map. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user.

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LANDMARK Geo-Engineers and Geologists **Project No.: LP22032**	**Riverside County Geographic Information System (GIS) Fault Map**	**Plate A-5**

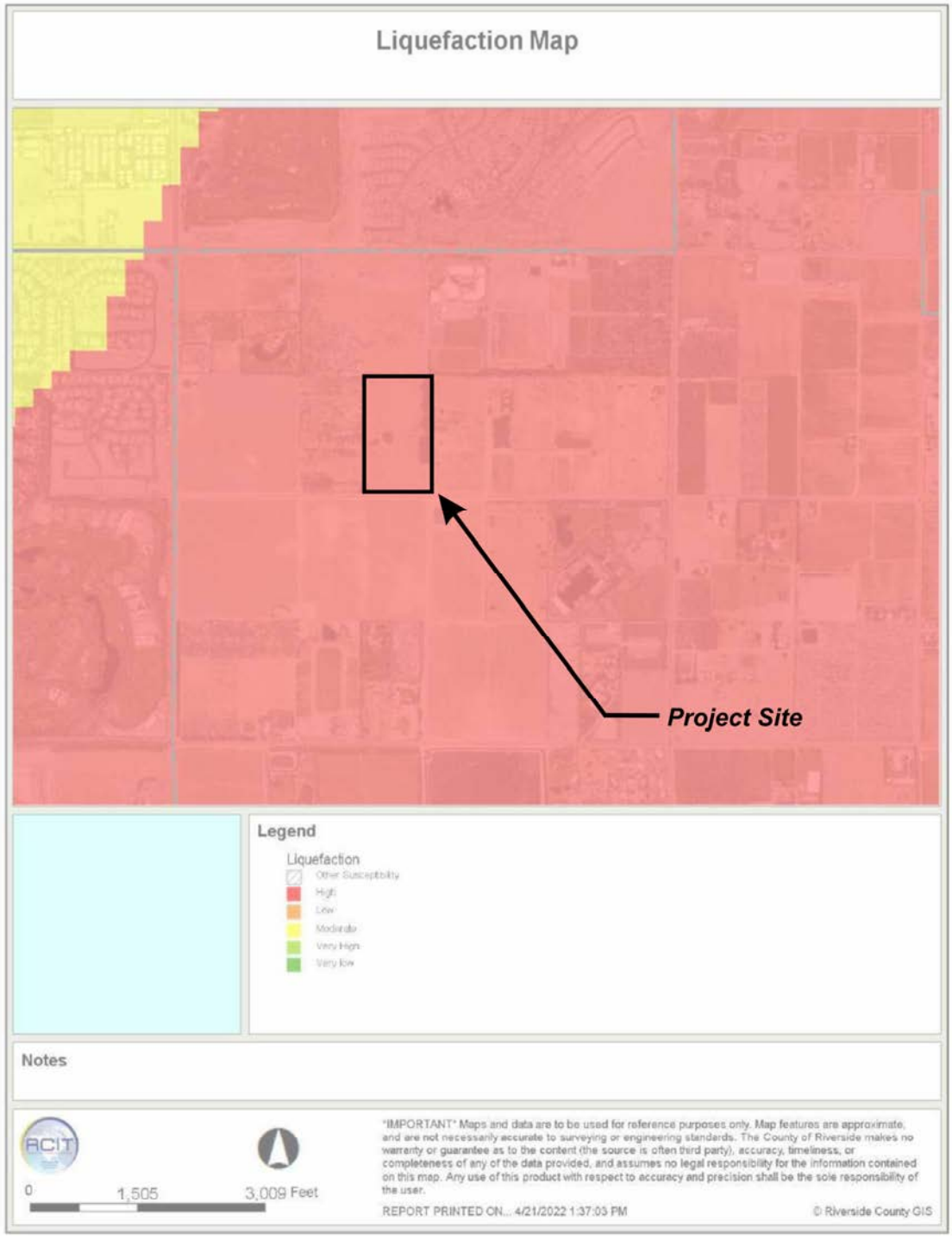


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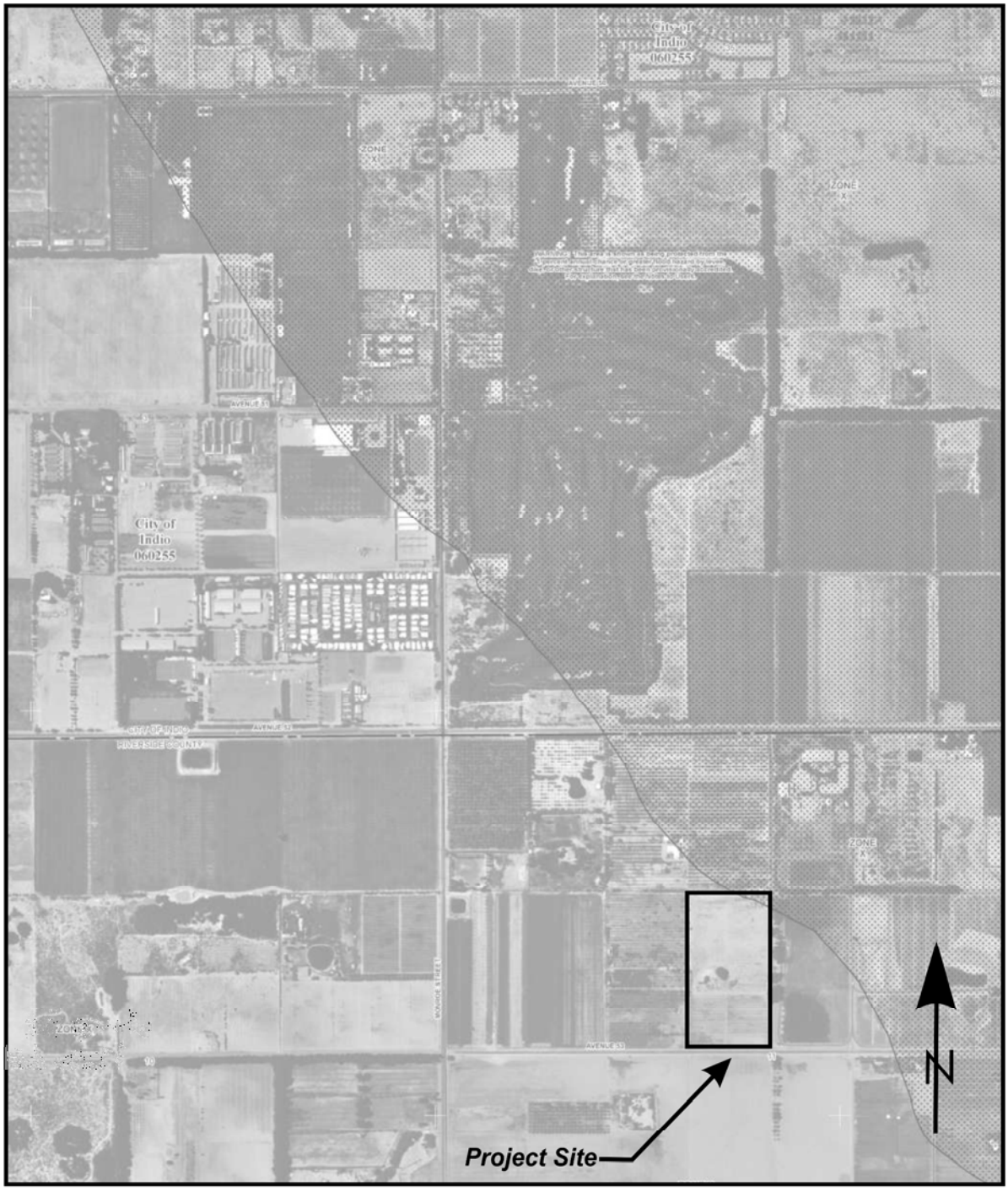
Project No.: LP22032

Riverside County
Geographic Information System (GIS)
Subsidence

Plate
A-6



LANDMARK Geo-Engineers and Geologists Project No.: LP22032	Riverside County Geographic Information System (GIS) Liquefaction Zones	Plate A-7



Reference: Federal Emergency Management Agency (FEMA)
Indio, California, Riverside County
Community-Panel Numbers 06065C 2261G

LANDMARK Geo-Engineers and Geologists **Project No.: LP22032**	**Flood Insurance Rate Map (FIRM)**	**Plate A-8**

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{24}76^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11N
600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

APPENDIX B

LOG OF BORING No. B-1

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
5			41		SILTY SAND (SM): Lt. brown, dry, dense, fine grained	103.8	1.7	Passing #200 = 47.6%
10			14		SAND (SP-SM): Lt. brown, dry, medium dense, fine grained		1.8	Passing #200 = 2.1%
15			29		SANDY SILT (ML): Lt. brown to gray brown, moist to very moist, medium dense, fine grained sand	97.0	8.7	
20			11				15.7	Passing #200 = 68.0%
25			29		some clay	93.7	28.9	
30								
35								
40								
45								
50								
55								
60								

Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.

DATE DRILLED: 3/14/22
LOGGED BY: L. Jackson
SURFACE ELEVATION: Approximately -25 ft

TOTAL DEPTH: 26.5 Feet
TYPE OF BIT: Hollow Stem Auger
HAMMER WT.: 140 lbs.

DEPTH TO WATER: NA
DIAMETER: 8 in.
DROP: 30 in.

PROJECT NO. LP22032

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PLATE B-1

LOG OF BORING No. B-2

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
0					SANDY SILT (ML): Lt. brown, moist, medium dense, fine grained sand			Passing #200 = 63.1%
5			21			78.2	7.2	
10			11		SILTY SAND (SM): Lt. brown, dry to damp, medium dense, fine grained		2.5	
15			26			101.0	2.2	Passing #200 = 13.6%
20			25				4.2	
25			30		SAND (SP-SM): Yellowish brown, dry, dense, fine grained	97.7	1.5	Passing #200 = 7.0%
30			27		SANDY SILT (ML): Lt. brown, moist, medium dense, fine grained sand		12.4	
35			23		SAND (SP-SM): Lt. brown, dry, medium dense, fine grained		2.0	Passing #200 = 6.9%
40			21		SILTY SAND (SM): Olive gray, moist, medium dense to dense, fine to medium grained		9.0	
45			39				7.7	Passing #200 = 25.0%
50			34				5.0	
55					Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			
60								

DATE DRILLED: 3/14/22

LOGGED BY: L. Jackson

SURFACE ELEVATION: Approximately -25 ft

TOTAL DEPTH: 51.5 Feet

TYPE OF BIT: Hollow Stem Auger

HAMMER WT.: 140 lbs.

DEPTH TO WATER: NA

DIAMETER: 8 in.

DROP: 30 in.

PROJECT NO. LP22032

LANDMARK Geo-Engineers and Geologists

PLATE B-2

LOG OF BORING No. B-3

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
5			20		SAND (SP-SM): Lt. brown, dry, medium dense, fine grained	91.2	1.4	
10			8		loose		1.9	Passing #200 = 8.6%
15			24		SILTY SAND (SM): Reddish brown to lt. brown, damp, medium dense to dense, fine grained sand	95.2	3.5	
20			23				4.7	Passing #200 = 33.1%
25			40			102.1	3.0	
30								
35								
40								
45								
50								
55								
60								

Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.

DATE DRILLED: 3/14/22
LOGGED BY: L. Jackson
SURFACE ELEVATION: Approximately -25 ft

TOTAL DEPTH: 26.5 Feet
TYPE OF BIT: Hollow Stem Auger
HAMMER WT.: 140 lbs.

DEPTH TO WATER: NA
DIAMETER: 8 in.
DROP: 30 in.

PROJECT NO. LP22032

LANDMARK
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PLATE B-3

LOG OF BORING No. B-4

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
5			23		SAND (SP): Lt. brown, dry, medium dense, fine grained	89.8	1.1	Passing #200 = 3.9%
10			10				1.5	
15			21		SILTY SAND (SM): Lt. brown, dry to damp, medium dense to dense, fine grained sand	86.5	1.9	Passing #200 = 18.5%
20			29				8.5	
25								
30								
35								
40								
45								
50								
55								
60								

Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.

DATE DRILLED: 3/14/22

LOGGED BY: L. Jackson

SURFACE ELEVATION: Approximately -25 ft

TOTAL DEPTH: 21.5 Feet

TYPE OF BIT: Hollow Stem Auger

HAMMER WT.: 140 lbs.

DEPTH TO WATER: NA

DIAMETER: 8 in.

DROP: 30 in.

PROJECT NO. LP22032

LANDMARK
Geo-Engineers and Geologists

PLATE B-4

LOG OF BORING No. B-5

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
5			33		SAND (SP): Lt. brown, dry, dense to medium dense, fine grained	90.6	0.9	Passing #200 = 1.9%
10			17				1.0	
15			29		SILTY SAND (SM): Lt. brown, dry to damp, medium dense to dense, fine grained sand	92.8	2.2	Passing #200 = 30.9%
20			19				7.0	
25			36			94.7	2.5	Passing #200 = 25.7%
30								
35								
40								
45								
50								
55								
60					Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			

DATE DRILLED: 3/14/22

LOGGED BY: L. Jackson

SURFACE ELEVATION: Approximately -25 ft

TOTAL DEPTH: 26.5 Feet

TYPE OF BIT: Hollow Stem Auger

HAMMER WT.: 140 lbs.

DEPTH TO WATER: NA

DIAMETER: 8 in.

DROP: 30 in.

PROJECT NO. LP22032

LANDMARK
Geo-Engineers and Geologists

PLATE B-5

DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS		SECONDARY DIVISIONS
Coarse grained soils More than half of material is larger that No. 200 sieve	**Gravels** More than half of coarse fraction is larger than No. 4 sieve	Clean gravels (less than 5% fines)		**GW**	Well graded gravels, gravel-sand mixtures, little or no fines
				**GP**	Poorly graded gravels, or gravel-sand mixtures, little or no fines
		Gravel with fines		**GM**	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
				**GC**	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	Sands More than half of coarse fraction is smaller than No. 4 sieve	Clean sands (less than 5% fines)		**SW**	Well graded sands, gravelly sands, little or no fines
				**SP**	Poorly graded sands or gravelly sands, little or no fines
		Sands with fines		**SM**	Silty sands, sand-silt mixtures, non-plastic fines
				**SC**	Clayey sands, sand-clay mixtures, plastic fines
Fine grained soils More than half of material is smaller than No. 200 sieve	**Silts and clays** Liquid limit is less than 50%			**ML**	Inorganic silts, clayey silts with slight plasticity
				**CL**	Inorganic clays of low to medium plasticity, gravely, sandy, or lean clays
				**OL**	Organic silts and organic clays of low plasticity
	Silts and clays Liquid limit is more than 50%			**MH**	Inorganic silts, micaceous or diatomaceous silty soils, elastic silts
				**CH**	Inorganic clays of high plasticity, fat clays
				**OH**	Organic clays of medium to high plasticity, organic silts
Highly organic soils				**PT**	Peat and other highly organic soils

GRAIN SIZES

Silts and Clays	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		
200	40	10	4	3/4"	3"	12"	

US Standard Series Sieve — Clear Square Openings

Sands, Gravels, etc.	Blows/ft. *
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Clays & Plastic Silts	Strength **	Blows/ft. *
Very Soft	0-0.25	0-2
Soft	0.25-0.5	2-4
Firm	0.5-1.0	4-8
Stiff	1.0-2.0	8-16
Very Stiff	2.0-4.0	16-32
Hard	Over 4.0	Over 32

* Number of blows of 140 lb. hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 in. I.D.) split spoon (ASTM D1586).

** Unconfined compressive strength in tons/s.f. as determined by laboratory testing or approximated by the Standard Penetration Test (ASTM D1586), Pocket Penetrometer, Torvane, or visual observation.

Type of Samples:

Ring Sample — Standard Penetration Test — Shelby Tube — Bulk (Bag) Sample

Drilling Notes:

1. Sampling and Blow Counts
   - Ring Sampler - Number of blows per foot of a 140 lb. hammer falling 30 inches.
   - Standard Penetration Test - Number of blows per foot.
   - Shelby Tube - Three (3) inch nominal diameter tube hydraulically pushed.
2. P. P. = Pocket Penetrometer (tons/s.f.).
3. NR = No recovery.
4. GWT = Ground Water Table observed @ specified time.

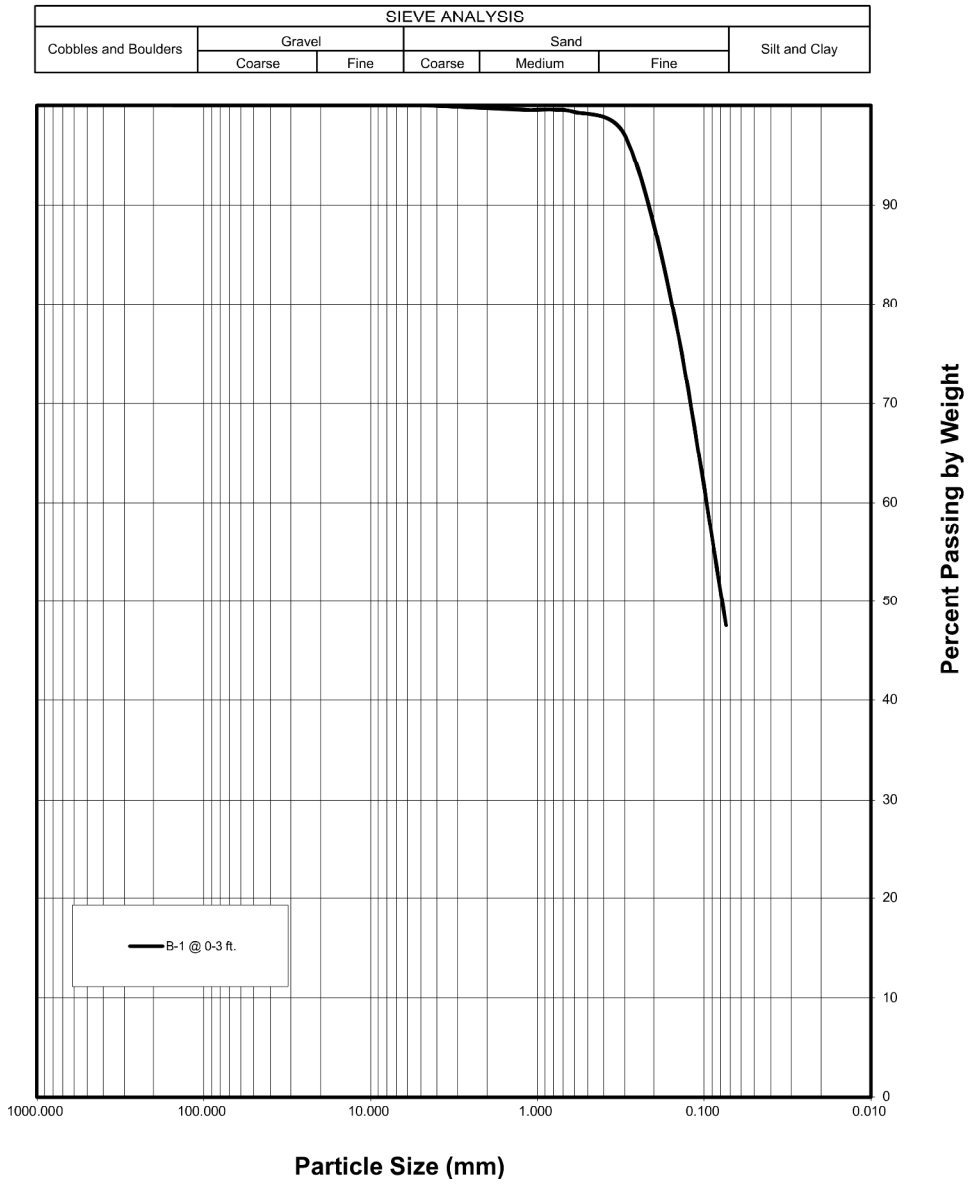
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Project No. LP22032

Key to Logs

Plate
B-6

APPENDIX C



LANDMARK
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Project No.: LP22032

Grain Size Analysis

Plate
C-1

LANDMARK CONSULTANTS, INC.

CLIENT: MBG Construction, LLC
PROJECT: APN 780-010-014 -- La Quinta, CA
JOB No.: LP22032
DATE: 04/15/22

CHEMICAL ANALYSIS

Boring:	B-1	**Caltrans**
Sample Depth, ft:	0-3	**Method**
pH:	7.9	**643**
Electrical Conductivity (mmhos):	--	**424**
Resistivity (ohm-cm):	2,400	**643**
Chloride (Cl), ppm:	80	**422**
Sulfate (SO4), ppm:	10	**417**

General Guidelines for Soil Corrosivity

Material Affected	Chemical Agent	Amount in Soil (ppm)	Degree of Corrosivity
Concrete	Soluble Sulfates	0 - 1,000	Low
		1,000 - 2,000	Moderate
		2,000 - 20,000	Severe
		> 20,000	Very Severe
Normal Grade Steel	Soluble Chlorides	0 - 200	Low
		200 - 700	Moderate
		700 - 1,500	Severe
		> 1,500	Very Severe
Normal Grade Steel	Resistivity	1 - 1,000	Very Severe
		1,000 - 2,000	Severe
		2,000 - 10,000	Moderate
		> 10,000	Low

LANDMARK
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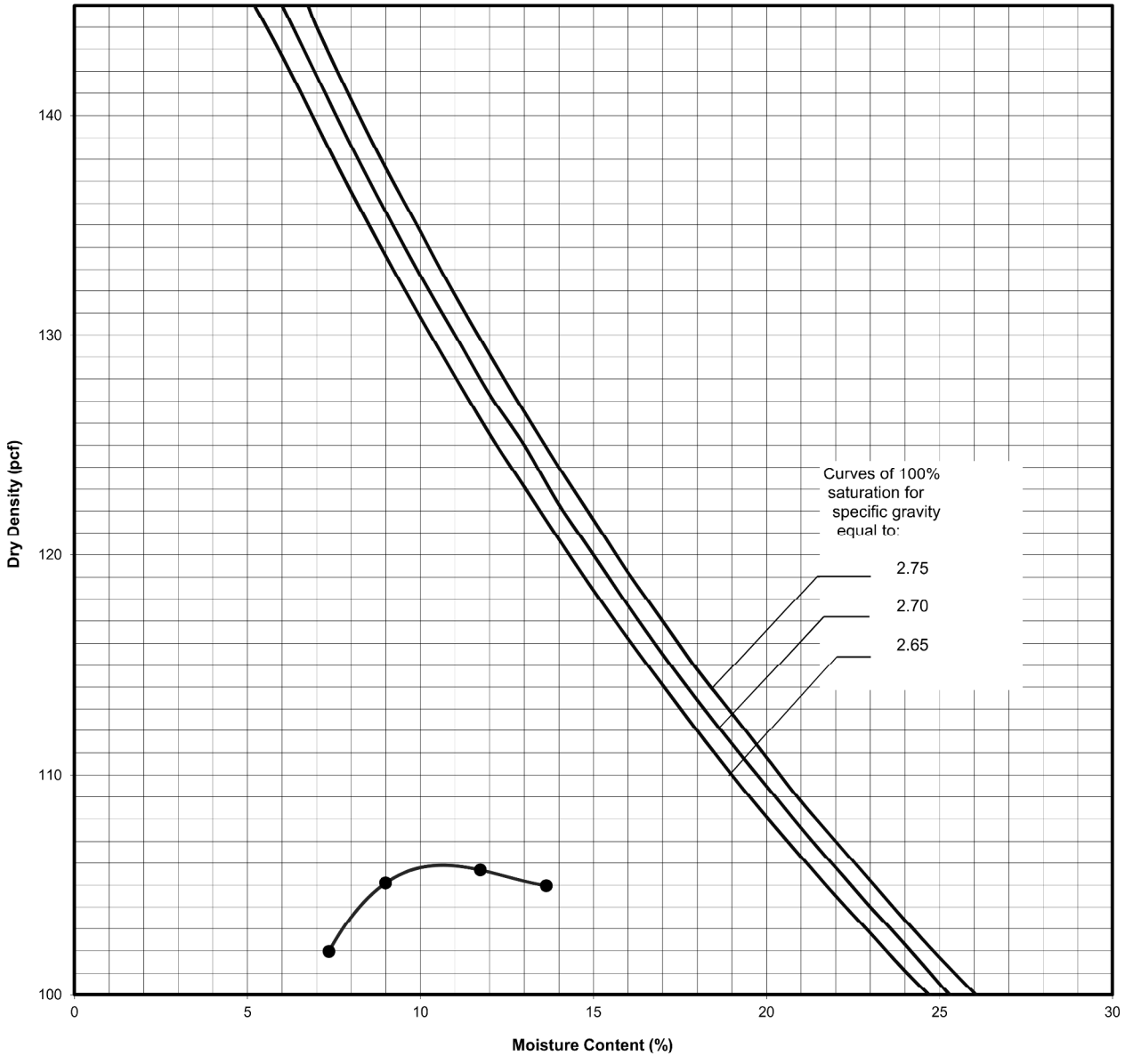
Project No.: LP22032

Selected Chemical Test Results

Plate C-2

Client: MBG Construction, LLC
Project: APN 780-010-014 -- La Quinta, CA
Project No.: LP22032
Date: 3/23/2022
Lab. No.: 0

Soil Description: Olive-Brown Silty Sand
Sample Location: B-1 @ 0-3 ft.
Test Method: ASTM D-1557 A
Maximum Dry Density (pcf): 105.9
Optimum Moisture Content (%): 10.6



LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Moisture Density Relationship

Plate C-3

APPENDIX D

Seismic Dry Settlement Calculation

Project Name: APN 780-010-014 -- La Quinta, CA
Project No.: LP22032
Location: B-2

Maximum Credible Earthquake	7.5	
Design Ground Motion	0.79	g
Water Unit Weight,	62.4	pcf
Depth to Groundwater	80	ft
Hammer Effenciency	85	

15.2

Mod. Cal	SPT	DEPTH (ft.)	THICKNESS (ft.)	D_{50} (mm)	ϕ (°)	Density (pcf)	Total Pressure (tsf)	N1(60)	Relative Density	Fine Content	$N_{1(60)CS}$	Gmax	Shear Strain Gam-eff	E15	Enc	Settlement (in.)	TOTAL (in.)
21		6.00	6	0.25	25	82.8	0.248	35.6	89	70	47.7	653	1.03E-03	3.65E-04	3.66E-04	0.05	
	11	11.00	5	0.25	25	92.8	0.510	32.3	85	50	43.7	909	1.33E-03	5.19E-04	5.21E-04	0.06	
26		16.00	5	0.25	25	94.1	0.753	41.6	96	50	54.9	1190	1.11E-03	3.30E-04	3.32E-04	0.04	
	25	21.00	5	0.25	25	100	1.050	60.0	116	70	77.0	1572	8.71E-04	1.73E-04	1.74E-04	0.02	
30		26.00	5	0.25	25	100	1.300	44.5	100	70	58.4	1597	1.19E-03	3.29E-04	3.30E-04	0.04	
	27	31.00	5	0.25	25	100	1.550	58.2	114	70	74.9	1892	9.68E-04	1.99E-04	2.00E-04	0.02	
	23	36.00	5	0.25	25	110	1.980	46.2	102	70	60.4	1993	1.21E-03	3.22E-04	3.23E-04	0.04	
	21	41.00	5	0.25	25	110	2.255	36.2	90	70	48.5	1977	1.41E-03	4.86E-04	4.89E-04	0.06	
	39	46.00	5	0.25	25	110	2.530	69.3	125	70	88.1	2551	8.15E-04	1.37E-04	1.38E-04	0.02	
	34	51.00	5	0.25	25	110	2.805	57.4	113	70	73.8	2534	8.52E-04	1.78E-04	1.79E-04	0.02	
																	0.37

REFERENCES
(1) Tokimatsu and Seed, 1984. Simplified Procedures for the Evaluation of Settlements in Clean Sands.
(2) Seed and Idriss, 1982. Ground Motion and Soil Liquefaction During Earthquakes, EERI Monograph.
(3) Youd, Leslie, 1997. Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils
(4) Pradel, Daniel, 1998. JGEE, Vol. 124, No. 4, ASCE
(5) Seed, et.al., 2003, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework. University of California, Earthquake Engineering Research Center Report 2003-06, 71 p.

APPENDIX E

LANDMARK CONSULTANTS, INC

Project:	APN 780-010-014	Project No:	LP22032	Date:	04/19/2022
Test Hole No:	P-1	Tested By:	Alex A		
Depth of Test Hole, D_T:	60"	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	6"	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	8:02	8:15	13.00	16.00	48.00	32.00	Yes
2	8:25	8:40	15.00	23.00	36.00	13.00	Yes

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:41	8:51	10.00	12.00	24.00	12.00	0.83
2	8:51	9:01	10.00	24.00	40.00	16.00	0.63
3	9:01	9:11	10.00	19.00	29.00	10.00	1.00
4	9:11	9:21	10.00	29.00	37.00	8.00	1.25
5	9:21	9:31	10.00	14.00	26.00	12.00	0.83
6	9:31	9:41	10.00	26.00	40.00	14.00	0.71
7							
8							
9							
10							
11							
12							

COMMENTS:

LANDMARK CONSULTANTS, INC

Project:	APN 780-010-014	Project No:	LP22032	Date:	04/0192022
Test Hole No:	P-2	Tested By:	Alex A		
Depth of Test Hole, D_T:	60"	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	6"	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	8:04	8:19	13.00	16.00	48.00	32.00	Yes
2	8:27	8:42	15.00	10.00	44.00	34.00	Yes

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:41	8:51	10.00	11.00	33.00	21.00	0.48
2	8:51	9:01	10.00	33.00	47.00	14.00	0.71
3	9:01	9:11	10.00	12.00	29.00	17.00	0.59
4	9:11	9:21	10.00	29.00	41.00	12.00	0.83
5	9:21	9:31	10.00	19.00	32.00	12.00	0.83
6	9:31	9:41	10.00	32.00	42.00	10.00	1.00
7							
8							
9							
10							
11							
12							

COMMENTS:

PERCOLATION RATE CONVERSION

CLIENT:	**MBG Construction, LLC**
PROJECT:	**APN 780-010-014**
PROJECT NO.:	**LP22032**
DATE:	**4/19/2022**

TEST HOLE NO: P-1

Time interval, **Δt** = 10 inches

Initial Depth to Water, D_0 = 26 inches

Final Depth to Water, D_f = 40 inches

Total Depth of Test Hole, D_T = 60 inches

[2]Test Hole Radius, **r** = 4 inches

The conversion equation is used:

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t(r+2H_{avg}}$$

"H_o" is the initial height of water at the selected time interval

$H_o = D_T - D_0$ = 60 - 26 = 34 inches

"H_f" is the final height of water at the selected time interval

$H_f = D_T - D_0$ = 60 - 40 = 20 inches

"ΔH" is the change in height over the time interval

$\Delta H = \Delta D = H_o - H_f$ = 34 - 20 = 14 inches

"H_{avg}" is the average head height over the time interval

$H_{avg} = (H_o - H_f)/2$ = (34 + 20)/2 = 27 inches

"I_t" is the tested infiltration rate

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t\ (r+2H_{avg})} = \frac{(14\text{ in})(60\text{min/hr})(4\text{in})}{(10\text{ min})((4\text{ in}) + 2\ (27\text{ in}))} = 5.79\text{ in/hr}$$

LANDMARK Geo-Engineers and Geologists **Project No.: LP22032**	**Percolation Rate Conversion**	**Plate E-3**

PERCOLATION RATE CONVERSION

CLIENT:	**MBG Construction, LLC**
PROJECT:	**APN 780-010-014**
PROJECT NO.:	**LP22032**
DATE:	**4/19/2022**

TEST HOLE NO: P-2

Time interval, **Δt** = 10 inches

Initial Depth to Water, D_0 = 32 inches

Final Depth to Water, D_f = 42 inches

Total Depth of Test Hole, D_T = 60 inches

²Test Hole Radius, **r** = 4 inches

The conversion equation is used:

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t(r+2H_{avg}}$$

"H_o" is the initial height of water at the selected time interval

$H_o = D_T - D_0$ = 60 - 32 = 28 inches

"H_f" is the final height of water at the selected time interval

$H_f = D_T - D_0$ = 60 - 42 = 18 inches

"ΔH" is the change in height over the time interval

$\Delta H = \Delta D = H_o - H_f$ = 28 - 18 = 10 inches

"H_{avg}" is the average head height over the time interval

$H_{avg} = (H_o - H_f)/2$ = (28 + 18)/2 = 23 inches

"I_t" is the tested infiltration rate

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t\ (r+2H_{avg})} = \frac{(10\text{ in})(60\text{min/hr})(4\text{in})}{(10\text{ min})((4\text{ in}) + 2\ (23\text{ in}))} = 4.8\text{ in/hr}$$

LANDMARK Geo-Engineers and Geologists **Project No.: LP22032**	**Percolation Rate Conversion**	**Plate E-4**

APPENDIX F

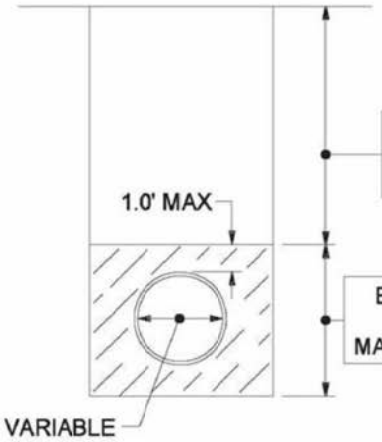
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Project No.: LP22032

Riverside County Standard No. 818
Utility Trench Backfill

Plate
F-1

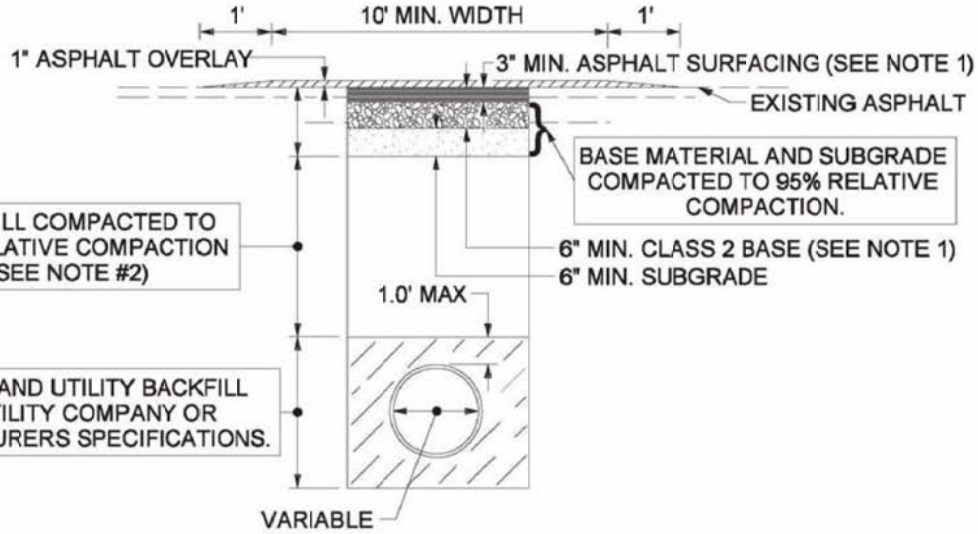
NON-ASPHALT SURFACED AREAS CASE 1



BACKFILL COMPACTED TO 90% RELATIVE COMPACTION (SEE NOTE #2)

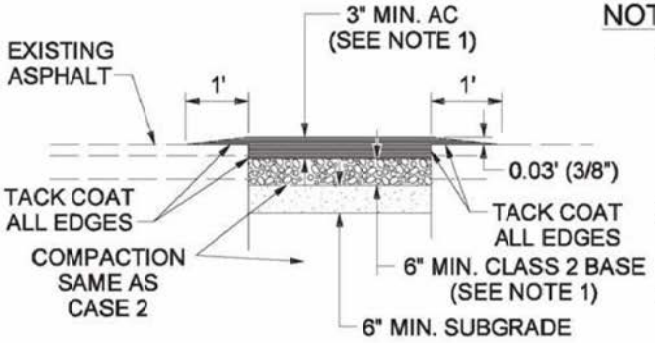
BEDDING AND UTILITY BACKFILL PER UTILITY COMPANY OR MANUFACTURERS SPECIFICATIONS.

ASPHALT SURFACED STREETS WITH OVERLAY PARALLEL INSTALLATION CASE 2



NOT TO SCALE

ASPHALT SURFACED STREET WITHOUT OVERLAY PERPENDICULAR INSTALLATION CASE 3



NOTES:

1. REPLACE STRUCTURAL SECTION AS FOLLOWS:
   SURFACING: EXISTING THICKNESS; OR 3" MIN. A.C., TYPE B.
   BASE: CLASS 2 A.B. IN SAME THICKNESS AS EXISTING BASE MATERIAL, 6" MIN. AS DIRECTED BY THE INSPECTOR.
2. MAXIMUM LIFT THICKNESS IS 8 INCHES; MAXIMUM LIFT THICKNESS WHEN PONDING AND JETTING IS 4 FEET.
3. WHEN A FIRM FOUNDATION IS NOT ENCOUNTERED, DUE TO SOFT, SPONGY OR OTHER UNSUITABLE MATERIAL, SUCH MATERIAL SHALL BE REMOVED TO THE LIMITS DIRECTED BY THE DIRECTOR OF TRANSPORTATION OR AFFECTED UTILITY COMPANY AND THE RESULTING EXCAVATION BACKFILLED WITH PIPE BEDDING MATERIAL.