PRELIMINARY HYDROLOGY REPORT

For Property Located in Those Portions of
Section 32, T5S., R6E., SBM
In the Cities of Palm Desert and Indian Wells, California

The Living Desert
Crossroads of Conservation
Phase 3

June 23, 2023

Prepared for:

The Living Desert
47900 Portola Avenue
Palm Desert, CA 92260

JN: 2244

MSA CONSULTING, INC.
> PLANNING > CIVIL ENGINEERING > LAND SURVEYING

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EXECUTIVE SUMMARY

The proposed project at The Living Desert in the City of Palm Desert and City of Indian Wells consists of a new events building, new animal habitats for lions and smaller animals, and a new special events entrance. On-site storm runoff will be conveyed through sheet flows and storm drain lines to a retention basins designed to retain the incremental increase in stormwater volume resulting from the new development, with subsequent runoff following existing drainage routes.

PROJECT LOCATION

The proposed project site is located in The Living Desert in Sections 28, 29, 32 and 33, Township 5 South, Range 6 East, San Bernardino Base and Meridian. A vicinity map obtained from the Riverside TLMA website is included as Appendix A.

EXISTING SITE CONDITIONS

The subject area consists of previously developed land with various buildings and structures. Mounding on the perimeter of the surrounding areas of The Living Desert prevents offsite flows from entering the project area. The existing parking lot uses a combination of permeable pavers and storm drain catch basins to percolate storm flows into the ground or convey them to the existing 66" storm drain line running underneath the project site.

On-site flows within the project site typically flow south to north and generally occur as sheet flow. Refer to Appendix H for the Existing Conditions Exhibit.

Flood Rate Map

The proposed (to be developed) area is covered by FIRM Panel Number 06065C2228G, revised May 2, 2013, by LOMR 12-09-314P-060254 which indicates the project area lies within Zone X (Shaded), which is defined as *"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. Insurance purchase is not required in these zones".* (Refer to the attached Flood Insurance Rate Map – Appendix B).

PROPOSED FLOOD CONTROL REQUIREMENTS

Drainage requirements for this project fall under the respective jurisdictions of the City of Palm Desert and the City of Indian Wells. Stormwater runoff will be conveyed via sheet flow and swales to proposed inlets and subsequently to proposed retention basins. The retention basins will be sized to retain the incremental increase in storm runoff volume, with further runoff being allowed to continue onto existing or proposed drainage routes.

No new storm drain facilities will be connected directly to the existing 66" storm drain line which runs north under the existing parking lot.

HYDROLOGY ANALYSIS DESIGN CRITERIA

Storm run-off volumes for the 100-year event were obtained utilizing the Synthetic Unit (Shortcut Method) Hydrograph, as described in the *RCFC&WCD Hydrology Manual*. The shortcut method is useful for evaluating those areas less than 200 acres in size. The hydrologic data used for the calculations are as follows:

National Cooperative Soil Survey

The existing soil is categorized as "not rated" as shown on the attached National Cooperative Soil Survey exhibits in Appendix C. Per the Earth Systems Southwest Geotechnical Engineering and Percolation Report, File No. PID-000166-001, Doc. No. 16-03-714, dated March 30, 2016, site "alluvial soils consist generally of well and poorly graded sands with varying amounts of silt and gravel (Universal Soils Classification System symbols of SP and

SW, SP-SM, and SW-SM)." This description matches Soil Group A, defined by RCFCD as – "those soils having high infiltration rates. These soils consist mainly of deep, well drained to excessively drained sands or gravely sands. These soils have a high rate of water transmission."

Antecedent Moisture Condition

AMC II – Moderate runoff potential, an intermediate condition. Per RCFC&WCD Hydrology Manual (Dated: April, 1978): "For the purposes of design hydrology using District methods, AMC II should normally be assumed for both the 10 year and 100 year frequency storm".

Land Use Classifications and Runoff Index Numbers

Runoff Index Numbers were obtained from RCFCD Plate D-5.5 and are summarized below:

Existing Conditions – Open Brush Poor	62
Proposed Conditions – Paving/Hardscape	32

Percent of Impervious Cover (RCFCD Plate E-6.3):

Existing Open Brush Poor	5%
Buildings/Paving/Hardscape	100%

Low Loss Rates:	85%

Precipitation Frequency Estimates

Precipitation depths were obtained from NOAA Atlas 14:

100 Year – 1 Hour Precipitation:	1.98	inches
100 Year – 3 Hour Precipitation:	2.59	inches
100 Year - 6 Hour Precipitation	3.16	inches
100 Year – 24 Hour Precipitation	4.88	inches

See Appendix D for the NOAA Atlas 14 Point Precipitation Frequency Estimates and respective RCFCD Plates.

SYNTHETIC UNIT HYDROGRAPH (SHORTCUT METHOD) ANALYSES

The tributary areas are considerably less than the 200-acre limit guideline for utilization of the shortcut method. It should be noted that the peak flow for the 1-hour storm is not necessarily representative for peak flow. Per RCFC&WCD, peak discharges from the 3-hour storm should normally compare well with rational peaks.

Analyses performed include comparative flood volume calculations for the existing and proposed conditions based on the RCFC&WCD Synthetic Unit Hydrograph (Shortcut Method). The differentials of the results provide the anticipated worst-case incremental increase flood volume from the 100-year storm event. The synthetic unit hydrograph worksheets are included in Appendix E and the Preliminary Hydrology Exhibit is included in Appendix J, with results summarized below:

Drainage Area A

STORM EVENT SUMMARY – DEVELOPED CONDITION					
Duration		1-HOUR	3-HOUR	6-HOUR	24-HOUR
Effective Rain	(in)	1.44	1.12	1.03	0.75
Flood Volume	(cu-ft)	18,837	14,588	13,485	9,772
	(acre-ft)	0.43	0.33	0.31	0.22
Existing Flood Volume	(cu-ft)	18,948	14,373	13,320	9,468
	(acre-ft)	0.43	0.33	0.31	0.22
Incremental Increase	(cu-ft)	-111	215	165	304
	(acre-ft)	0.00	0.00	0.00	0.01
Peak Flow	(cfs)	n/a	7.30	5.75	0.73

Drainage Area B

STORM EVENT SUMMARY – DEVELOPED CONDITION					
Duration		1-HOUR	3-HOUR	6-HOUR	24-HOUR
Effective Rain	(in)	1.64	1.58	1.43	1.25
Flood Volume	(cu-ft)	33,470	32,347	29,246	25,564
	(acre-ft)	0.77	0.74	0.67	0.59
Existing Flood Volume	(cu-ft)	31,337	26,656	24,556	19,483
	(acre-ft)	0.72	0.61	0.56	0.45
Incremental Increase	(cu-ft)	2,132	5,690	4,690	6,081
	(acre-ft)	0.05	0.13	0.11	0.14
Peak Flow	(cfs)	n/a	12.52	10.11	2.09

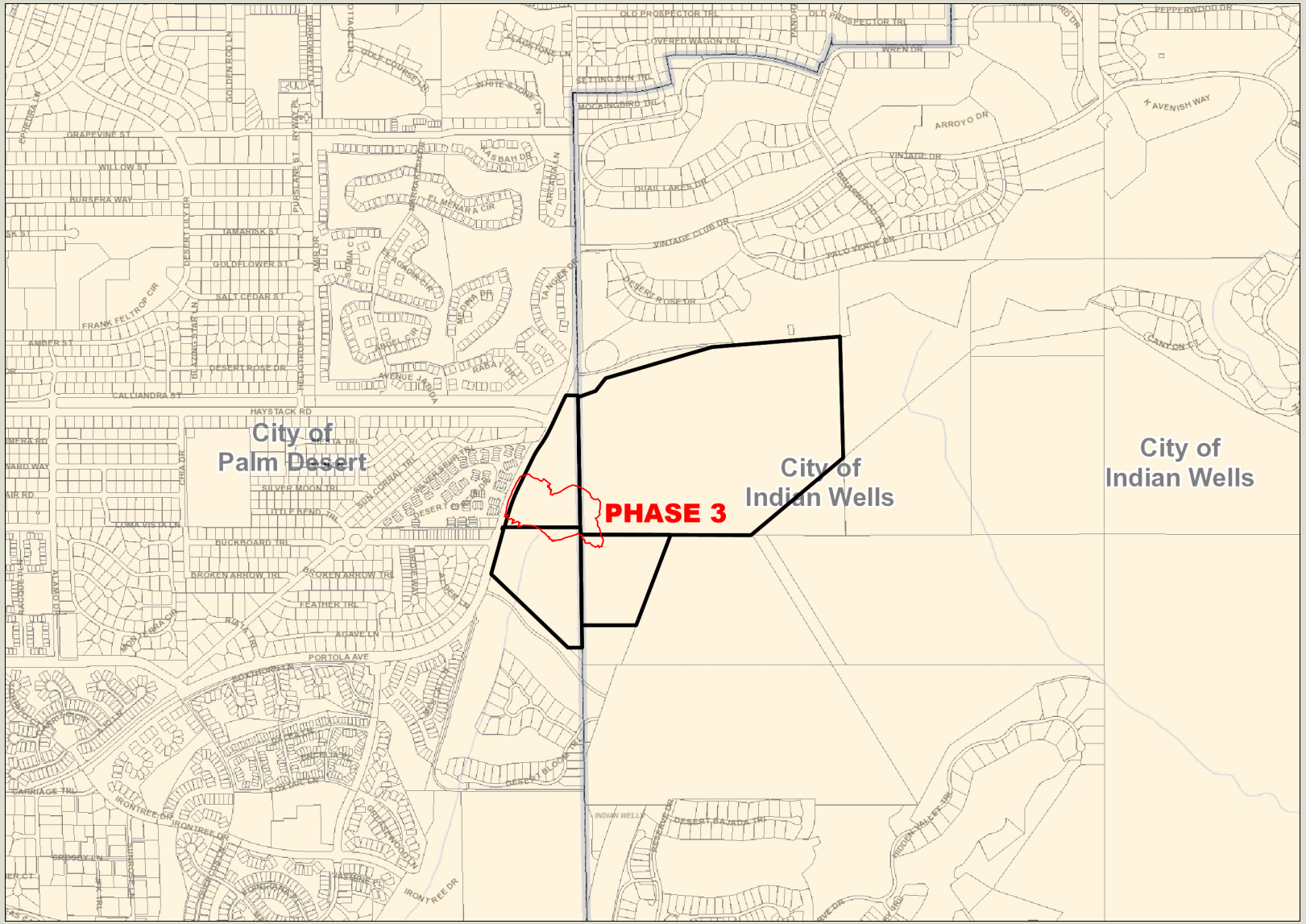
RESULTS AND CONCLUSIONS

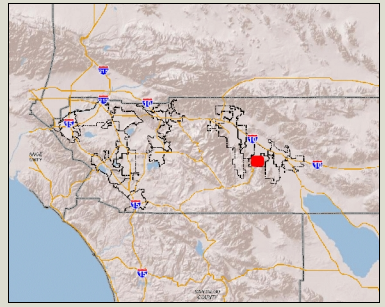
As demonstrated by the above narrative and appendices, the on-site storm water runoff from the 100-year storm event will be conveyed to the retention facilities, which have sufficient capacity to retain the incremental increase of flood volume from the 100-year storm. It is therefore concluded that this project conforms to the hydrologic requirements set forth by the City of Palm Desert and the City of Indian Wells.

Appendix A

Riverside County TLMA Vicinity Map

Vicinity Map





Legend

- Display Parcels
- City Boundaries
- Cities
- roadsanno
- highways
  - HWY
  - INTERCHANGE
  - INTERSTATE
  - OFFRAMP
  - ONRAMP
  - USHWY
- counties
- cities
- hydrographylines
- waterbodies
  - Lakes
  - Rivers

RCIT

0 1,889 3,778 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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Notes

Appendix B

NFIP Flood Insurance Rate Map

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Indian Wells Riverside County California	NO PROJECT	UPDATE
	COMMUNITY NO.: 060254		
IDENTIFIER	Indian Wells & Palm Desert SFHA Discrepancy	APPROXIMATE LATITUDE & LONGITUDE: 33.701, -116.365 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 06065C2228G DATE: August 28, 2008	NO REVISION TO THE FLOOD INSURANCE STUDY REPORT

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map; ** FBFM - Flood Boundary and Floodway Map; *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCES & REVISED REACHES

Lower Living Desert Debris Basin - from the outlet to Deep Canyon Storm Water Channel to approximately 2,780 feet upstream

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Lower Living Desert Debris Basin	Zone AO	Zone A	NONE	YES
	Depths*	No Depths	NONE	YES
	Zone AO	Zone X (shaded)	NONE	YES

* Depths - Base (1-percent-annual-chance) flood depths

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA MAP Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the base (1-percent-annual-chance) flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA MAP Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

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Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA MAP Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

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Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp.

LOCAL NEWSPAPER Name: *The Desert Sun*
Dates: December 27, 2012 and January 3, 2013

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA MAP Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/business/nfip.

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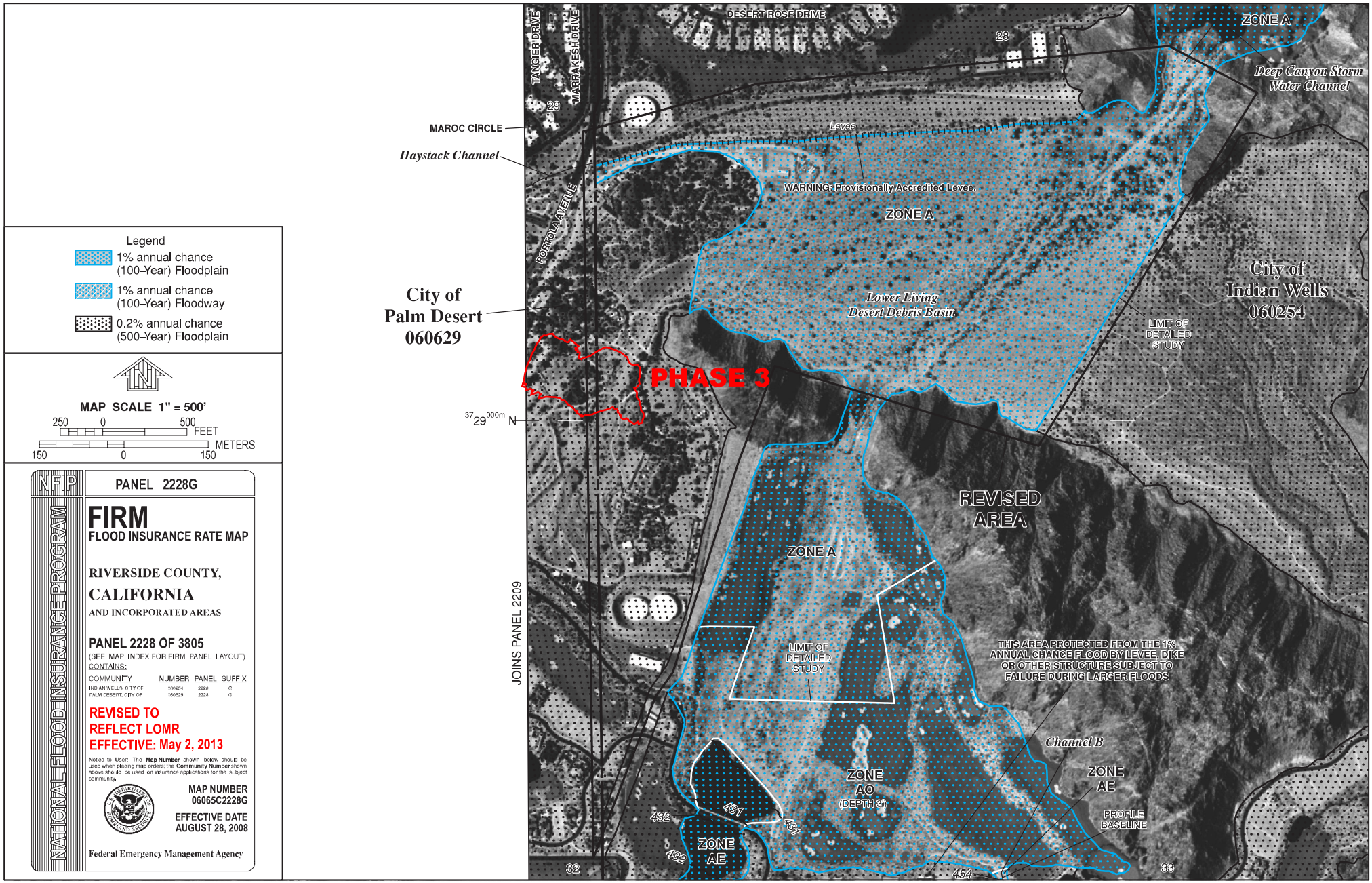
Federal Insurance and Mitigation Administration


Legend
1% annual chance (100-Year) Floodplain
1% annual chance (100-Year) Floodway
0.2% annual chance (500-Year) Floodplain
MAP SCALE 1" = 500'
250 0 500 FEET
150 0 150 METERS
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 2228G
FIRM
FLOOD INSURANCE RATE MAP
RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS
PANEL 2228 OF 3805
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
INDIAN WELLS, CITY OF 060254 2228 G
PALM DESERT, CITY OF 060629 2228 G
REVISED TO REFLECT LOMR EFFECTIVE: May 2, 2013
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER 06065C2228G
EFFECTIVE DATE AUGUST 28, 2008
Federal Emergency Management Agency
City of Palm Desert 060629
City of Indian Wells 060254
PHASE 3
REVISED AREA
DESERT ROSE DRIVE
TANGIER DRIVE
MARRAKESH DRIVE
PORTOLA AVENUE
MAROC CIRCLE
Haystack Channel
Levee
WARNING: Provisionally Accredited Levee.
Deep Canyon Storm Water Channel
Lower Living Desert Debris Basin
LIMIT OF DETAILED STUDY
ZONE A
ZONE AO (DEPTH 3')
ZONE AE
THIS AREA PROTECTED FROM THE 1% ANNUAL CHANCE FLOOD BY LEVEE, DIKE OR OTHER STRUCTURE SUBJECT TO FAILURE DURING LARGER FLOODS
Channel B
PROFILE BASELINE
JOINS PANEL 2209
37°29'000mN
28
29
32
33
451
452
454

DEFINITIONS OF FEMA FLOOD ZONE DESIGNATIONS

Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

ZONE	DESCRIPTION
X (Shaded)	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. Insurance purchase is not required in these zones.
X	Areas determined to be outside the 0.2% annual chance floodplain.

High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. In most instances, base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones. For areas of alluvial fan flooding, velocities are also determined.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

High Risk – Coastal Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

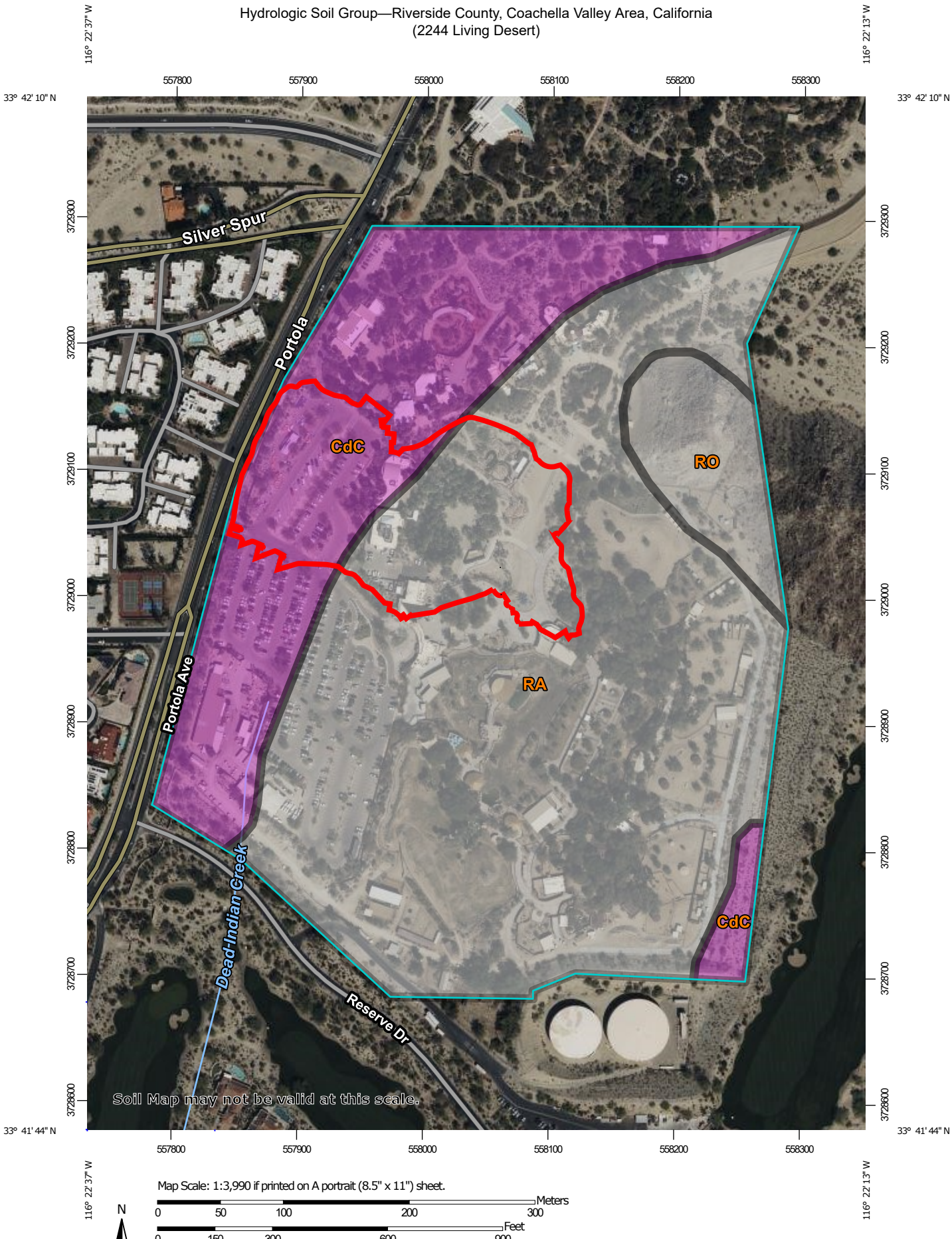
ZONE	DESCRIPTION
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Undetermined Risk Areas

ZONE	DESCRIPTION
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

Appendix C
USDA NCSS Hydrologic Soils Map

Hydrologic Soil Group—Riverside County, Coachella Valley Area, California
(2244 Living Desert)



Map Scale: 1:3,990 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 14, Sep 1, 2022

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

Date(s) aerial images were photographed: Mar 15, 2022—May 28, 2022

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CdC	Carsitas gravelly sand, 0 to 9 percent slopes	A	17.0	27.6%
RA	Riverwash		40.8	66.3%
RO	Rock outcrop		3.7	6.0%
Totals for Area of Interest			**61.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Appendix D

NOAA Atlas 14 RCFCD Reference Plates

NOAA Atlas 14, Volume 6, Version 2
Location name: Indian Wells, California, US*
Latitude: 33.6992°, Longitude: -116.3739°
Elevation: 382 ft*
* source: Google Maps

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	0.075 (0.063–0.091)	0.115 (0.096–0.140)	0.178 (0.148–0.216)	0.238 (0.196–0.291)	0.335 (0.267–0.425)	0.424 (0.331–0.550)	0.530 (0.403–0.704)	0.657 (0.485–0.898)	0.864 (0.611–1.23)	1.06 (0.724–1.57)
10-min	0.108 (0.090–0.131)	0.165 (0.138–0.200)	0.255 (0.212–0.310)	0.341 (0.281–0.417)	0.480 (0.382–0.609)	0.608 (0.474–0.788)	0.760 (0.578–1.01)	0.941 (0.696–1.29)	1.24 (0.876–1.77)	1.52 (1.04–2.24)
15-min	0.131 (0.109–0.158)	0.200 (0.167–0.242)	0.308 (0.256–0.374)	0.412 (0.340–0.505)	0.581 (0.463–0.736)	0.735 (0.573–0.953)	0.919 (0.699–1.22)	1.14 (0.841–1.56)	1.50 (1.06–2.14)	1.84 (1.25–2.71)
30-min	0.196 (0.164–0.238)	0.300 (0.250–0.364)	0.463 (0.385–0.563)	0.619 (0.511–0.759)	0.873 (0.696–1.11)	1.11 (0.862–1.43)	1.38 (1.05–1.84)	1.71 (1.27–2.34)	2.25 (1.59–3.21)	2.76 (1.89–4.08)
60-min	0.281 (0.234–0.340)	0.429 (0.358–0.520)	0.662 (0.551–0.805)	0.885 (0.730–1.09)	1.25 (0.994–1.58)	1.58 (1.23–2.05)	1.98 (1.50–2.62)	2.45 (1.81–3.35)	3.22 (2.28–4.59)	3.95 (2.70–5.83)
2-hr	0.388 (0.324–0.469)	0.569 (0.475–0.689)	0.848 (0.705–1.03)	1.11 (0.915–1.36)	1.53 (1.22–1.93)	1.90 (1.48–2.46)	2.33 (1.77–3.10)	2.84 (2.10–3.88)	3.64 (2.58–5.20)	4.38 (2.99–6.47)
3-hr	0.458 (0.383–0.554)	0.664 (0.553–0.804)	0.976 (0.811–1.19)	1.27 (1.04–1.55)	1.72 (1.37–2.18)	2.13 (1.66–2.76)	2.59 (1.97–3.44)	3.13 (2.31–4.28)	3.98 (2.82–5.67)	4.74 (3.24–7.00)
6-hr	0.592 (0.495–0.717)	0.852 (0.710–1.03)	1.24 (1.03–1.51)	1.59 (1.31–1.95)	2.14 (1.71–2.71)	2.62 (2.04–3.39)	3.16 (2.40–4.20)	3.78 (2.79–5.17)	4.73 (3.35–6.75)	5.57 (3.80–8.23)
12-hr	0.722 (0.603–0.873)	1.06 (0.882–1.28)	1.55 (1.29–1.89)	2.00 (1.64–2.44)	2.67 (2.13–3.38)	3.24 (2.53–4.20)	3.89 (2.96–5.16)	4.61 (3.41–6.31)	5.71 (4.04–8.14)	6.65 (4.54–9.83)
24-hr	0.875 (0.774–1.01)	1.32 (1.16–1.52)	1.95 (1.72–2.26)	2.52 (2.20–2.94)	3.37 (2.85–4.06)	4.09 (3.39–5.02)	4.88 (3.96–6.14)	5.76 (4.55–7.45)	7.08 (5.37–9.53)	8.21 (6.02–11.4)
2-day	1.01 (0.889–1.16)	1.53 (1.36–1.77)	2.30 (2.03–2.66)	2.98 (2.61–3.48)	4.00 (3.39–4.82)	4.86 (4.04–5.97)	5.81 (4.71–7.31)	6.87 (5.43–8.88)	8.46 (6.42–11.4)	9.81 (7.20–13.6)
3-day	1.08 (0.952–1.24)	1.65 (1.46–1.91)	2.49 (2.20–2.89)	3.24 (2.83–3.78)	4.36 (3.69–5.25)	5.31 (4.41–6.52)	6.36 (5.15–8.00)	7.53 (5.95–9.73)	9.29 (7.05–12.5)	10.8 (7.92–15.0)
4-day	1.15 (1.01–1.32)	1.76 (1.56–2.03)	2.66 (2.35–3.08)	3.46 (3.03–4.04)	4.66 (3.95–5.61)	5.68 (4.72–6.98)	6.81 (5.52–8.56)	8.07 (6.37–10.4)	9.96 (7.56–13.4)	11.6 (8.50–16.1)
7-day	1.22 (1.08–1.41)	1.88 (1.66–2.17)	2.84 (2.50–3.28)	3.69 (3.23–4.30)	4.97 (4.21–5.98)	6.05 (5.02–7.44)	7.25 (5.88–9.12)	8.58 (6.78–11.1)	10.6 (8.02–14.2)	12.3 (9.01–17.1)
10-day	1.26 (1.11–1.45)	1.94 (1.71–2.23)	2.93 (2.58–3.39)	3.81 (3.33–4.45)	5.14 (4.35–6.19)	6.26 (5.20–7.69)	7.49 (6.07–9.42)	8.86 (6.99–11.5)	10.9 (8.27–14.7)	12.6 (9.28–17.6)
20-day	1.36 (1.21–1.57)	2.13 (1.88–2.46)	3.26 (2.87–3.77)	4.26 (3.72–4.97)	5.75 (4.87–6.93)	7.01 (5.82–8.62)	8.38 (6.80–10.5)	9.91 (7.82–12.8)	12.1 (9.21–16.3)	14.0 (10.3–19.5)
30-day	1.49 (1.32–1.72)	2.36 (2.08–2.72)	3.64 (3.20–4.21)	4.77 (4.17–5.57)	6.47 (5.48–7.79)	7.89 (6.55–9.69)	9.42 (7.64–11.9)	11.1 (8.77–14.4)	13.6 (10.3–18.3)	15.6 (11.5–21.7)
45-day	1.61 (1.42–1.86)	2.60 (2.30–3.00)	4.04 (3.56–4.68)	5.33 (4.66–6.22)	7.25 (6.14–8.73)	8.86 (7.35–10.9)	10.6 (8.58–13.3)	12.5 (9.84–16.1)	15.2 (11.5–20.4)	17.4 (12.8–24.2)
60-day	1.72 (1.52–1.99)	2.82 (2.49–3.26)	4.43 (3.91–5.13)	5.87 (5.13–6.84)	7.99 (6.77–9.63)	9.77 (8.11–12.0)	11.7 (9.47–14.7)	13.7 (10.8–17.8)	16.7 (12.7–22.5)	19.1 (14.0–26.6)

[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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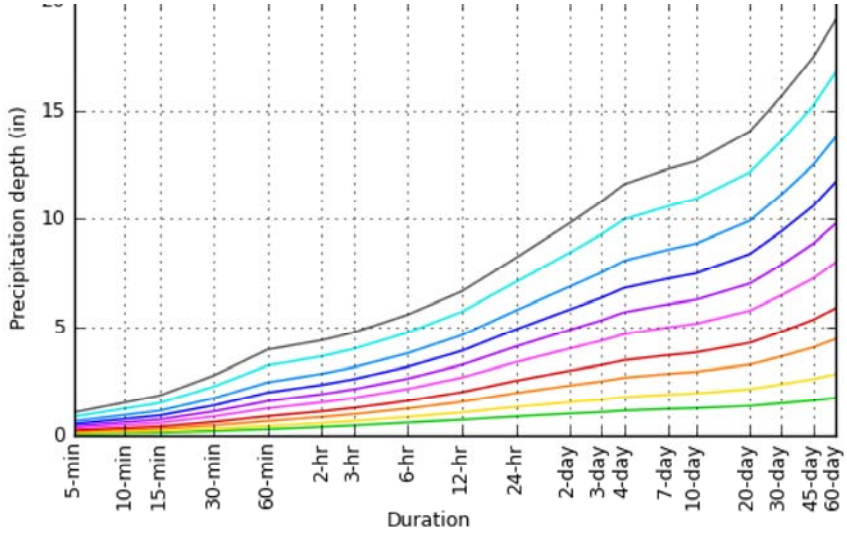
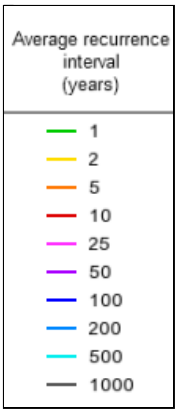
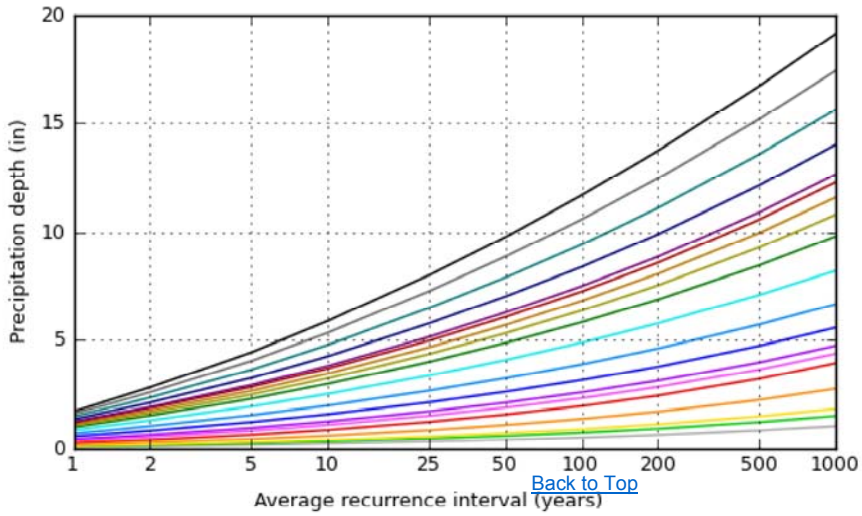
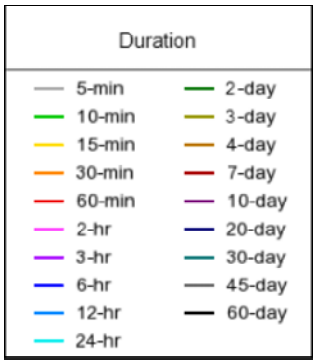
PF graphical









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Maps & aerials

NOAA Atlas 14, Volume 6, Version 2

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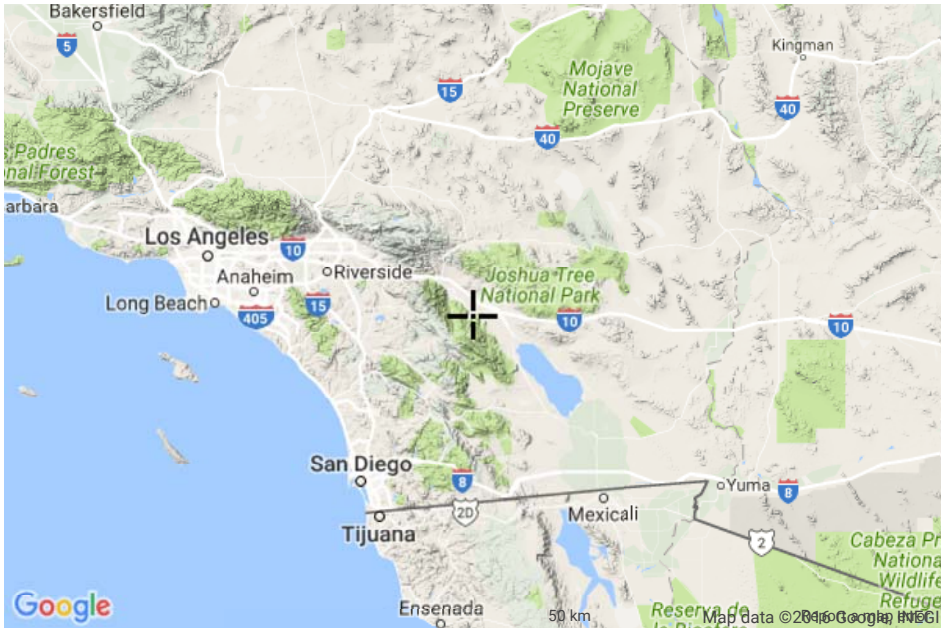
Small scale terrain



Large scale terrain

Large scale map

Large scale aerial

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Appendix E

RCFC&WCD Synthetic Unit Hydrograph Worksheets

RCFCD SYNTHETIC UNIT HYDROGRAPH - SHORTCUT METHOD
INCREMENTAL INCREASE WORKSHEET

DATA INPUT SHEET

DATE: June 23, 2023

WORKSHEET PREPARED BY: RRR

PROJECT NAME: Living Desert - Crossroads Phase 3

PROJECT NUMBER: 2244

CONCENTRATION POINT DESIGNATION: Retention Basin

AREA DESIGNATION: Drainage Area A

AMC NUMBER: 2

Low Loss Conditions: X=Existing; D=Developed; BS=Retention

EXISTING CONDITIONS

AREA DESIG	SOIL GROUP	TRIBUTARY AREAS	ACRES	LOW LOSS CONDITION	RI NUMBER	AMC II INFILTRATION RATE	IMPERVIOUS PERCENT
2	A	PAVING/HARDSCAPE	0.730	D	32	0.74	1.00
9	A	LANDSCAPING	2.930	D	32	0.74	0.10

PROPOSED CONDITIONS

AREA DESIG	SOIL GROUP	TRIBUTARY AREAS	ACRES	LOW LOSS CONDITION	RI NUMBER	AMC II INFILTRATION RATE	IMPERVIOUS PERCENT
2	A	PAVING/HARDSCAPE	0.810	D	32	0.74	1.00
9	A	LANDSCAPING	2.790	D	32	0.74	0.10

	UNDEVELOPED	DEVELOPED
LENGTH OF WATERCOURSE (L)	672 ft	661 ft
LENGTH TO POINT OPPOSITE CENTROID (Lca)	343 ft	340 ft
ELEVATION OF HEADWATER	389.0 ft	389.0 ft
ELEVATION OF CONCENTRATION POINT	371.6 ft	371.6 ft
AVERAGE MANNINGS 'N' VALUE	0.018	0.018

STORM FREQUENCY (YEAR): 100

LOW LOSS RATE (Storm Events > 10 Years): **85.00%**

POINT RAIN FROM NOAA ATLAS

1-HOUR: 1.98 in

3-HOUR: 2.59 in

6-HOUR: 3.16 in

24-HOUR: 4.88 in

BASIN CHARACTERISTICS:

ELEVATION	AREA
368.0 ft	428 sf
369.0 ft	696 sf
370.0 ft	1,022 sf

PERCOLATION RATE: 2.0 in/hr

DRYWELL DATA

NUMBER USED: 0

PERCOLATION RATE: 0.00 cfs

LOWEST FLOWLINE ELEVATION: 371.60 ft

LOWEST PAD ELEVATION: 378.3 ft

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD BASIC DATA CALCULATION FORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 BY: RRR DATE: 6/23/23

PHYSICAL DATA

	UNDEVELOPED CONDITION	DEVELOPED CONDITION
[1] CONCENTRATION POINT	Retention Basin	Retention Basin
[2] AREA DESIGNATION	Drainage Area A	Drainage Area A
[3] AREA - ACRES	3.660	3.600
[4] L-FEET	672	661
[5] L-MILES	0.127	0.125
[6] La-FEET	343.00	340.00
[7] La-MILES	0.065	0.064
[8] ELEVATION OF HEADWATER	389	389
[9] ELEVATION OF CONCENTRATION POINT	371.6	371.6
[10] H-FEET	17.4	17.4
[11] S-FEET/MILE	136.7	139.0
[12] S^0.5	11.69	11.79
[13] L*LCA/S^0.5	0.001	0.001
[14] AVERAGE MANNINGS 'N'	0.018	0.018
[15] LAG TIME-HOURS	0.03	0.03
[16] LAG TIME-MINUTES	1.6	1.6
[17] 100% OF LAG-MINUTES	1.6	1.6
[18] 200% OF LAG-MINUTES	3.3	3.3

RAINFALL DATA

[1] AMC	II
[2] FREQUENCY-YEARS	100
NOAA ATLAS	**0**
[3] STORM DURATION:	POINT RAIN
1-HOUR	1.98 in
3-HOUR	2.59 in
6-HOUR	3.16 in
24-HOUR	4.88 in

STORM EVENT SUMMARY

DURATION		UNDEVELOPED CONDITION 1-HOUR	UNDEVELOPED CONDITION 3-HOUR	UNDEVELOPED CONDITION 6-HOUR	UNDEVELOPED CONDITION 24-HOUR	DEVELOPED CONDITION 1-HOUR	DEVELOPED CONDITION 3-HOUR	DEVELOPED CONDITION 6-HOUR	DEVELOPED CONDITION 24-HOUR
EFFECTIVE RAIN	(in)	1.43	1.08	1.00	0.71	1.44	1.12	1.03	0.75
FLOOD VOLUME	(cu-ft) (acre-ft)	18,948 0.43	14,373 0.33	13,320 0.31	9,468 0.22	18,837 0.43	14,588 0.33	13,485 0.31	9,772 0.22
PEAK FLOW	(cfs)	N/A	7.36	5.79	0.69	N/A	7.30	5.75	0.73

STORM EVENT SUMMARY

DURATION		1-HOUR	3-HOUR	6-HOUR	24-HOUR
DEVELOPED CONDITION FLOOD VOLUME	(cu-ft)	**18,837**	14,588	13,485	9,772
	(ac-ft)	0.43	0.33	0.31	0.22
UNDEVELOPED CONDITION FLOOD VOLUME	(cu-ft)	18,948	14,373	13,320	9,468
	(ac-ft)	0.43	0.33	0.31	0.22
INCREMENTAL INCREASE IN FLOOD VOLUME	(cu-ft)	-111	215	165	304
	(ac-ft)	0.00	0.00	0.00	0.01
TOTAL FLOOD VOLUME RETAINED	(cu-ft)	1,557	1,825	2,272	4,473
	(ac-ft)	0.04	0.04	0.05	0.10
TOTAL BASIN OUTFLOW	(cu-ft)	17,280	12,763	11,213	5,299
	(ac-ft)	0.40	0.29	0.26	0.12
	(cfs)	27.75	7.25	5.71	0.68
MAXIMUM WSEL	(ft)	**369.98**	**369.98**	**369.98**	369.95
DEPTH	(ft)	**1.98**	**1.98**	**1.98**	1.95
LOWEST FLOWLINE ELEVATION		371.60			
DIFFERENCE	(ft)	1.62	1.62	1.62	1.65
LOWEST PAD ELEVATION		378.30			
DIFFERENCE	(ft)	8.32	8.32	8.32	8.35
ESTIMATED TIME TO DEWATER BASIN Based on total Flood Volume & Average Percolation Rate	(days)	0.4	0.5	0.6	1.3

NOTE: PEAK FLOW FOR THE 1-HOUR STORM IS NOT REPRESENTATIVE. PER RCFCD THE 3-HOUR STORM PEAK DISCHARGES SHOULD NORMALLY COMPARE WELL WITH RATIONAL PEAKS.

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD BASIC DATA CALCULATION FORM AMC II	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 BY: RRR DATE: 6/23/23

AVERAGE ADJUSTED LOSS RATE - UNDEVELOPED CONDITIONS

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA	AREA WEIGHTED AVERAGE	MAX AVERAGE ADJUSTED INFILTRATION RATE (in/hr)	LOW LOSS CONDITION	LOW LOSS RATE PER RCFC/2322 (in/hr)	MIN AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	PAVING/HARDSCAPE	32	0.74	100%	0.07	0.730	0.199	0.0148	DEVELOPED	0.1000	0.0199
A	LANDSCAPING	32	0.74	10%	0.67	2.930	0.801	0.5391	DEVELOPED	0.8200	0.6564
					SUM	3.660	SUM	0.5538			0.6764

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.27692377

C= 0.00513

Ft=C(24-(T/60))^1.55 = 0.00513 (24-(T/60))^1.55 + **0.28** in/hr

CONSTANT LOSS RATE (3 & 6 HOUR STORMS) = **0.5538** in/hr

LOW LOSS RATE = **0.8500** in/hr

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period, T=1 1/2 unit time for the second period, etc.

NOTE: Low loss rates established per RCFC/2322 (Dated: May-30-95)
For 2, 5 & 10 Year Storm Events
Undeveloped Condition: Low Loss = 90%
Developed Condition: Low Loss = 0.9 - (0.8 * %impervious)
Basin Site: Low Loss = 10%
For 100 Year Storm - Low Loss should be between 80% & 90% of the Rainfall Rate

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 1-HOUR STORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.66	
UNIT TIME-MINUTES	5	
LAG TIME - MINUTES	1.65	
UNIT TIME-PERCENT OF LAG	303.8	
TOTAL ADJUSTED STORM RAIN-INCHES	1.98	
CONSTANT LOSS RATE-in/hr		0.55
LOW LOSS RATE - PERCENT		85%

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs
1	5	0.08	3.6	0.86	0.55	0.73	0.30	1.11
2	10	0.17	4.2	1.00	0.55	0.85	0.44	1.64
3	15	0.25	4.4	1.05	0.55	0.89	0.49	1.81
4	20	0.33	4.6	1.09	0.55	0.93	0.54	1.99
5	25	0.42	5.0	1.19	0.55	1.01	0.63	2.34
6	30	0.50	5.6	1.33	0.55	1.13	0.78	2.87
7	35	0.58	6.4	1.52	0.55	1.29	0.97	3.57
8	40	0.67	8.1	1.92	0.55	1.64	1.37	5.06
9	45	0.75	13.1	3.11	0.55	2.65	2.56	9.44
10	50	0.83	34.5	8.20	0.55	6.97	7.64	**28.21**
11	55	0.92	6.7	1.59	0.55	1.35	1.04	3.83
12	60	1.00	3.8	0.90	0.55	0.77	0.35	1.29

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.43
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18,948
PEAK FLOW RATE (cfs)	28.21

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 3-HOUR STORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.66	
UNIT TIME-MINUTES	5	
LAG TIME - MINUTES	1.65	
UNIT TIME-PERCENT OF LAG	303.8	
TOTAL ADJUSTED STORM RAIN-INCHES	2.59	
CONSTANT LOSS RATE-in/hr		0.55
LOW LOSS RATE - PERCENT		85%

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs
1	5	0.08	1.3	0.40	0.55	0.34	0.06	0.22
2	10	0.17	1.3	0.40	0.55	0.34	0.06	0.22
3	15	0.25	1.1	0.34	0.55	0.29	0.05	0.19
4	20	0.33	1.5	0.47	0.55	0.40	0.07	0.26
5	25	0.42	1.5	0.47	0.55	0.40	0.07	0.26
6	30	0.50	1.8	0.56	0.55	0.48	0.01	0.02
7	35	0.58	1.5	0.47	0.55	0.40	0.07	0.26
8	40	0.67	1.8	0.56	0.55	0.48	0.01	0.02
9	45	0.75	1.8	0.56	0.55	0.48	0.01	0.02
10	50	0.83	1.5	0.47	0.55	0.40	0.07	0.26
11	55	0.92	1.6	0.50	0.55	0.42	0.07	0.28
12	60	1.00	1.8	0.56	0.55	0.48	0.01	0.02
13	65	1.08	2.2	0.68	0.55	0.58	0.13	0.48
14	70	1.17	2.2	0.68	0.55	0.58	0.13	0.48
15	75	1.25	2.2	0.68	0.55	0.58	0.13	0.48
16	80	1.33	2.0	0.62	0.55	0.53	0.07	0.25
17	85	1.42	2.6	0.81	0.55	0.69	0.25	0.94
18	90	1.50	2.7	0.84	0.55	0.71	0.29	1.05
19	95	1.58	2.4	0.75	0.55	0.63	0.19	0.71
20	100	1.67	2.7	0.84	0.55	0.71	0.29	1.05
21	105	1.75	3.3	1.03	0.55	0.87	0.47	1.74
22	110	1.83	3.1	0.96	0.55	0.82	0.41	1.51
23	115	1.92	2.9	0.90	0.55	0.77	0.35	1.28
24	120	2.00	3.0	0.93	0.55	0.79	0.38	1.40
25	125	2.08	3.1	0.96	0.55	0.82	0.41	1.51
26	130	2.17	4.2	1.31	0.55	1.11	0.75	2.77
27	135	2.25	5.0	1.55	0.55	1.32	1.00	3.69
28	140	2.33	3.5	1.09	0.55	0.92	0.53	1.97
29	145	2.42	6.8	2.11	0.55	1.80	1.56	5.76
30	150	2.50	7.3	2.27	0.55	1.93	1.71	6.33
31	155	2.58	8.2	2.55	0.55	2.17	1.99	**7.36**
32	160	2.67	5.9	1.83	0.55	1.56	1.28	4.72
33	165	2.75	2.0	0.62	0.55	0.53	0.07	0.25
34	170	2.83	1.8	0.56	0.55	0.48	0.01	0.02
35	175	2.92	1.8	0.56	0.55	0.48	0.01	0.02
36	180	3.00	0.6	0.19	0.55	0.16	0.03	0.10

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.08
FLOOD VOLUME (acft)	0.33
FLOOD VOLUME (cuft)	14,373
PEAK FLOW RATE (cfs)	7.36

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 6-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.66
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	303.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16
CONSTANT LOSS RATE-in/hr	0.554
LOW LOSS RATE - PERCENT	85%

Unit Time Period	Time		Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours			Max	Low		
1	5	0.08	0.5	0.190	0.55	0.16	0.03	0.10
2	10	0.17	0.6	0.228	0.55	0.19	0.03	0.13
3	15	0.25	0.6	0.228	0.55	0.19	0.03	0.13
4	20	0.33	0.6	0.228	0.55	0.19	0.03	0.13
5	25	0.42	0.6	0.228	0.55	0.19	0.03	0.13
6	30	0.50	0.7	0.265	0.55	0.23	0.04	0.15
7	35	0.58	0.7	0.265	0.55	0.23	0.04	0.15
8	40	0.67	0.7	0.265	0.55	0.23	0.04	0.15
9	45	0.75	0.7	0.265	0.55	0.23	0.04	0.15
10	50	0.83	0.7	0.265	0.55	0.23	0.04	0.15
11	55	0.92	0.7	0.265	0.55	0.23	0.04	0.15
12	60	1.00	0.8	0.303	0.55	0.26	0.05	0.17
13	65	1.08	0.8	0.303	0.55	0.26	0.05	0.17
14	70	1.17	0.8	0.303	0.55	0.26	0.05	0.17
15	75	1.25	0.8	0.303	0.55	0.26	0.05	0.17
16	80	1.33	0.8	0.303	0.55	0.26	0.05	0.17
17	85	1.42	0.8	0.303	0.55	0.26	0.05	0.17
18	90	1.50	0.8	0.303	0.55	0.26	0.05	0.17
19	95	1.58	0.8	0.303	0.55	0.26	0.05	0.17
20	100	1.67	0.8	0.303	0.55	0.26	0.05	0.17
21	105	1.75	0.8	0.303	0.55	0.26	0.05	0.17
22	110	1.83	0.8	0.303	0.55	0.26	0.05	0.17
23	115	1.92	0.8	0.303	0.55	0.26	0.05	0.17
24	120	2.00	0.9	0.341	0.55	0.29	0.05	0.19
25	125	2.08	0.8	0.303	0.55	0.26	0.05	0.17
26	130	2.17	0.9	0.341	0.55	0.29	0.05	0.19
27	135	2.25	0.9	0.341	0.55	0.29	0.05	0.19
28	140	2.33	0.9	0.341	0.55	0.29	0.05	0.19
29	145	2.42	0.9	0.341	0.55	0.29	0.05	0.19
30	150	2.50	0.9	0.341	0.55	0.29	0.05	0.19
31	155	2.58	0.9	0.341	0.55	0.29	0.05	0.19
32	160	2.67	0.9	0.341	0.55	0.29	0.05	0.19
33	165	2.75	1.0	0.379	0.55	0.32	0.06	0.21
34	170	2.83	1.0	0.379	0.55	0.32	0.06	0.21
35	175	2.92	1.0	0.379	0.55	0.32	0.06	0.21
36	180	3.00	1.0	0.379	0.55	0.32	0.06	0.21
37	185	3.08	1.0	0.379	0.55	0.32	0.06	0.21
38	190	3.17	1.1	0.417	0.55	0.35	0.06	0.23
39	195	3.25	1.1	0.417	0.55	0.35	0.06	0.23
40	200	3.33	1.1	0.417	0.55	0.35	0.06	0.23
41	205	3.42	1.2	0.455	0.55	0.39	0.07	0.25
42	210	3.50	1.3	0.493	0.55	0.42	0.07	0.27
43	215	3.58	1.4	0.531	0.55	0.45	0.08	0.29
44	220	3.67	1.4	0.531	0.55	0.45	0.08	0.29
45	225	3.75	1.5	0.569	0.55	0.48	0.01	0.06
46	230	3.83	1.5	0.569	0.55	0.48	0.01	0.06
47	235	3.92	1.6	0.607	0.55	0.52	0.05	0.20
48	240	4.00	1.6	0.607	0.55	0.52	0.05	0.20
49	245	4.08	1.7	0.645	0.55	0.55	0.09	0.34
50	250	4.17	1.8	0.683	0.55	0.58	0.13	0.48

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 6-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.66
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	303.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16
CONSTANT LOSS RATE-in/hr	0.554
LOW LOSS RATE - PERCENT	85%

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs
51	255	4.25	1.9	0.720	0.55	0.61	0.17	0.61
52	260	4.33	2.0	0.758	0.55	0.64	0.20	0.75
53	265	4.42	2.1	0.796	0.55	0.68	0.24	0.89
54	270	4.50	2.1	0.796	0.55	0.68	0.24	0.89
55	275	4.58	2.2	0.834	0.55	0.71	0.28	1.03
56	280	4.67	2.3	0.872	0.55	0.74	0.32	1.17
57	285	4.75	2.4	0.910	0.55	0.77	0.36	1.31
58	290	4.83	2.4	0.910	0.55	0.77	0.36	1.31
59	295	4.92	2.5	0.948	0.55	0.81	0.39	1.45
60	300	5.00	2.6	0.986	0.55	0.84	0.43	1.59
61	305	5.08	3.1	1.176	0.55	1.00	0.62	2.29
62	310	5.17	3.6	1.365	0.55	1.16	0.81	2.99
63	315	5.25	3.9	1.479	0.55	1.26	0.93	3.41
64	320	5.33	4.2	1.593	0.55	1.35	1.04	3.83
65	325	5.42	4.7	1.782	0.55	1.51	1.23	4.53
66	330	5.50	5.6	2.124	0.55	1.80	1.57	**5.79**
67	335	5.58	1.9	0.720	0.55	0.61	0.17	0.61
68	340	5.67	0.9	0.341	0.55	0.29	0.05	0.19
69	345	5.75	0.6	0.228	0.55	0.19	0.03	0.13
70	350	5.83	0.5	0.190	0.55	0.16	0.03	0.10
71	355	5.92	0.3	0.114	0.55	0.10	0.02	0.06
72	360	6.00	0.2	0.076	0.55	0.06	0.01	0.04

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.00
FLOOD VOLUME (acft)	0.31
FLOOD VOLUME (cuft)	13,320
PEAK FLOW RATE (cfs)	5.79

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 24-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE: BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.660	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.5538
LAG TIME - MINUTES	1.65	MINIMUM LOSS RATE (for var. loss) - in/hr	0.277
UNIT TIME-PERCENT OF LAG	911.3	LOW LOSS RATE - DECIMAL	0.85
TOTAL ADJUSTED STORM RAIN-INCHES	4.88	C	0.00513

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours	(Plate E-5.9)		Max	Low		
1	15	0.25	0.2	0.039	0.978	0.033	0.006	0.02
2	30	0.50	0.3	0.059	0.967	0.050	0.009	0.03
3	45	0.75	0.3	0.059	0.955	0.050	0.009	0.03
4	60	1.00	0.4	0.078	0.944	0.066	0.012	0.04
5	75	1.25	0.3	0.059	0.933	0.050	0.009	0.03
6	90	1.50	0.3	0.059	0.922	0.050	0.009	0.03
7	105	1.75	0.3	0.059	0.911	0.050	0.009	0.03
8	120	2.00	0.4	0.078	0.900	0.066	0.012	0.04
9	135	2.25	0.4	0.078	0.889	0.066	0.012	0.04
10	150	2.50	0.4	0.078	0.878	0.066	0.012	0.04
11	165	2.75	0.5	0.098	0.868	0.083	0.015	0.05
12	180	3.00	0.5	0.098	0.857	0.083	0.015	0.05
13	195	3.25	0.5	0.098	0.846	0.083	0.015	0.05
14	210	3.50	0.5	0.098	0.836	0.083	0.015	0.05
15	225	3.75	0.5	0.098	0.825	0.083	0.015	0.05
16	240	4.00	0.6	0.117	0.815	0.100	0.018	0.06
17	255	4.25	0.6	0.117	0.805	0.100	0.018	0.06
18	270	4.50	0.7	0.137	0.794	0.116	0.020	0.08
19	285	4.75	0.7	0.137	0.784	0.116	0.020	0.08
20	300	5.00	0.8	0.156	0.774	0.133	0.023	0.09
21	315	5.25	0.6	0.117	0.764	0.100	0.018	0.06
22	330	5.50	0.7	0.137	0.754	0.116	0.020	0.08
23	345	5.75	0.8	0.156	0.744	0.133	0.023	0.09
24	360	6.00	0.8	0.156	0.734	0.133	0.023	0.09
25	375	6.25	0.9	0.176	0.725	0.149	0.026	0.10
26	390	6.50	0.9	0.176	0.715	0.149	0.026	0.10
27	405	6.75	1.0	0.195	0.705	0.166	0.029	0.11
28	420	7.00	1.0	0.195	0.696	0.166	0.029	0.11
29	435	7.25	1.0	0.195	0.686	0.166	0.029	0.11
30	450	7.50	1.1	0.215	0.677	0.183	0.032	0.12
31	465	7.75	1.2	0.234	0.668	0.199	0.035	0.13
32	480	8.00	1.3	0.254	0.659	0.216	0.038	0.14
33	495	8.25	1.5	0.293	0.649	0.249	0.044	0.16
34	510	8.50	1.5	0.293	0.640	0.249	0.044	0.16
35	525	8.75	1.6	0.312	0.631	0.265	0.047	0.17
36	540	9.00	1.7	0.332	0.622	0.282	0.050	0.18
37	555	9.25	1.9	0.371	0.614	0.315	0.056	0.21
38	570	9.50	2.0	0.390	0.605	0.332	0.059	0.22
39	585	9.75	2.1	0.410	0.596	0.348	0.061	0.23
40	600	10.00	2.2	0.429	0.588	0.365	0.064	0.24
41	615	10.25	1.5	0.293	0.579	0.249	0.044	0.16
42	630	10.50	1.5	0.293	0.571	0.249	0.044	0.16
43	645	10.75	2.0	0.390	0.562	0.332	0.059	0.22
44	660	11.00	2.0	0.390	0.554	0.332	0.059	0.22
45	675	11.25	1.9	0.371	0.546	0.315	0.056	0.21
46	690	11.50	1.9	0.371	0.538	0.315	0.056	0.21
47	705	11.75	1.7	0.332	0.530	0.282	0.050	0.18
48	720	12.00	1.8	0.351	0.522	0.299	0.053	0.19
49	735	12.25	2.5	0.488	0.514	0.415	0.073	0.27
50	750	12.50	2.6	0.508	0.507	0.431	0.001	0.00
51	765	12.75	2.8	0.547	0.499	0.465	0.047	0.18
52	780	13.00	2.9	0.566	0.492	0.481	0.075	0.27
53	795	13.25	3.4	0.664	0.484	0.564	0.180	0.66
54	810	13.50	3.4	0.664	0.477	0.564	0.187	**0.69**
55	825	13.75	2.3	0.449	0.470	0.382	0.067	0.25
56	840	14.00	2.3	0.449	0.462	0.382	0.067	0.25
57	855	14.25	2.7	0.527	0.455	0.448	0.072	0.26
58	870	14.50	2.6	0.508	0.448	0.431	0.059	0.22
59	885	14.75	2.6	0.508	0.442	0.431	0.066	0.24
60	900	15.00	2.5	0.488	0.435	0.415	0.053	0.20

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 24-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE: BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.660	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.5538
LAG TIME - MINUTES	1.65	MINIMUM LOSS RATE (for var. loss) - in/hr	0.277
UNIT TIME-PERCENT OF LAG	911.3	LOW LOSS RATE - DECIMAL	0.85
TOTAL ADJUSTED STORM RAIN-INCHES	4.88	C	0.00513

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours	(Plate E-5.9)		Max	Low		
61	915	15.25	2.4	0.468	0.428	0.398	0.040	0.15
62	930	15.50	2.3	0.449	0.422	0.382	0.027	0.10
63	945	15.75	1.9	0.371	0.415	0.315	0.056	0.21
64	960	16.00	1.9	0.371	0.409	0.315	0.056	0.21
65	975	16.25	0.4	0.078	0.403	0.066	0.012	0.04
66	990	16.50	0.4	0.078	0.396	0.066	0.012	0.04
67	1005	16.75	0.3	0.059	0.390	0.050	0.009	0.03
68	1020	17.00	0.3	0.059	0.385	0.050	0.009	0.03
69	1035	17.25	0.5	0.098	0.379	0.083	0.015	0.05
70	1050	17.50	0.5	0.098	0.373	0.083	0.015	0.05
71	1065	17.75	0.5	0.098	0.367	0.083	0.015	0.05
72	1080	18.00	0.4	0.078	0.362	0.066	0.012	0.04
73	1095	18.25	0.4	0.078	0.357	0.066	0.012	0.04
74	1110	18.50	0.4	0.078	0.352	0.066	0.012	0.04
75	1125	18.75	0.3	0.059	0.346	0.050	0.009	0.03
76	1140	19.00	0.2	0.039	0.341	0.033	0.006	0.02
77	1155	19.25	0.3	0.059	0.337	0.050	0.009	0.03
78	1170	19.50	0.4	0.078	0.332	0.066	0.012	0.04
79	1185	19.75	0.3	0.059	0.327	0.050	0.009	0.03
80	1200	20.00	0.2	0.039	0.323	0.033	0.006	0.02
81	1215	20.25	0.3	0.059	0.319	0.050	0.009	0.03
82	1230	20.50	0.3	0.059	0.315	0.050	0.009	0.03
83	1245	20.75	0.3	0.059	0.311	0.050	0.009	0.03
84	1260	21.00	0.2	0.039	0.307	0.033	0.006	0.02
85	1275	21.25	0.3	0.059	0.303	0.050	0.009	0.03
86	1290	21.50	0.2	0.039	0.300	0.033	0.006	0.02
87	1305	21.75	0.3	0.059	0.297	0.050	0.009	0.03
88	1320	22.00	0.2	0.039	0.293	0.033	0.006	0.02
89	1335	22.25	0.3	0.059	0.291	0.050	0.009	0.03
90	1350	22.50	0.2	0.039	0.288	0.033	0.006	0.02
91	1365	22.75	0.2	0.039	0.285	0.033	0.006	0.02
92	1380	23.00	0.2	0.039	0.283	0.033	0.006	0.02
93	1395	23.25	0.2	0.039	0.281	0.033	0.006	0.02
94	1410	23.50	0.2	0.039	0.279	0.033	0.006	0.02
95	1425	23.75	0.2	0.039	0.278	0.033	0.006	0.02
96	1440	24.00	0.2	0.039	0.277	0.033	0.006	0.02

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.71
FLOOD VOLUME (acft)	0.22
FLOOD VOLUME (cuft)	9,468
PEAK FLOW (cfs)	0.69

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD BASIC DATA CALCULATION FORM AMC II	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 BY: RRR DATE: 6/23/23

AVERAGE ADJUSTED LOSS RATE - DEVELOPED CONDITIONS

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA	AREA WEIGHTED AVERAGE	MAX AVERAGE ADJUSTED INFILTRATION RATE (in/hr)	LOW LOSS CONDITION	LOW LOSS RATE PER RCFC/2322 (in/hr)	MIN AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	PAVING/HARDSCAPE	32	0.74	100%	0.07	0.810	0.225	0.0167	DEVELOPED	0.1000	0.0225
A	LANDSCAPING	32	0.74	10%	0.67	2.790	0.775	0.5219	DEVELOPED	0.8200	0.6355
					SUM	3.600	SUM	0.5385			0.6580

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.2692675

C= 0.00499

Ft=C(24-(T/60))^1.55 = 0.00499 (24-(T/60))^1.55 + **0.27** in/hr

CONSTANT LOSS RATE (3 & 6 HOUR STORMS) = **0.5385** in/hr

LOW LOSS RATE = **0.8500** in/hr

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period, T=1 1/2 unit time for the second period, etc.

NOTE: Low loss rates established per RCFC/2322 (Dated: May-30-95)
For Storms Less than the 100 Year Event
Undeveloped Condition: Low Loss = 90%
Developed Condition: Low Loss = 0.9 - (0.8 * %impervious)
Basin Site: Low Loss = 10%
For 100 Year Storm - Low Loss should be between 80% & 90% of the Rainfall Rate

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITIONS 1-HOUR STORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60	
UNIT TIME-MINUTES	5	
LAG TIME - MINUTES	1.65	
UNIT TIME-PERCENT OF LAG	303.8	
TOTAL ADJUSTED STORM RAIN-INCHES	1.98	
CONSTANT LOSS RATE-in/hr		0.54
LOW LOSS RATE - PERCENT		85%

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs
1	5	0.08	3.6	0.86	0.54	0.73	0.32	1.15
2	10	0.17	4.2	1.00	0.54	0.85	0.46	1.67
3	15	0.25	4.4	1.05	0.54	0.89	0.51	1.84
4	20	0.33	4.6	1.09	0.54	0.93	0.55	2.01
5	25	0.42	5.0	1.19	0.54	1.01	0.65	2.36
6	30	0.50	5.6	1.33	0.54	1.13	0.79	2.88
7	35	0.58	6.4	1.52	0.54	1.29	0.98	3.57
8	40	0.67	8.1	1.92	0.54	1.64	1.39	5.03
9	45	0.75	13.1	3.11	0.54	2.65	2.57	9.34
10	50	0.83	34.5	8.20	0.54	6.97	7.66	**27.80**
11	55	0.92	6.7	1.59	0.54	1.35	1.05	3.82
12	60	1.00	3.8	0.90	0.54	0.77	0.36	1.32

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.44
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18,837
PEAK FLOW RATE (cfs)	27.80

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITIONS 3-HOUR STORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60	
UNIT TIME-MINUTES	5	
LAG TIME - MINUTES	1.63	
UNIT TIME-PERCENT OF LAG	307.7	
TOTAL ADJUSTED STORM RAIN-INCHES	2.59	
CONSTANT LOSS RATE-in/hr		0.54
LOW LOSS RATE - PERCENT		85%

Unit Time Period	Time		Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours			Max	Low		
1	5	0.08	1.3	0.40	0.54	0.34	0.06	0.22
2	10	0.17	1.3	0.40	0.54	0.34	0.06	0.22
3	15	0.25	1.1	0.34	0.54	0.29	0.05	0.19
4	20	0.33	1.5	0.47	0.54	0.40	0.07	0.25
5	25	0.42	1.5	0.47	0.54	0.40	0.07	0.25
6	30	0.50	1.8	0.56	0.54	0.48	0.02	0.08
7	35	0.58	1.5	0.47	0.54	0.40	0.07	0.25
8	40	0.67	1.8	0.56	0.54	0.48	0.02	0.08
9	45	0.75	1.8	0.56	0.54	0.48	0.02	0.08
10	50	0.83	1.5	0.47	0.54	0.40	0.07	0.25
11	55	0.92	1.6	0.50	0.54	0.42	0.07	0.27
12	60	1.00	1.8	0.56	0.54	0.48	0.02	0.08
13	65	1.08	2.2	0.68	0.54	0.58	0.15	0.53
14	70	1.17	2.2	0.68	0.54	0.58	0.15	0.53
15	75	1.25	2.2	0.68	0.54	0.58	0.15	0.53
16	80	1.33	2.0	0.62	0.54	0.53	0.08	0.30
17	85	1.42	2.6	0.81	0.54	0.69	0.27	0.98
18	90	1.50	2.7	0.84	0.54	0.71	0.30	1.09
19	95	1.58	2.4	0.75	0.54	0.63	0.21	0.75
20	100	1.67	2.7	0.84	0.54	0.71	0.30	1.09
21	105	1.75	3.3	1.03	0.54	0.87	0.49	1.77
22	110	1.83	3.1	0.96	0.54	0.82	0.42	1.54
23	115	1.92	2.9	0.90	0.54	0.77	0.36	1.32
24	120	2.00	3.0	0.93	0.54	0.79	0.39	1.43
25	125	2.08	3.1	0.96	0.54	0.82	0.42	1.54
26	130	2.17	4.2	1.31	0.54	1.11	0.77	2.78
27	135	2.25	5.0	1.55	0.54	1.32	1.02	3.69
28	140	2.33	3.5	1.09	0.54	0.92	0.55	1.99
29	145	2.42	6.8	2.11	0.54	1.80	1.57	5.72
30	150	2.50	7.3	2.27	0.54	1.93	1.73	6.28
31	155	2.58	8.2	2.55	0.54	2.17	2.01	**7.30**
32	160	2.67	5.9	1.83	0.54	1.56	1.30	4.70
33	165	2.75	2.0	0.62	0.54	0.53	0.08	0.30
34	170	2.83	1.8	0.56	0.54	0.48	0.02	0.08
35	175	2.92	1.8	0.56	0.54	0.48	0.02	0.08
36	180	3.00	0.6	0.19	0.54	0.16	0.03	0.10

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.12
FLOOD VOLUME (acft)	0.33
FLOOD VOLUME (cuft)	14,588
PEAK FLOW RATE (cfs)	7.30

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITIONS 6-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.63
UNIT TIME-PERCENT OF LAG	307.7
TOTAL ADJUSTED STORM RAIN-INCHES	3.16
CONSTANT LOSS RATE-in/hr	0.539
LOW LOSS RATE - PERCENT	85%

Unit Time Period	Time		Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours			Max	Low		
1	5	0.08	0.5	0.190	0.54	0.16	0.03	0.10
2	10	0.17	0.6	0.228	0.54	0.19	0.03	0.12
3	15	0.25	0.6	0.228	0.54	0.19	0.03	0.12
4	20	0.33	0.6	0.228	0.54	0.19	0.03	0.12
5	25	0.42	0.6	0.228	0.54	0.19	0.03	0.12
6	30	0.50	0.7	0.265	0.54	0.23	0.04	0.14
7	35	0.58	0.7	0.265	0.54	0.23	0.04	0.14
8	40	0.67	0.7	0.265	0.54	0.23	0.04	0.14
9	45	0.75	0.7	0.265	0.54	0.23	0.04	0.14
10	50	0.83	0.7	0.265	0.54	0.23	0.04	0.14
11	55	0.92	0.7	0.265	0.54	0.23	0.04	0.14
12	60	1.00	0.8	0.303	0.54	0.26	0.05	0.17
13	65	1.08	0.8	0.303	0.54	0.26	0.05	0.17
14	70	1.17	0.8	0.303	0.54	0.26	0.05	0.17
15	75	1.25	0.8	0.303	0.54	0.26	0.05	0.17
16	80	1.33	0.8	0.303	0.54	0.26	0.05	0.17
17	85	1.42	0.8	0.303	0.54	0.26	0.05	0.17
18	90	1.50	0.8	0.303	0.54	0.26	0.05	0.17
19	95	1.58	0.8	0.303	0.54	0.26	0.05	0.17
20	100	1.67	0.8	0.303	0.54	0.26	0.05	0.17
21	105	1.75	0.8	0.303	0.54	0.26	0.05	0.17
22	110	1.83	0.8	0.303	0.54	0.26	0.05	0.17
23	115	1.92	0.8	0.303	0.54	0.26	0.05	0.17
24	120	2.00	0.9	0.341	0.54	0.29	0.05	0.19
25	125	2.08	0.8	0.303	0.54	0.26	0.05	0.17
26	130	2.17	0.9	0.341	0.54	0.29	0.05	0.19
27	135	2.25	0.9	0.341	0.54	0.29	0.05	0.19
28	140	2.33	0.9	0.341	0.54	0.29	0.05	0.19
29	145	2.42	0.9	0.341	0.54	0.29	0.05	0.19
30	150	2.50	0.9	0.341	0.54	0.29	0.05	0.19
31	155	2.58	0.9	0.341	0.54	0.29	0.05	0.19
32	160	2.67	0.9	0.341	0.54	0.29	0.05	0.19
33	165	2.75	1.0	0.379	0.54	0.32	0.06	0.21
34	170	2.83	1.0	0.379	0.54	0.32	0.06	0.21
35	175	2.92	1.0	0.379	0.54	0.32	0.06	0.21
36	180	3.00	1.0	0.379	0.54	0.32	0.06	0.21
37	185	3.08	1.0	0.379	0.54	0.32	0.06	0.21
38	190	3.17	1.1	0.417	0.54	0.35	0.06	0.23
39	195	3.25	1.1	0.417	0.54	0.35	0.06	0.23
40	200	3.33	1.1	0.417	0.54	0.35	0.06	0.23
41	205	3.42	1.2	0.455	0.54	0.39	0.07	0.25
42	210	3.50	1.3	0.493	0.54	0.42	0.07	0.27
43	215	3.58	1.4	0.531	0.54	0.45	0.08	0.29
44	220	3.67	1.4	0.531	0.54	0.45	0.08	0.29
45	225	3.75	1.5	0.569	0.54	0.48	0.03	0.11
46	230	3.83	1.5	0.569	0.54	0.48	0.03	0.11
47	235	3.92	1.6	0.607	0.54	0.52	0.07	0.25
48	240	4.00	1.6	0.607	0.54	0.52	0.07	0.25
49	245	4.08	1.7	0.645	0.54	0.55	0.11	0.39
50	250	4.17	1.8	0.683	0.54	0.58	0.14	0.52

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITIONS 6-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.63
UNIT TIME-PERCENT OF LAG	307.7
TOTAL ADJUSTED STORM RAIN-INCHES	3.16
CONSTANT LOSS RATE-in/hr	0.539
LOW LOSS RATE - PERCENT	85%

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs
51	255	4.25	1.9	0.720	0.54	0.61	0.18	0.66
52	260	4.33	2.0	0.758	0.54	0.64	0.22	0.80
53	265	4.42	2.1	0.796	0.54	0.68	0.26	0.94
54	270	4.50	2.1	0.796	0.54	0.68	0.26	0.94
55	275	4.58	2.2	0.834	0.54	0.71	0.30	1.07
56	280	4.67	2.3	0.872	0.54	0.74	0.33	1.21
57	285	4.75	2.4	0.910	0.54	0.77	0.37	1.35
58	290	4.83	2.4	0.910	0.54	0.77	0.37	1.35
59	295	4.92	2.5	0.948	0.54	0.81	0.41	1.49
60	300	5.00	2.6	0.986	0.54	0.84	0.45	1.62
61	305	5.08	3.1	1.176	0.54	1.00	0.64	2.31
62	310	5.17	3.6	1.365	0.54	1.16	0.83	3.00
63	315	5.25	3.9	1.479	0.54	1.26	0.94	3.41
64	320	5.33	4.2	1.593	0.54	1.35	1.05	3.83
65	325	5.42	4.7	1.782	0.54	1.51	1.24	4.51
66	330	5.50	5.6	2.124	0.54	1.80	1.58	**5.75**
67	335	5.58	1.9	0.720	0.54	0.61	0.18	0.66
68	340	5.67	0.9	0.341	0.54	0.29	0.05	0.19
69	345	5.75	0.6	0.228	0.54	0.19	0.03	0.12
70	350	5.83	0.5	0.190	0.54	0.16	0.03	0.10
71	355	5.92	0.3	0.114	0.54	0.10	0.02	0.06
72	360	6.00	0.2	0.076	0.54	0.06	0.01	0.04

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.03
FLOOD VOLUME (acft)	0.31
FLOOD VOLUME (cuft)	13,485
PEAK FLOW RATE (cfs)	5.75

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITION 24-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE: BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.5385
LAG TIME - MINUTES	1.63	MINIMUM LOSS RATE (for var. loss) - in/hr	0.269
UNIT TIME-PERCENT OF LAG	923.0	LOW LOSS RATE - DECIMAL	0.85
TOTAL ADJUSTED STORM RAIN-INCHES	4.88	C	0.00499

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours	(Plate E-5.9)		Max	Low		
1	15	0.25	0.2	0.039	0.951	0.033	0.006	0.02
2	30	0.50	0.3	0.059	0.940	0.050	0.009	0.03
3	45	0.75	0.3	0.059	0.929	0.050	0.009	0.03
4	60	1.00	0.4	0.078	0.918	0.066	0.012	0.04
5	75	1.25	0.3	0.059	0.907	0.050	0.009	0.03
6	90	1.50	0.3	0.059	0.896	0.050	0.009	0.03
7	105	1.75	0.3	0.059	0.886	0.050	0.009	0.03
8	120	2.00	0.4	0.078	0.875	0.066	0.012	0.04
9	135	2.25	0.4	0.078	0.865	0.066	0.012	0.04
10	150	2.50	0.4	0.078	0.854	0.066	0.012	0.04
11	165	2.75	0.5	0.098	0.844	0.083	0.015	0.05
12	180	3.00	0.5	0.098	0.833	0.083	0.015	0.05
13	195	3.25	0.5	0.098	0.823	0.083	0.015	0.05
14	210	3.50	0.5	0.098	0.813	0.083	0.015	0.05
15	225	3.75	0.5	0.098	0.802	0.083	0.015	0.05
16	240	4.00	0.6	0.117	0.792	0.100	0.018	0.06
17	255	4.25	0.6	0.117	0.782	0.100	0.018	0.06
18	270	4.50	0.7	0.137	0.772	0.116	0.020	0.07
19	285	4.75	0.7	0.137	0.762	0.116	0.020	0.07
20	300	5.00	0.8	0.156	0.753	0.133	0.023	0.09
21	315	5.25	0.6	0.117	0.743	0.100	0.018	0.06
22	330	5.50	0.7	0.137	0.733	0.116	0.020	0.07
23	345	5.75	0.8	0.156	0.724	0.133	0.023	0.09
24	360	6.00	0.8	0.156	0.714	0.133	0.023	0.09
25	375	6.25	0.9	0.176	0.705	0.149	0.026	0.10
26	390	6.50	0.9	0.176	0.695	0.149	0.026	0.10
27	405	6.75	1.0	0.195	0.686	0.166	0.029	0.11
28	420	7.00	1.0	0.195	0.677	0.166	0.029	0.11
29	435	7.25	1.0	0.195	0.667	0.166	0.029	0.11
30	450	7.50	1.1	0.215	0.658	0.183	0.032	0.12
31	465	7.75	1.2	0.234	0.649	0.199	0.035	0.13
32	480	8.00	1.3	0.254	0.640	0.216	0.038	0.14
33	495	8.25	1.5	0.293	0.631	0.249	0.044	0.16
34	510	8.50	1.5	0.293	0.623	0.249	0.044	0.16
35	525	8.75	1.6	0.312	0.614	0.265	0.047	0.17
36	540	9.00	1.7	0.332	0.605	0.282	0.050	0.18
37	555	9.25	1.9	0.371	0.597	0.315	0.056	0.20
38	570	9.50	2.0	0.390	0.588	0.332	0.059	0.21
39	585	9.75	2.1	0.410	0.580	0.348	0.061	0.22
40	600	10.00	2.2	0.429	0.571	0.365	0.064	0.23
41	615	10.25	1.5	0.293	0.563	0.249	0.044	0.16
42	630	10.50	1.5	0.293	0.555	0.249	0.044	0.16
43	645	10.75	2.0	0.390	0.547	0.332	0.059	0.21
44	660	11.00	2.0	0.390	0.539	0.332	0.059	0.21
45	675	11.25	1.9	0.371	0.531	0.315	0.056	0.20
46	690	11.50	1.9	0.371	0.523	0.315	0.056	0.20
47	705	11.75	1.7	0.332	0.515	0.282	0.050	0.18
48	720	12.00	1.8	0.351	0.508	0.299	0.053	0.19
49	735	12.25	2.5	0.488	0.500	0.415	0.073	0.27
50	750	12.50	2.6	0.508	0.493	0.431	0.015	0.05
51	765	12.75	2.8	0.547	0.485	0.465	0.061	0.22
52	780	13.00	2.9	0.566	0.478	0.481	0.088	0.32
53	795	13.25	3.4	0.664	0.471	0.564	0.193	0.70
54	810	13.50	3.4	0.664	0.464	0.564	0.200	**0.73**
55	825	13.75	2.3	0.449	0.457	0.382	0.067	0.24
56	840	14.00	2.3	0.449	0.450	0.382	0.067	0.24
57	855	14.25	2.7	0.527	0.443	0.448	0.084	0.31
58	870	14.50	2.6	0.508	0.436	0.431	0.072	0.26
59	885	14.75	2.6	0.508	0.429	0.431	0.078	0.28
60	900	15.00	2.5	0.488	0.423	0.415	0.065	0.24
61	915	15.25	2.4	0.468	0.416	0.398	0.052	0.19

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITION 24-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE: BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.5385
LAG TIME - MINUTES	1.63	MINIMUM LOSS RATE (for var. loss) - in/hr	0.269
UNIT TIME-PERCENT OF LAG	923.0	LOW LOSS RATE - DECIMAL	0.85
TOTAL ADJUSTED STORM RAIN-INCHES	4.88	C	0.00499

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours	(Plate E-5.9)		Max	Low		
62	930	15.50	2.3	0.449	0.410	0.382	0.039	0.14
63	945	15.75	1.9	0.371	0.404	0.315	0.056	0.20
64	960	16.00	1.9	0.371	0.398	0.315	0.056	0.20
65	975	16.25	0.4	0.078	0.391	0.066	0.012	0.04
66	990	16.50	0.4	0.078	0.385	0.066	0.012	0.04
67	1005	16.75	0.3	0.059	0.380	0.050	0.009	0.03
68	1020	17.00	0.3	0.059	0.374	0.050	0.009	0.03
69	1035	17.25	0.5	0.098	0.368	0.083	0.015	0.05
70	1050	17.50	0.5	0.098	0.363	0.083	0.015	0.05
71	1065	17.75	0.5	0.098	0.357	0.083	0.015	0.05
72	1080	18.00	0.4	0.078	0.352	0.066	0.012	0.04
73	1095	18.25	0.4	0.078	0.347	0.066	0.012	0.04
74	1110	18.50	0.4	0.078	0.342	0.066	0.012	0.04
75	1125	18.75	0.3	0.059	0.337	0.050	0.009	0.03
76	1140	19.00	0.2	0.039	0.332	0.033	0.006	0.02
77	1155	19.25	0.3	0.059	0.327	0.050	0.009	0.03
78	1170	19.50	0.4	0.078	0.323	0.066	0.012	0.04
79	1185	19.75	0.3	0.059	0.318	0.050	0.009	0.03
80	1200	20.00	0.2	0.039	0.314	0.033	0.006	0.02
81	1215	20.25	0.3	0.059	0.310	0.050	0.009	0.03
82	1230	20.50	0.3	0.059	0.306	0.050	0.009	0.03
83	1245	20.75	0.3	0.059	0.302	0.050	0.009	0.03
84	1260	21.00	0.2	0.039	0.298	0.033	0.006	0.02
85	1275	21.25	0.3	0.059	0.295	0.050	0.009	0.03
86	1290	21.50	0.2	0.039	0.292	0.033	0.006	0.02
87	1305	21.75	0.3	0.059	0.288	0.050	0.009	0.03
88	1320	22.00	0.2	0.039	0.285	0.033	0.006	0.02
89	1335	22.25	0.3	0.059	0.282	0.050	0.009	0.03
90	1350	22.50	0.2	0.039	0.280	0.033	0.006	0.02
91	1365	22.75	0.2	0.039	0.277	0.033	0.006	0.02
92	1380	23.00	0.2	0.039	0.275	0.033	0.006	0.02
93	1395	23.25	0.2	0.039	0.273	0.033	0.006	0.02
94	1410	23.50	0.2	0.039	0.272	0.033	0.006	0.02
95	1425	23.75	0.2	0.039	0.270	0.033	0.006	0.02
96	1440	24.00	0.2	0.039	0.269	0.033	0.006	0.02

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.75
FLOOD VOLUME (acft)	0.22
FLOOD VOLUME (cuft)	9,772
PEAK FLOW (cfs)	0.73

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 1 HOUR STORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	303.8
TOTAL ADJUSTED STORM RAIN-INCHES	1.98

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time Minutes	Hours	Effective Rain in/hr	Flood Hydrograph Flow cfs	Volume In cu-ft	Basin Volume cu-ft	Basin Losses Percolation Area sf	Basin Losses Maximum Percolation cu-ft	Basin Losses Percolation Out cu-ft	Total in Basin cu-ft	Total in Basin ac-ft	Basin WSEL ft	Basin Outflow Volume Out cu-ft	Basin Outflow Flow Out cfs
1	5	0.08	0.32	1.15	345	345	594	8	8	337	0.01	368.61	0	0.00
2	10	0.17	0.46	1.67	500	837	803	11	11	826	0.02	369.32	0	0.00
3	15	0.25	0.51	1.84	552	1,378	1,010	14	14	1,364	0.03	369.95	0	0.00
4	20	0.33	0.55	2.01	604	1,410	1,022	14	14	1,396	0.03	**369.98**	557	1.86
5	25	0.42	0.65	2.36	707	1,410	1,022	14	14	1,396	0.03	**369.98**	693	2.31
6	30	0.50	0.79	2.88	863	1,410	1,022	14	14	1,396	0.03	**369.98**	848	2.83
7	35	0.58	0.98	3.57	1,070	1,410	1,022	14	14	1,396	0.03	**369.98**	1,055	3.52
8	40	0.67	1.39	5.03	1,509	1,410	1,022	14	14	1,396	0.03	**369.98**	1,495	4.98
9	45	0.75	2.57	9.34	2,803	1,410	1,022	14	14	1,396	0.03	**369.98**	2,789	9.30
10	50	0.83	7.66	27.80	8,340	1,410	1,022	14	14	1,396	0.03	**369.98**	8,326	27.75
11	55	0.92	1.05	3.82	1,147	1,410	1,022	14	14	1,396	0.03	**369.98**	1,133	3.78
12	60	1.00	0.36	1.32	397	1,410	1,022	14	14	1,396	0.03	**369.98**	383	1.28

BASIN WORKSHEET SUMMARY

EFFECTIVE RAIN	1.44 in
FLOOD VOLUME	0.43 acft
	18,837 cuft
TOTAL VOLUME RETAINED	1,557 cuft
MAX WSEL	369.98 ft
PEAK FLOW RATE	27.80 cfs
AVERAGE PERCOLATION RATE	2.69 cf/min
TOTAL OUTFLOW	17,280 cuft
	57.60 cfs
MAXIMUM OUTFLOW	8,326 cuft
	27.75 cfs

RCFC & WCD
HYDROLOGY MANUAL

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	303.8
TOTAL ADJUSTED STORM RAIN-INCHES	2.59

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 3 HOUR STORM

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time Minutes	Hours	Effective Rain in/hr	Flood Hydrograph Flow cfs	Volume In cu-ft	Basin Volume cu-ft	Basin Losses Percolation Area sf	Basin Losses Maximum Percolation cu-ft	Basin Losses Percolation Out cu-ft	Total in Basin cu-ft	Total in Basin ac-ft	Basin WSEL ft	Basin Outflow Volume Out cu-ft	Basin Outflow Flow Out cfs
1	5	0.08	0.06	0.2	66	66	460	6	6	60	0.00	368.11	0	0.00
2	10	0.17	0.06	0.2	66	126	488	7	7	119	0.00	368.21	0	0.00
3	15	0.25	0.05	0.2	56	175	512	7	7	168	0.00	368.30	0	0.00
4	20	0.33	0.07	0.3	76	244	545	8	8	236	0.01	368.42	0	0.00
5	25	0.42	0.07	0.3	76	312	578	8	8	304	0.01	368.55	0	0.00
6	30	0.50	0.02	0.1	23	327	585	8	8	319	0.01	368.57	0	0.00
7	35	0.58	0.07	0.3	76	395	618	9	9	386	0.01	368.69	0	0.00
8	40	0.67	0.02	0.1	23	409	625	9	9	401	0.01	368.72	0	0.00
9	45	0.75	0.02	0.1	23	423	632	9	9	415	0.01	368.74	0	0.00
10	50	0.83	0.07	0.3	76	491	664	9	9	481	0.01	368.87	0	0.00
11	55	0.92	0.07	0.3	81	563	698	10	10	553	0.01	368.99	0	0.00
12	60	1.00	0.02	0.1	23	576	703	10	10	566	0.01	369.01	0	0.00
13	65	1.08	0.15	0.5	158	724	760	11	11	714	0.02	369.18	0	0.00
14	70	1.17	0.15	0.5	158	872	816	11	11	860	0.02	369.36	0	0.00
15	75	1.25	0.15	0.5	158	1,019	872	12	12	1,006	0.02	369.53	0	0.00
16	80	1.33	0.08	0.3	90	1,097	902	13	13	1,084	0.02	369.62	0	0.00
17	85	1.42	0.27	1.0	294	1,378	1,010	14	14	1,364	0.03	369.95	0	0.00
18	90	1.50	0.30	1.1	327	1,410	1,022	14	14	1,396	0.03	**369.98**	281	0.94
19	95	1.58	0.21	0.8	226	1,410	1,022	14	14	1,396	0.03	**369.98**	212	0.71
20	100	1.67	0.30	1.1	327	1,410	1,022	14	14	1,396	0.03	**369.98**	313	1.04
21	105	1.75	0.49	1.8	530	1,410	1,022	14	14	1,396	0.03	**369.98**	516	1.72
22	110	1.83	0.42	1.5	463	1,410	1,022	14	14	1,396	0.03	**369.98**	449	1.50
23	115	1.92	0.36	1.3	395	1,410	1,022	14	14	1,396	0.03	**369.98**	381	1.27
24	120	2.00	0.39	1.4	429	1,410	1,022	14	14	1,396	0.03	**369.98**	415	1.38
25	125	2.08	0.42	1.5	463	1,410	1,022	14	14	1,396	0.03	**369.98**	449	1.50
26	130	2.17	0.77	2.8	835	1,410	1,022	14	14	1,396	0.03	**369.98**	821	2.74
27	135	2.25	1.02	3.7	1,106	1,410	1,022	14	14	1,396	0.03	**369.98**	1,092	3.64
28	140	2.33	0.55	2.0	598	1,410	1,022	14	14	1,396	0.03	**369.98**	584	1.95
29	145	2.42	1.57	5.7	1,715	1,410	1,022	14	14	1,396	0.03	**369.98**	1,701	5.67
30	150	2.50	1.73	6.3	1,884	1,410	1,022	14	14	1,396	0.03	**369.98**	1,870	6.23
31	155	2.58	2.01	7.3	2,189	1,410	1,022	14	14	1,396	0.03	**369.98**	2,175	7.25
32	160	2.67	1.30	4.7	1,410	1,410	1,022	14	14	1,396	0.03	**369.98**	1,396	4.65
33	165	2.75	0.08	0.3	90	1,410	1,022	14	14	1,396	0.03	**369.98**	76	0.25
34	170	2.83	0.02	0.1	23	1,410	1,022	14	14	1,396	0.03	**369.98**	9	0.03
35	175	2.92	0.02	0.1	23	1,410	1,022	14	14	1,396	0.03	**369.98**	9	0.03
36	180	3.00	0.03	0.1	30	1,410	1,022	14	14	1,396	0.03	**369.98**	16	0.05

BASIN WORKSHEET SUMMARY

EFFECTIVE RAIN	1.12 in
FLOOD VOLUME	0.33 acft
	14,588 cuft
TOTAL VOLUME RETAINED	1,825 cuft
MAX WSEL	369.98 ft
PEAK FLOW RATE	7.30 cfs
AVERAGE PERCOLATION RATE	2.38 cf/min
TOTAL BASIN OUTFLOW	12,763 cuft
	42.54 cfs
MAXIMUM BASIN OUTFLOW	2,175 cuft
	7.25 cfs

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITION BASIN STAGE STORAGE - 6 HOUR STORM

PROJECT: Living Desert - Crossroads Pha

6/23/23

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	303.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16

BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
1	5	0.08	0.03	0.10	31	31	443	6	6	25	0.00	368.04	0	0.00
2	10	0.17	0.03	0.12	37	62	458	6	6	56	0.00	368.10	0	0.00
3	15	0.25	0.03	0.12	37	93	473	7	7	86	0.00	368.15	0	0.00
4	20	0.33	0.03	0.12	37	123	487	7	7	117	0.00	368.21	0	0.00
5	25	0.42	0.03	0.12	37	154	502	7	7	147	0.00	368.26	0	0.00
6	30	0.50	0.04	0.14	43	190	520	7	7	183	0.00	368.33	0	0.00
7	35	0.58	0.04	0.14	43	226	537	7	7	219	0.01	368.39	0	0.00
8	40	0.67	0.04	0.14	43	262	554	8	8	255	0.01	368.46	0	0.00
9	45	0.75	0.04	0.14	43	298	571	8	8	290	0.01	368.52	0	0.00
10	50	0.83	0.04	0.14	43	333	588	8	8	325	0.01	368.58	0	0.00
11	55	0.92	0.04	0.14	43	368	605	8	8	360	0.01	368.65	0	0.00
12	60	1.00	0.05	0.17	50	410	625	9	9	401	0.01	368.72	0	0.00
13	65	1.08	0.05	0.17	50	451	645	9	9	442	0.01	368.79	0	0.00
14	70	1.17	0.05	0.17	50	491	664	9	9	482	0.01	368.87	0	0.00
15	75	1.25	0.05	0.17	50	531	684	9	9	522	0.01	368.94	0	0.00
16	80	1.33	0.05	0.17	50	571	702	10	10	562	0.01	369.01	0	0.00
17	85	1.42	0.05	0.17	50	611	717	10	10	601	0.01	369.05	0	0.00
18	90	1.50	0.05	0.17	50	651	732	10	10	641	0.01	369.10	0	0.00
19	95	1.58	0.05	0.17	50	690	747	10	10	680	0.02	369.14	0	0.00

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD
SHORTCUT METHOD
DEVELOPED CONDITION BASIN STAGE STORAGE - 6 HOUR STORM

PROJECT: Living Desert - Crossroads Pha

6/23/23

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	303.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16

BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
20	100	1.67	0.05	0.17	50	729	762	11	11	719	0.02	369.19	0	0.00
21	105	1.75	0.05	0.17	50	768	777	11	11	758	0.02	369.24	0	0.00
22	110	1.83	0.05	0.17	50	807	792	11	11	796	0.02	369.28	0	0.00
23	115	1.92	0.05	0.17	50	846	806	11	11	835	0.02	369.33	0	0.00
24	120	2.00	0.05	0.19	56	890	823	11	11	879	0.02	369.38	0	0.00
25	125	2.08	0.05	0.17	50	928	838	12	12	917	0.02	369.42	0	0.00
26	130	2.17	0.05	0.19	56	973	855	12	12	961	0.02	369.47	0	0.00
27	135	2.25	0.05	0.19	56	1,016	872	12	12	1,004	0.02	369.52	0	0.00
28	140	2.33	0.05	0.19	56	1,060	888	12	12	1,048	0.02	369.58	0	0.00
29	145	2.42	0.05	0.19	56	1,103	905	13	13	1,091	0.03	369.63	0	0.00
30	150	2.50	0.05	0.19	56	1,147	921	13	13	1,134	0.03	369.68	0	0.00
31	155	2.58	0.05	0.19	56	1,190	938	13	13	1,177	0.03	369.73	0	0.00
32	160	2.67	0.05	0.19	56	1,232	954	13	13	1,219	0.03	369.78	0	0.00
33	165	2.75	0.06	0.21	62	1,281	973	14	14	1,268	0.03	369.83	0	0.00
34	170	2.83	0.06	0.21	62	1,329	991	14	14	1,316	0.03	369.89	0	0.00
35	175	2.92	0.06	0.21	62	1,378	1,009	14	14	1,364	0.03	369.95	0	0.00
36	180	3.00	0.06	0.21	62	1,410	1,022	14	14	1,396	0.03	**369.98**	15	0.05
37	185	3.08	0.06	0.21	62	1,410	1,022	14	14	1,396	0.03	**369.98**	48	0.16
38	190	3.17	0.06	0.23	68	1,410	1,022	14	14	1,396	0.03	**369.98**	54	0.18
39	195	3.25	0.06	0.23	68	1,410	1,022	14	14	1,396	0.03	**369.98**	54	0.18
40	200	3.33	0.06	0.23	68	1,410	1,022	14	14	1,396	0.03	**369.98**	54	0.18
41	205	3.42	0.07	0.25	74	1,410	1,022	14	14	1,396	0.03	**369.98**	60	0.20
42	210	3.50	0.07	0.27	81	1,410	1,022	14	14	1,396	0.03	**369.98**	66	0.22
43	215	3.58	0.08	0.29	87	1,410	1,022	14	14	1,396	0.03	**369.98**	73	0.24
44	220	3.67	0.08	0.29	87	1,410	1,022	14	14	1,396	0.03	**369.98**	73	0.24
45	225	3.75	0.03	0.11	33	1,410	1,022	14	14	1,396	0.03	**369.98**	19	0.06
46	230	3.83	0.03	0.11	33	1,410	1,022	14	14	1,396	0.03	**369.98**	19	0.06
47	235	3.92	0.07	0.25	74	1,410	1,022	14	14	1,396	0.03	**369.98**	60	0.20
48	240	4.00	0.07	0.25	74	1,410	1,022	14	14	1,396	0.03	**369.98**	60	0.20
49	245	4.08	0.11	0.39	116	1,410	1,022	14	14	1,396	0.03	**369.98**	101	0.34
50	250	4.17	0.14	0.52	157	1,410	1,022	14	14	1,396	0.03	**369.98**	143	0.48
51	255	4.25	0.18	0.66	198	1,410	1,022	14	14	1,396	0.03	**369.98**	184	0.61
52	260	4.33	0.22	0.80	239	1,410	1,022	14	14	1,396	0.03	**369.98**	225	0.75
53	265	4.42	0.26	0.94	281	1,410	1,022	14	14	1,396	0.03	**369.98**	267	0.89
54	270	4.50	0.26	0.94	281	1,410	1,022	14	14	1,396	0.03	**369.98**	267	0.89

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD
SHORTCUT METHOD
DEVELOPED CONDITION BASIN STAGE STORAGE - 6 HOUR STORM

PROJECT: Living Desert - Crossroads Pha

6/23/23

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	303.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16

BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
55	275	4.58	0.30	1.07	322	1,410	1,022	14	14	1,396	0.03	**369.98**	308	1.03
56	280	4.67	0.33	1.21	363	1,410	1,022	14	14	1,396	0.03	**369.98**	349	1.16
57	285	4.75	0.37	1.35	405	1,410	1,022	14	14	1,396	0.03	**369.98**	390	1.30
58	290	4.83	0.37	1.35	405	1,410	1,022	14	14	1,396	0.03	**369.98**	390	1.30
59	295	4.92	0.41	1.49	446	1,410	1,022	14	14	1,396	0.03	**369.98**	432	1.44
60	300	5.00	0.45	1.62	487	1,410	1,022	14	14	1,396	0.03	**369.98**	473	1.58
61	305	5.08	0.64	2.31	694	1,410	1,022	14	14	1,396	0.03	**369.98**	679	2.26
62	310	5.17	0.83	3.00	900	1,410	1,022	14	14	1,396	0.03	**369.98**	886	2.95
63	315	5.25	0.94	3.41	1,024	1,410	1,022	14	14	1,396	0.03	**369.98**	1,010	3.37
64	320	5.33	1.05	3.83	1,148	1,410	1,022	14	14	1,396	0.03	**369.98**	1,134	3.78
65	325	5.42	1.24	4.51	1,354	1,410	1,022	14	14	1,396	0.03	**369.98**	1,340	4.47
66	330	5.50	1.58	5.75	1,726	1,410	1,022	14	14	1,396	0.03	**369.98**	1,712	5.71
67	335	5.58	0.18	0.66	198	1,410	1,022	14	14	1,396	0.03	**369.98**	184	0.61
68	340	5.67	0.05	0.19	56	1,410	1,022	14	14	1,396	0.03	**369.98**	42	0.14
69	345	5.75	0.03	0.12	37	1,410	1,022	14	14	1,396	0.03	**369.98**	23	0.08
70	350	5.83	0.03	0.10	31	1,410	1,022	14	14	1,396	0.03	**369.98**	17	0.06
71	355	5.92	0.02	0.06	19	1,410	1,022	14	14	1,396	0.03	**369.98**	4	0.01
72	360	6.00	0.01	0.04	12	1,409	1,021	14	14	1,394	0.03	369.98	0	0.00

BASIN WORKSHEET SUMMARY

EFFECTIVE RAIN	1.03 in
FLOOD VOLUME	0.31 acft
	13,454 cuft
TOTAL VOLUME RETAINED	2,241 cuft
MAX WSEL	369.98 ft
PEAK FLOW RATE	5.75 cfs
AVERAGE PERCOLATION RATE	2.44 cf/min
TOTAL OUTFLOW	11,213 cuft
	37.38 cfs
MAXIMUM OUTFLOW	1,712 cuft
	5.71 cfs

RCFC & WCD
HYDROLOGY MANUAL

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	15
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	911.3
TOTAL ADJUSTED STORM RAIN-INCHES	4.88

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 24 HOUR STORM

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
1	15	0.25	0.006	0.0	19	19	437	18	18	1	0.00	368.00	0	0.00
2	30	0.50	0.009	0.0	29	30	442	18	18	11	0.00	368.02	0	0.00
3	45	0.75	0.009	0.0	29	40	447	19	19	21	0.00	368.04	0	0.00
4	60	1.00	0.012	0.0	38	60	457	19	19	40	0.00	368.07	0	0.00
5	75	1.25	0.009	0.0	29	69	461	19	19	50	0.00	368.09	0	0.00
6	90	1.50	0.009	0.0	29	79	466	19	19	59	0.00	368.11	0	0.00
7	105	1.75	0.009	0.0	29	88	470	20	20	68	0.00	368.12	0	0.00
8	120	2.00	0.012	0.0	38	107	479	20	20	87	0.00	368.16	0	0.00
9	135	2.25	0.012	0.0	38	125	488	20	20	105	0.00	368.19	0	0.00
10	150	2.50	0.012	0.0	38	143	497	21	21	122	0.00	368.22	0	0.00
11	165	2.75	0.015	0.1	48	170	510	21	21	149	0.00	368.27	0	0.00
12	180	3.00	0.015	0.1	48	197	523	22	22	175	0.00	368.31	0	0.00
13	195	3.25	0.015	0.1	48	223	535	22	22	200	0.00	368.36	0	0.00
14	210	3.50	0.015	0.1	48	248	547	23	23	225	0.01	368.40	0	0.00
15	225	3.75	0.015	0.1	48	273	560	23	23	250	0.01	368.45	0	0.00
16	240	4.00	0.018	0.1	57	307	576	24	24	283	0.01	368.51	0	0.00
17	255	4.25	0.018	0.1	57	341	592	25	25	316	0.01	368.57	0	0.00
18	270	4.50	0.020	0.1	67	383	612	26	26	357	0.01	368.64	0	0.00
19	285	4.75	0.020	0.1	67	424	632	26	26	398	0.01	368.72	0	0.00
20	300	5.00	0.023	0.1	77	475	656	27	27	447	0.01	368.80	0	0.00
21	315	5.25	0.018	0.1	57	505	671	28	28	477	0.01	368.86	0	0.00
22	330	5.50	0.020	0.1	67	544	690	29	29	515	0.01	368.92	0	0.00
23	345	5.75	0.023	0.1	77	591	709	30	30	562	0.01	369.01	0	0.00
24	360	6.00	0.023	0.1	77	638	727	30	30	608	0.01	369.06	0	0.00
25	375	6.25	0.026	0.1	86	694	749	31	31	663	0.02	369.12	0	0.00
26	390	6.50	0.026	0.1	86	749	769	32	32	717	0.02	369.19	0	0.00
27	405	6.75	0.029	0.1	96	813	794	33	33	780	0.02	369.26	0	0.00
28	420	7.00	0.029	0.1	96	875	818	34	34	841	0.02	369.33	0	0.00
29	435	7.25	0.029	0.1	96	937	841	35	35	902	0.02	369.40	0	0.00
30	450	7.50	0.032	0.1	105	1,007	868	36	36	971	0.02	369.49	0	0.00
31	465	7.75	0.035	0.1	115	1,086	898	37	37	1,048	0.02	369.58	0	0.00
32	480	8.00	0.038	0.1	124	1,173	931	39	39	1,134	0.03	369.68	0	0.00
33	495	8.25	0.044	0.2	143	1,277	971	40	40	1,237	0.03	369.80	0	0.00
34	510	8.50	0.044	0.2	143	1,380	1,010	42	42	1,338	0.03	369.92	0	0.00
35	525	8.75	0.047	0.2	153	1,410	1,022	43	43	1,368	0.03	**369.95**	81	0.09
36	540	9.00	0.050	0.2	163	1,410	1,022	43	43	1,368	0.03	**369.95**	120	0.13
37	555	9.25	0.056	0.2	182	1,410	1,022	43	43	1,368	0.03	**369.95**	139	0.15
38	570	9.50	0.059	0.2	191	1,410	1,022	43	43	1,368	0.03	**369.95**	149	0.17
39	585	9.75	0.061	0.2	201	1,410	1,022	43	43	1,368	0.03	**369.95**	158	0.18
40	600	10.00	0.064	0.2	210	1,410	1,022	43	43	1,368	0.03	**369.95**	168	0.19
41	615	10.25	0.044	0.2	143	1,410	1,022	43	43	1,368	0.03	**369.95**	101	0.11
42	630	10.50	0.044	0.2	143	1,410	1,022	43	43	1,368	0.03	**369.95**	101	0.11
43	645	10.75	0.059	0.2	191	1,410	1,022	43	43	1,368	0.03	**369.95**	149	0.17
44	660	11.00	0.059	0.2	191	1,410	1,022	43	43	1,368	0.03	**369.95**	149	0.17
45	675	11.25	0.056	0.2	182	1,410	1,022	43	43	1,368	0.03	**369.95**	139	0.15

RCFC & WCD
HYDROLOGY MANUAL

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	15
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	911.3
TOTAL ADJUSTED STORM RAIN-INCHES	4.88

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 24 HOUR STORM

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
46	690	11.50	0.056	0.2	182	1,410	1,022	43	43	1,368	0.03	**369.95**	139	0.15
47	705	11.75	0.050	0.2	163	1,410	1,022	43	43	1,368	0.03	**369.95**	120	0.13
48	720	12.00	0.053	0.2	172	1,410	1,022	43	43	1,368	0.03	**369.95**	130	0.14
49	735	12.25	0.073	0.3	239	1,410	1,022	43	43	1,368	0.03	**369.95**	197	0.22
50	750	12.50	0.015	0.1	48	1,410	1,022	43	43	1,368	0.03	**369.95**	6	0.01
51	765	12.75	0.061	0.2	200	1,410	1,022	43	43	1,368	0.03	**369.95**	158	0.18
52	780	13.00	0.088	0.3	288	1,410	1,022	43	43	1,368	0.03	**369.95**	245	0.27
53	795	13.25	0.193	0.7	630	1,410	1,022	43	43	1,368	0.03	**369.95**	588	0.65
54	810	13.50	0.200	0.7	654	1,410	1,022	43	43	1,368	0.03	**369.95**	611	0.68
55	825	13.75	0.067	0.2	220	1,410	1,022	43	43	1,368	0.03	**369.95**	177	0.20
56	840	14.00	0.067	0.2	220	1,410	1,022	43	43	1,368	0.03	**369.95**	177	0.20
57	855	14.25	0.084	0.3	275	1,410	1,022	43	43	1,368	0.03	**369.95**	233	0.26
58	870	14.50	0.072	0.3	234	1,410	1,022	43	43	1,368	0.03	**369.95**	191	0.21
59	885	14.75	0.078	0.3	255	1,410	1,022	43	43	1,368	0.03	**369.95**	213	0.24
60	900	15.00	0.065	0.2	213	1,410	1,022	43	43	1,368	0.03	**369.95**	170	0.19
61	915	15.25	0.052	0.2	170	1,410	1,022	43	43	1,368	0.03	**369.95**	128	0.14
62	930	15.50	0.039	0.1	127	1,410	1,022	43	43	1,368	0.03	**369.95**	85	0.09
63	945	15.75	0.056	0.2	182	1,410	1,022	43	43	1,368	0.03	**369.95**	139	0.15
64	960	16.00	0.056	0.2	182	1,410	1,022	43	43	1,368	0.03	**369.95**	139	0.15
65	975	16.25	0.012	0.0	38	1,406	1,020	43	43	1,364	0.03	369.95	0	0.00
66	990	16.50	0.012	0.0	38	1,402	1,019	42	42	1,359	0.03	369.94	0	0.00
67	1005	16.75	0.009	0.0	29	1,388	1,013	42	42	1,346	0.03	369.92	0	0.00
68	1020	17.00	0.009	0.0	29	1,375	1,008	42	42	1,333	0.03	369.91	0	0.00
69	1035	17.25	0.015	0.1	48	1,380	1,011	42	42	1,338	0.03	369.92	0	0.00
70	1050	17.50	0.015	0.1	48	1,386	1,013	42	42	1,344	0.03	369.92	0	0.00
71	1065	17.75	0.015	0.1	48	1,392	1,015	42	42	1,349	0.03	369.93	0	0.00
72	1080	18.00	0.012	0.0	38	1,388	1,013	42	42	1,345	0.03	369.92	0	0.00
73	1095	18.25	0.012	0.0	38	1,384	1,012	42	42	1,342	0.03	369.92	0	0.00
74	1110	18.50	0.012	0.0	38	1,380	1,010	42	42	1,338	0.03	369.91	0	0.00
75	1125	18.75	0.009	0.0	29	1,366	1,005	42	42	1,325	0.03	369.90	0	0.00
76	1140	19.00	0.006	0.0	19	1,344	997	42	42	1,302	0.03	369.87	0	0.00
77	1155	19.25	0.009	0.0	29	1,331	992	41	41	1,290	0.03	369.86	0	0.00
78	1170	19.50	0.012	0.0	38	1,328	990	41	41	1,287	0.03	369.85	0	0.00
79	1185	19.75	0.009	0.0	29	1,315	986	41	41	1,274	0.03	369.84	0	0.00
80	1200	20.00	0.006	0.0	19	1,293	977	41	41	1,253	0.03	369.82	0	0.00
81	1215	20.25	0.009	0.0	29	1,281	973	41	41	1,241	0.03	369.80	0	0.00
82	1230	20.50	0.009	0.0	29	1,269	968	40	40	1,229	0.03	369.79	0	0.00
83	1245	20.75	0.009	0.0	29	1,258	964	40	40	1,218	0.03	369.77	0	0.00
84	1260	21.00	0.006	0.0	19	1,237	956	40	40	1,197	0.03	369.75	0	0.00
85	1275	21.25	0.009	0.0	29	1,226	951	40	40	1,186	0.03	369.74	0	0.00
86	1290	21.50	0.006	0.0	19	1,205	944	39	39	1,166	0.03	369.71	0	0.00
87	1305	21.75	0.009	0.0	29	1,195	940	39	39	1,155	0.03	369.70	0	0.00
88	1320	22.00	0.006	0.0	19	1,175	932	39	39	1,136	0.03	369.68	0	0.00
89	1335	22.25	0.009	0.0	29	1,164	928	39	39	1,126	0.03	369.67	0	0.00
90	1350	22.50	0.006	0.0	19	1,145	921	38	38	1,106	0.03	369.64	0	0.00

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 24 HOUR STORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	15
LAG TIME - MINUTES	1.65
UNIT TIME-PERCENT OF LAG	911.3
TOTAL ADJUSTED STORM RAIN-INCHES	4.88

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
91	1365	22.75	0.006	0.0	19	1,126	913	38	38	1,088	0.02	369.62	0	0.00
92	1380	23.00	0.006	0.0	19	1,107	906	38	38	1,069	0.02	369.60	0	0.00
93	1395	23.25	0.006	0.0	19	1,088	899	37	37	1,051	0.02	369.58	0	0.00
94	1410	23.50	0.006	0.0	19	1,070	892	37	37	1,033	0.02	369.56	0	0.00
95	1425	23.75	0.006	0.0	19	1,052	885	37	37	1,015	0.02	369.54	0	0.00
96	1440	24.00	0.006	0.0	19	1,034	878	37	37	997	0.02	369.52	0	0.00

BASIN WORKSHEET SUMMARY

EFFECTIVE RAIN	0.75 in
FLOOD VOLUME	0.22 acft
	9,772 cuft
TOTAL VOLUME RETAINED	4,473 cuft
MAX WSEL	369.95 ft
PEAK FLOW RATE	0.73 cfs
AVERAGE PERCOLATION RATE	2.41 cf/min
TOTAL OUTFLOW	5,299 cuft
	5.89 cfs
MAXIMUM OUTFLOW	611 cuft
	0.68 cfs

BASIN VOLUME WORKSHEET

PROECT Living Desert - Crossroads Phase 3
JOB No. 2244

BASIN CHARACTERISTICS

CONTOUR ELEVATION	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	TOTAL (acre-ft)
368	0	0		428	0	0	0.00
369	1	1	268	696	557	557	0.01
370	1	2	326	1,022	854	1,410	0.03

WHERE: $$V = \frac{1}{3}(E_1 - E_2)\left(A_1 + A_2 + \sqrt{A_1 A_2}\right)$$

RCFCD SYNTHETIC UNIT HYDROGRAPH - SHORTCUT METHOD
INCREMENTAL INCREASE WORKSHEET

DATA INPUT SHEET

DATE: June 23, 2023

WORKSHEET PREPARED BY: RRR

PROJECT NAME: Living Desert - Crossroads Phase 3

PROJECT NUMBER: 2244

CONCENTRATION POINT DESIGNATION: Retention Basin

AREA DESIGNATION: Drainage Area A

AMC NUMBER: 2

Low Loss Conditions: X=Existing; D=Developed; BS=Retention

EXISTING CONDITIONS

AREA DESIG	SOIL GROUP	TRIBUTARY AREAS	ACRES	LOW LOSS CONDITION	RI NUMBER	AMC II INFILTRATION RATE	IMPERVIOUS PERCENT
2	A	PAVING/HARDSCAPE	2.130	D	32	0.74	1.00
9	A	LANDSCAPING	3.500	D	32	0.74	0.10

PROPOSED CONDITIONS

AREA DESIG	SOIL GROUP	TRIBUTARY AREAS	ACRES	LOW LOSS CONDITION	RI NUMBER	AMC II INFILTRATION RATE	IMPERVIOUS PERCENT
2	A	PAVING/HARDSCAPE	3.110	D	32	0.74	1.00
9	A	LANDSCAPING	2.520	D	32	0.74	0.10

	UNDEVELOPED	DEVELOPED
LENGTH OF WATERCOURSE (L)	452 ft	602 ft
LENGTH TO POINT OPPOSITE CENTROID (Lca)	122 ft	172 ft
ELEVATION OF HEADWATER	386.2 ft	386.2 ft
ELEVATION OF CONCENTRATION POINT	376.5 ft	359.0 ft
AVERAGE MANNINGS 'N' VALUE	0.018	0.018

STORM FREQUENCY (YEAR): 100

LOW LOSS RATE (Storm Events > 10 Years): **85.00%**

POINT RAIN FROM NOAA ATLAS

1-HOUR	1.98 in
3-HOUR	2.59 in
6-HOUR	3.16 in
24-HOUR	4.88 in

BASIN CHARACTERISTICS:

ELEVATION	AREA
359.0 ft	138 sf
360.0 ft	649 sf
361.0 ft	751 sf
362.0 ft	836 sf
363.0 ft	918 sf
364.0 ft	997 sf

PERCOLATION RATE: 2.0 in/hr

DRYWELL DATA

NUMBER USED: 0

PERCOLATION RATE: 0.00 cfs

LOWEST FLOWLINE ELEVATION: 370.70 ft

LOWEST PAD ELEVATION: 377.6 ft

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD BASIC DATA CALCULATION FORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 BY: RRR DATE: 6/23/23

PHYSICAL DATA

	UNDEVELOPED CONDITION	DEVELOPED CONDITION
[1] CONCENTRATION POINT	Retention Basin	Retention Basin
[2] AREA DESIGNATION	Drainage Area A	Drainage Area A
[3] AREA - ACRES	5.630	5.630
[4] L-FEET	452	602
[5] L-MILES	0.086	0.114
[6] La-FEET	122.00	172.00
[7] La-MILES	0.023	0.033
[8] ELEVATION OF HEADWATER	386.2	386.2
[9] ELEVATION OF CONCENTRATION POINT	376.5	359
[10] H-FEET	9.7	27.2
[11] S-FEET/MILE	113.3	238.6
[12] S^0.5	10.64	15.45
[13] L*LCA/S^0.5	0.000	0.000
[14] AVERAGE MANNINGS 'N'	0.018	0.018
[15] LAG TIME-HOURS	0.02	0.02
[16] LAG TIME-MINUTES	1.0	1.1
[17] 100% OF LAG-MINUTES	1.0	1.1
[18] 200% OF LAG-MINUTES	2.0	2.2

RAINFALL DATA

[1] AMC	II
[2] FREQUENCY-YEARS	100
NOAA ATLAS	**0**
[3] STORM DURATION:	POINT RAIN
1-HOUR	1.98 in
3-HOUR	2.59 in
6-HOUR	3.16 in
24-HOUR	4.88 in

STORM EVENT SUMMARY

DURATION		UNDEVELOPED CONDITION 1-HOUR	UNDEVELOPED CONDITION 3-HOUR	UNDEVELOPED CONDITION 6-HOUR	UNDEVELOPED CONDITION 24-HOUR	DEVELOPED CONDITION 1-HOUR	DEVELOPED CONDITION 3-HOUR	DEVELOPED CONDITION 6-HOUR	DEVELOPED CONDITION 24-HOUR
EFFECTIVE RAIN	(in)	1.53	1.30	1.20	0.95	1.64	1.58	1.43	1.25
FLOOD VOLUME	(cu-ft) (acre-ft)	31,337 0.72	26,656 0.61	24,556 0.56	19,483 0.45	33,470 0.77	32,347 0.74	29,246 0.67	25,564 0.59
PEAK FLOW	(cfs)	N/A	11.93	9.52	1.58	N/A	12.52	10.11	2.09

STORM EVENT SUMMARY

DURATION		1-HOUR	3-HOUR	6-HOUR	24-HOUR
DEVELOPED CONDITION FLOOD VOLUME	(cu-ft)	**33,470**	32,347	29,246	25,564
	(ac-ft)	0.77	0.74	0.67	0.59
UNDEVELOPED CONDITION FLOOD VOLUME	(cu-ft)	31,337	26,656	24,556	19,483
	(ac-ft)	0.72	0.61	0.56	0.45
INCREMENTAL INCREASE IN FLOOD VOLUME	(cu-ft)	2,132	5,690	4,690	6,081
	(ac-ft)	0.05	0.13	0.11	0.14
TOTAL FLOOD VOLUME RETAINED	(cu-ft)	3,834	4,124	4,522	7,040
	(ac-ft)	0.09	0.09	0.10	0.16
TOTAL BASIN OUTFLOW	(cu-ft)	29,635	28,222	24,725	18,524
	(ac-ft)	0.68	0.65	0.57	0.43
	(cfs)	44.55	12.48	10.07	2.05
MAXIMUM WSEL	(ft)	**363.99**	**363.99**	**363.99**	363.96
DEPTH	(ft)	**4.99**	**4.99**	**4.99**	4.96
LOWEST FLOWLINE ELEVATION		370.70			
DIFFERENCE	(ft)	6.71	6.71	6.71	6.74
LOWEST PAD ELEVATION		377.60			
DIFFERENCE	(ft)	13.61	13.61	13.61	13.64
ESTIMATED TIME TO DEWATER BASIN Based on total Flood Volume & Average Percolation Rate	(days)	1.0	1.1	1.3	2.0

NOTE: PEAK FLOW FOR THE 1-HOUR STORM IS NOT REPRESENTATIVE. PER RCFCD THE 3-HOUR STORM PEAK DISCHARGES SHOULD NORMALLY COMPARE WELL WITH RATIONAL PEAKS.

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD BASIC DATA CALCULATION FORM AMC II	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 BY: RRR DATE: 6/23/23

AVERAGE ADJUSTED LOSS RATE - UNDEVELOPED CONDITIONS

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA	AREA WEIGHTED AVERAGE	MAX AVERAGE ADJUSTED INFILTRATION RATE (in/hr)	LOW LOSS CONDITION	LOW LOSS RATE PER RCFC/2322 (in/hr)	MIN AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	PAVING/HARDSCAPE	32	0.74	100%	0.07	2.130	0.378	0.0280	DEVELOPED	0.1000	0.0378
A	LANDSCAPING	32	0.74	10%	0.67	3.500	0.622	0.4186	DEVELOPED	0.8200	0.5098
					SUM	5.630		SUM 0.4466			0.5476

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.223314387

C= 0.00414

Ft=C(24-(T/60))^1.55 = 0.00414 (24-(T/60))^1.55 + **0.22** in/hr

CONSTANT LOSS RATE (3 & 6 HOUR STORMS) = **0.4466** in/hr

LOW LOSS RATE = **0.8500** in/hr

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period, T=1 1/2 unit time for the second period, etc.

NOTE: Low loss rates established per RCFC/2322 (Dated: May-30-95)
For 2, 5 & 10 Year Storm Events
Undeveloped Condition: Low Loss = 90%
Developed Condition: Low Loss = 0.9 - (0.8 * %impervious)
Basin Site: Low Loss = 10%
For 100 Year Storm - Low Loss should be between 80% & 90% of the Rainfall Rate

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 1-HOUR STORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63	
UNIT TIME-MINUTES	5	
LAG TIME - MINUTES	0.99	
UNIT TIME-PERCENT OF LAG	504.8	
TOTAL ADJUSTED STORM RAIN-INCHES	1.98	
CONSTANT LOSS RATE-in/hr		0.45
LOW LOSS RATE - PERCENT		85%

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs
1	5	0.08	3.6	0.86	0.45	0.73	0.41	2.32
2	10	0.17	4.2	1.00	0.45	0.85	0.55	3.13
3	15	0.25	4.4	1.05	0.45	0.89	0.60	3.40
4	20	0.33	4.6	1.09	0.45	0.93	0.65	3.67
5	25	0.42	5.0	1.19	0.45	1.01	0.74	4.21
6	30	0.50	5.6	1.33	0.45	1.13	0.88	5.02
7	35	0.58	6.4	1.52	0.45	1.29	1.07	6.10
8	40	0.67	8.1	1.92	0.45	1.64	1.48	8.39
9	45	0.75	13.1	3.11	0.45	2.65	2.67	15.13
10	50	0.83	34.5	8.20	0.45	6.97	7.75	**44.00**
11	55	0.92	6.7	1.59	0.45	1.35	1.15	6.50
12	60	1.00	3.8	0.90	0.45	0.77	0.46	2.59

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.53
FLOOD VOLUME (acft)	0.72
FLOOD VOLUME (cuft)	31,337
PEAK FLOW RATE (cfs)	44.00

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 3-HOUR STORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63	
UNIT TIME-MINUTES	5	
LAG TIME - MINUTES	0.99	
UNIT TIME-PERCENT OF LAG	504.8	
TOTAL ADJUSTED STORM RAIN-INCHES	2.59	
CONSTANT LOSS RATE-in/hr		0.45
LOW LOSS RATE - PERCENT		85%

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs
1	5	0.08	1.3	0.40	0.45	0.34	0.06	0.34
2	10	0.17	1.3	0.40	0.45	0.34	0.06	0.34
3	15	0.25	1.1	0.34	0.45	0.29	0.05	0.29
4	20	0.33	1.5	0.47	0.45	0.40	0.02	0.11
5	25	0.42	1.5	0.47	0.45	0.40	0.02	0.11
6	30	0.50	1.8	0.56	0.45	0.48	0.11	0.64
7	35	0.58	1.5	0.47	0.45	0.40	0.02	0.11
8	40	0.67	1.8	0.56	0.45	0.48	0.11	0.64
9	45	0.75	1.8	0.56	0.45	0.48	0.11	0.64
10	50	0.83	1.5	0.47	0.45	0.40	0.02	0.11
11	55	0.92	1.6	0.50	0.45	0.42	0.05	0.29
12	60	1.00	1.8	0.56	0.45	0.48	0.11	0.64
13	65	1.08	2.2	0.68	0.45	0.58	0.24	1.35
14	70	1.17	2.2	0.68	0.45	0.58	0.24	1.35
15	75	1.25	2.2	0.68	0.45	0.58	0.24	1.35
16	80	1.33	2.0	0.62	0.45	0.53	0.17	0.99
17	85	1.42	2.6	0.81	0.45	0.69	0.36	2.05
18	90	1.50	2.7	0.84	0.45	0.71	0.39	2.23
19	95	1.58	2.4	0.75	0.45	0.63	0.30	1.70
20	100	1.67	2.7	0.84	0.45	0.71	0.39	2.23
21	105	1.75	3.3	1.03	0.45	0.87	0.58	3.29
22	110	1.83	3.1	0.96	0.45	0.82	0.52	2.93
23	115	1.92	2.9	0.90	0.45	0.77	0.45	2.58
24	120	2.00	3.0	0.93	0.45	0.79	0.49	2.76
25	125	2.08	3.1	0.96	0.45	0.82	0.52	2.93
26	130	2.17	4.2	1.31	0.45	1.11	0.86	4.87
27	135	2.25	5.0	1.55	0.45	1.32	1.11	6.29
28	140	2.33	3.5	1.09	0.45	0.92	0.64	3.64
29	145	2.42	6.8	2.11	0.45	1.80	1.67	9.46
30	150	2.50	7.3	2.27	0.45	1.93	1.82	10.34
31	155	2.58	8.2	2.55	0.45	2.17	2.10	**11.93**
32	160	2.67	5.9	1.83	0.45	1.56	1.39	7.87
33	165	2.75	2.0	0.62	0.45	0.53	0.17	0.99
34	170	2.83	1.8	0.56	0.45	0.48	0.11	0.64
35	175	2.92	1.8	0.56	0.45	0.48	0.11	0.64
36	180	3.00	0.6	0.19	0.45	0.16	0.03	0.16

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.30
FLOOD VOLUME (acft)	0.61
FLOOD VOLUME (cuft)	26,656
PEAK FLOW RATE (cfs)	11.93

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 6-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	504.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16
CONSTANT LOSS RATE-in/hr	0.447
LOW LOSS RATE - PERCENT	85%

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours	(Plate E-5.9)		Max	Low		
1	5	0.08	0.5	0.190	0.45	0.16	0.03	0.16
2	10	0.17	0.6	0.228	0.45	0.19	0.03	0.19
3	15	0.25	0.6	0.228	0.45	0.19	0.03	0.19
4	20	0.33	0.6	0.228	0.45	0.19	0.03	0.19
5	25	0.42	0.6	0.228	0.45	0.19	0.03	0.19
6	30	0.50	0.7	0.265	0.45	0.23	0.04	0.23
7	35	0.58	0.7	0.265	0.45	0.23	0.04	0.23
8	40	0.67	0.7	0.265	0.45	0.23	0.04	0.23
9	45	0.75	0.7	0.265	0.45	0.23	0.04	0.23
10	50	0.83	0.7	0.265	0.45	0.23	0.04	0.23
11	55	0.92	0.7	0.265	0.45	0.23	0.04	0.23
12	60	1.00	0.8	0.303	0.45	0.26	0.05	0.26
13	65	1.08	0.8	0.303	0.45	0.26	0.05	0.26
14	70	1.17	0.8	0.303	0.45	0.26	0.05	0.26
15	75	1.25	0.8	0.303	0.45	0.26	0.05	0.26
16	80	1.33	0.8	0.303	0.45	0.26	0.05	0.26
17	85	1.42	0.8	0.303	0.45	0.26	0.05	0.26
18	90	1.50	0.8	0.303	0.45	0.26	0.05	0.26
19	95	1.58	0.8	0.303	0.45	0.26	0.05	0.26
20	100	1.67	0.8	0.303	0.45	0.26	0.05	0.26
21	105	1.75	0.8	0.303	0.45	0.26	0.05	0.26
22	110	1.83	0.8	0.303	0.45	0.26	0.05	0.26
23	115	1.92	0.8	0.303	0.45	0.26	0.05	0.26
24	120	2.00	0.9	0.341	0.45	0.29	0.05	0.29
25	125	2.08	0.8	0.303	0.45	0.26	0.05	0.26
26	130	2.17	0.9	0.341	0.45	0.29	0.05	0.29
27	135	2.25	0.9	0.341	0.45	0.29	0.05	0.29
28	140	2.33	0.9	0.341	0.45	0.29	0.05	0.29
29	145	2.42	0.9	0.341	0.45	0.29	0.05	0.29
30	150	2.50	0.9	0.341	0.45	0.29	0.05	0.29
31	155	2.58	0.9	0.341	0.45	0.29	0.05	0.29
32	160	2.67	0.9	0.341	0.45	0.29	0.05	0.29
33	165	2.75	1.0	0.379	0.45	0.32	0.06	0.32
34	170	2.83	1.0	0.379	0.45	0.32	0.06	0.32
35	175	2.92	1.0	0.379	0.45	0.32	0.06	0.32
36	180	3.00	1.0	0.379	0.45	0.32	0.06	0.32
37	185	3.08	1.0	0.379	0.45	0.32	0.06	0.32
38	190	3.17	1.1	0.417	0.45	0.35	0.06	0.36
39	195	3.25	1.1	0.417	0.45	0.35	0.06	0.36
40	200	3.33	1.1	0.417	0.45	0.35	0.06	0.36
41	205	3.42	1.2	0.455	0.45	0.39	0.01	0.05
42	210	3.50	1.3	0.493	0.45	0.42	0.05	0.26
43	215	3.58	1.4	0.531	0.45	0.45	0.08	0.48
44	220	3.67	1.4	0.531	0.45	0.45	0.08	0.48
45	225	3.75	1.5	0.569	0.45	0.48	0.12	0.69
46	230	3.83	1.5	0.569	0.45	0.48	0.12	0.69
47	235	3.92	1.6	0.607	0.45	0.52	0.16	0.91
48	240	4.00	1.6	0.607	0.45	0.52	0.16	0.91
49	245	4.08	1.7	0.645	0.45	0.55	0.20	1.12
50	250	4.17	1.8	0.683	0.45	0.58	0.24	1.34

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 6-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	504.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16
CONSTANT LOSS RATE-in/hr	0.447
LOW LOSS RATE - PERCENT	85%

Unit Time Period	Time		Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours			Max	Low		
51	255	4.25	1.9	0.720	0.45	0.61	0.27	1.55
52	260	4.33	2.0	0.758	0.45	0.64	0.31	1.77
53	265	4.42	2.1	0.796	0.45	0.68	0.35	1.99
54	270	4.50	2.1	0.796	0.45	0.68	0.35	1.99
55	275	4.58	2.2	0.834	0.45	0.71	0.39	2.20
56	280	4.67	2.3	0.872	0.45	0.74	0.43	2.42
57	285	4.75	2.4	0.910	0.45	0.77	0.46	2.63
58	290	4.83	2.4	0.910	0.45	0.77	0.46	2.63
59	295	4.92	2.5	0.948	0.45	0.81	0.50	2.85
60	300	5.00	2.6	0.986	0.45	0.84	0.54	3.06
61	305	5.08	3.1	1.176	0.45	1.00	0.73	4.14
62	310	5.17	3.6	1.365	0.45	1.16	0.92	5.21
63	315	5.25	3.9	1.479	0.45	1.26	1.03	5.86
64	320	5.33	4.2	1.593	0.45	1.35	1.15	6.51
65	325	5.42	4.7	1.782	0.45	1.51	1.34	7.58
66	330	5.50	5.6	2.124	0.45	1.80	1.68	**9.52**
67	335	5.58	1.9	0.720	0.45	0.61	0.27	1.55
68	340	5.67	0.9	0.341	0.45	0.29	0.05	0.29
69	345	5.75	0.6	0.228	0.45	0.19	0.03	0.19
70	350	5.83	0.5	0.190	0.45	0.16	0.03	0.16
71	355	5.92	0.3	0.114	0.45	0.10	0.02	0.10
72	360	6.00	0.2	0.076	0.45	0.06	0.01	0.06

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.20
FLOOD VOLUME (acft)	0.56
FLOOD VOLUME (cuft)	24,556
PEAK FLOW RATE (cfs)	9.52

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 24-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE: BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.630	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.4466
LAG TIME - MINUTES	0.99	MINIMUM LOSS RATE (for var. loss) - in/hr	0.223
UNIT TIME-PERCENT OF LAG	1514.3	LOW LOSS RATE - DECIMAL	0.85
TOTAL ADJUSTED STORM RAIN-INCHES	4.88	C	0.00414

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours	(Plate E-5.9)		Max	Low		
1	15	0.25	0.2	0.039	0.789	0.033	0.006	0.03
2	30	0.50	0.3	0.059	0.780	0.050	0.009	0.05
3	45	0.75	0.3	0.059	0.770	0.050	0.009	0.05
4	60	1.00	0.4	0.078	0.761	0.066	0.012	0.07
5	75	1.25	0.3	0.059	0.752	0.050	0.009	0.05
6	90	1.50	0.3	0.059	0.743	0.050	0.009	0.05
7	105	1.75	0.3	0.059	0.735	0.050	0.009	0.05
8	120	2.00	0.4	0.078	0.726	0.066	0.012	0.07
9	135	2.25	0.4	0.078	0.717	0.066	0.012	0.07
10	150	2.50	0.4	0.078	0.708	0.066	0.012	0.07
11	165	2.75	0.5	0.098	0.700	0.083	0.015	0.08
12	180	3.00	0.5	0.098	0.691	0.083	0.015	0.08
13	195	3.25	0.5	0.098	0.682	0.083	0.015	0.08
14	210	3.50	0.5	0.098	0.674	0.083	0.015	0.08
15	225	3.75	0.5	0.098	0.666	0.083	0.015	0.08
16	240	4.00	0.6	0.117	0.657	0.100	0.018	0.10
17	255	4.25	0.6	0.117	0.649	0.100	0.018	0.10
18	270	4.50	0.7	0.137	0.641	0.116	0.020	0.12
19	285	4.75	0.7	0.137	0.632	0.116	0.020	0.12
20	300	5.00	0.8	0.156	0.624	0.133	0.023	0.13
21	315	5.25	0.6	0.117	0.616	0.100	0.018	0.10
22	330	5.50	0.7	0.137	0.608	0.116	0.020	0.12
23	345	5.75	0.8	0.156	0.600	0.133	0.023	0.13
24	360	6.00	0.8	0.156	0.592	0.133	0.023	0.13
25	375	6.25	0.9	0.176	0.584	0.149	0.026	0.15
26	390	6.50	0.9	0.176	0.577	0.149	0.026	0.15
27	405	6.75	1.0	0.195	0.569	0.166	0.029	0.17
28	420	7.00	1.0	0.195	0.561	0.166	0.029	0.17
29	435	7.25	1.0	0.195	0.553	0.166	0.029	0.17
30	450	7.50	1.1	0.215	0.546	0.183	0.032	0.18
31	465	7.75	1.2	0.234	0.538	0.199	0.035	0.20
32	480	8.00	1.3	0.254	0.531	0.216	0.038	0.22
33	495	8.25	1.5	0.293	0.524	0.249	0.044	0.25
34	510	8.50	1.5	0.293	0.516	0.249	0.044	0.25
35	525	8.75	1.6	0.312	0.509	0.265	0.047	0.27
36	540	9.00	1.7	0.332	0.502	0.282	0.050	0.28
37	555	9.25	1.9	0.371	0.495	0.315	0.056	0.32
38	570	9.50	2.0	0.390	0.488	0.332	0.059	0.33
39	585	9.75	2.1	0.410	0.481	0.348	0.061	0.35
40	600	10.00	2.2	0.429	0.474	0.365	0.064	0.37
41	615	10.25	1.5	0.293	0.467	0.249	0.044	0.25
42	630	10.50	1.5	0.293	0.460	0.249	0.044	0.25
43	645	10.75	2.0	0.390	0.454	0.332	0.059	0.33
44	660	11.00	2.0	0.390	0.447	0.332	0.059	0.33
45	675	11.25	1.9	0.371	0.440	0.315	0.056	0.32
46	690	11.50	1.9	0.371	0.434	0.315	0.056	0.32
47	705	11.75	1.7	0.332	0.427	0.282	0.050	0.28
48	720	12.00	1.8	0.351	0.421	0.299	0.053	0.30
49	735	12.25	2.5	0.488	0.415	0.415	0.073	0.42
50	750	12.50	2.6	0.508	0.409	0.431	0.099	0.56
51	765	12.75	2.8	0.547	0.402	0.465	0.144	0.82
52	780	13.00	2.9	0.566	0.396	0.481	0.170	0.96
53	795	13.25	3.4	0.664	0.390	0.564	0.273	1.55
54	810	13.50	3.4	0.664	0.385	0.564	0.279	**1.58**
55	825	13.75	2.3	0.449	0.379	0.382	0.070	0.40
56	840	14.00	2.3	0.449	0.373	0.382	0.076	0.43
57	855	14.25	2.7	0.527	0.367	0.448	0.160	0.91
58	870	14.50	2.6	0.508	0.362	0.431	0.146	0.83
59	885	14.75	2.6	0.508	0.356	0.431	0.151	0.86
60	900	15.00	2.5	0.488	0.351	0.415	0.137	0.78

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD UNDEVELOPED CONDITION 24-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE: BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.630	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.4466
LAG TIME - MINUTES	0.99	MINIMUM LOSS RATE (for var. loss) - in/hr	0.223
UNIT TIME-PERCENT OF LAG	1514.3	LOW LOSS RATE - DECIMAL	0.85
TOTAL ADJUSTED STORM RAIN-INCHES	4.88	C	0.00414

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours	(Plate E-5.9)		Max	Low		
61	915	15.25	2.4	0.468	0.345	0.398	0.123	0.70
62	930	15.50	2.3	0.449	0.340	0.382	0.109	0.62
63	945	15.75	1.9	0.371	0.335	0.315	0.036	0.20
64	960	16.00	1.9	0.371	0.330	0.315	0.041	0.23
65	975	16.25	0.4	0.078	0.325	0.066	0.012	0.07
66	990	16.50	0.4	0.078	0.320	0.066	0.012	0.07
67	1005	16.75	0.3	0.059	0.315	0.050	0.009	0.05
68	1020	17.00	0.3	0.059	0.310	0.050	0.009	0.05
69	1035	17.25	0.5	0.098	0.305	0.083	0.015	0.08
70	1050	17.50	0.5	0.098	0.301	0.083	0.015	0.08
71	1065	17.75	0.5	0.098	0.296	0.083	0.015	0.08
72	1080	18.00	0.4	0.078	0.292	0.066	0.012	0.07
73	1095	18.25	0.4	0.078	0.288	0.066	0.012	0.07
74	1110	18.50	0.4	0.078	0.283	0.066	0.012	0.07
75	1125	18.75	0.3	0.059	0.279	0.050	0.009	0.05
76	1140	19.00	0.2	0.039	0.275	0.033	0.006	0.03
77	1155	19.25	0.3	0.059	0.271	0.050	0.009	0.05
78	1170	19.50	0.4	0.078	0.268	0.066	0.012	0.07
79	1185	19.75	0.3	0.059	0.264	0.050	0.009	0.05
80	1200	20.00	0.2	0.039	0.261	0.033	0.006	0.03
81	1215	20.25	0.3	0.059	0.257	0.050	0.009	0.05
82	1230	20.50	0.3	0.059	0.254	0.050	0.009	0.05
83	1245	20.75	0.3	0.059	0.251	0.050	0.009	0.05
84	1260	21.00	0.2	0.039	0.247	0.033	0.006	0.03
85	1275	21.25	0.3	0.059	0.245	0.050	0.009	0.05
86	1290	21.50	0.2	0.039	0.242	0.033	0.006	0.03
87	1305	21.75	0.3	0.059	0.239	0.050	0.009	0.05
88	1320	22.00	0.2	0.039	0.237	0.033	0.006	0.03
89	1335	22.25	0.3	0.059	0.234	0.050	0.009	0.05
90	1350	22.50	0.2	0.039	0.232	0.033	0.006	0.03
91	1365	22.75	0.2	0.039	0.230	0.033	0.006	0.03
92	1380	23.00	0.2	0.039	0.228	0.033	0.006	0.03
93	1395	23.25	0.2	0.039	0.227	0.033	0.006	0.03
94	1410	23.50	0.2	0.039	0.225	0.033	0.006	0.03
95	1425	23.75	0.2	0.039	0.224	0.033	0.006	0.03
96	1440	24.00	0.2	0.039	0.223	0.033	0.006	0.03

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.95
FLOOD VOLUME (acft)	0.45
FLOOD VOLUME (cuft)	19,483
PEAK FLOW (cfs)	1.58

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD BASIC DATA CALCULATION FORM AMC II	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 BY: RRR DATE: 6/23/23

AVERAGE ADJUSTED LOSS RATE - DEVELOPED CONDITIONS

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA	AREA WEIGHTED AVERAGE	MAX AVERAGE ADJUSTED INFILTRATION RATE (in/hr)	LOW LOSS CONDITION	LOW LOSS RATE PER RCFC/2322 (in/hr)	MIN AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	PAVING/HARDSCAPE	32	0.74	100%	0.07	3.110	0.552	0.0409	DEVELOPED	0.1000	0.0552
A	LANDSCAPING	32	0.74	10%	0.67	2.520	0.448	0.3014	DEVELOPED	0.8200	0.3670
					SUM	5.630	SUM	0.3423			0.4223

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.171146359

C= 0.00317

Ft=C(24-(T/60))^1.55 = 0.00317 (24-(T/60))^1.55 + **0.17** in/hr

CONSTANT LOSS RATE (3 & 6 HOUR STORMS) = **0.3423** in/hr

LOW LOSS RATE = **0.8500** in/hr

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period, T=1 1/2 unit time for the second period, etc.

NOTE: Low loss rates established per RCFC/2322 (Dated: May-30-95)
For Storms Less than the 100 Year Event
Undeveloped Condition: Low Loss = 90%
Developed Condition: Low Loss = 0.9 - (0.8 * %impervious)
Basin Site: Low Loss = 10%
For 100 Year Storm - Low Loss should be between 80% & 90% of the Rainfall Rate

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITIONS 1-HOUR STORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63	
UNIT TIME-MINUTES	5	
LAG TIME - MINUTES	0.99	
UNIT TIME-PERCENT OF LAG	504.8	
TOTAL ADJUSTED STORM RAIN-INCHES	1.98	
CONSTANT LOSS RATE-in/hr		0.34
LOW LOSS RATE - PERCENT		85%

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs
1	5	0.08	3.6	0.86	0.34	0.73	0.51	2.91
2	10	0.17	4.2	1.00	0.34	0.85	0.66	3.72
3	15	0.25	4.4	1.05	0.34	0.89	0.70	3.99
4	20	0.33	4.6	1.09	0.34	0.93	0.75	4.26
5	25	0.42	5.0	1.19	0.34	1.01	0.85	4.80
6	30	0.50	5.6	1.33	0.34	1.13	0.99	5.61
7	35	0.58	6.4	1.52	0.34	1.29	1.18	6.69
8	40	0.67	8.1	1.92	0.34	1.64	1.58	8.98
9	45	0.75	13.1	3.11	0.34	2.65	2.77	15.73
10	50	0.83	34.5	8.20	0.34	6.97	7.85	**44.59**
11	55	0.92	6.7	1.59	0.34	1.35	1.25	7.09
12	60	1.00	3.8	0.90	0.34	0.77	0.56	3.18

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.64
FLOOD VOLUME (acft)	0.77
FLOOD VOLUME (cuft)	33,470
PEAK FLOW RATE (cfs)	44.59

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITIONS 3-HOUR STORM	PROJECT: Living Desert - Crossroads Phase 3 Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63	
UNIT TIME-MINUTES	5	
LAG TIME - MINUTES	1.09	
UNIT TIME-PERCENT OF LAG	457.7	
TOTAL ADJUSTED STORM RAIN-INCHES	2.59	
CONSTANT LOSS RATE-in/hr		0.34
LOW LOSS RATE - PERCENT		85%

Unit Time Period	Time		Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours			Max	Low		
1	5	0.08	1.3	0.40	0.34	0.34	0.06	0.35
2	10	0.17	1.3	0.40	0.34	0.34	0.06	0.35
3	15	0.25	1.1	0.34	0.34	0.29	0.05	0.29
4	20	0.33	1.5	0.47	0.34	0.40	0.12	0.70
5	25	0.42	1.5	0.47	0.34	0.40	0.12	0.70
6	30	0.50	1.8	0.56	0.34	0.48	0.22	1.23
7	35	0.58	1.5	0.47	0.34	0.40	0.12	0.70
8	40	0.67	1.8	0.56	0.34	0.48	0.22	1.23
9	45	0.75	1.8	0.56	0.34	0.48	0.22	1.23
10	50	0.83	1.5	0.47	0.34	0.40	0.12	0.70
11	55	0.92	1.6	0.50	0.34	0.42	0.15	0.88
12	60	1.00	1.8	0.56	0.34	0.48	0.22	1.23
13	65	1.08	2.2	0.68	0.34	0.58	0.34	1.94
14	70	1.17	2.2	0.68	0.34	0.58	0.34	1.94
15	75	1.25	2.2	0.68	0.34	0.58	0.34	1.94
16	80	1.33	2.0	0.62	0.34	0.53	0.28	1.59
17	85	1.42	2.6	0.81	0.34	0.69	0.47	2.64
18	90	1.50	2.7	0.84	0.34	0.71	0.50	2.82
19	95	1.58	2.4	0.75	0.34	0.63	0.40	2.29
20	100	1.67	2.7	0.84	0.34	0.71	0.50	2.82
21	105	1.75	3.3	1.03	0.34	0.87	0.68	3.88
22	110	1.83	3.1	0.96	0.34	0.82	0.62	3.53
23	115	1.92	2.9	0.90	0.34	0.77	0.56	3.17
24	120	2.00	3.0	0.93	0.34	0.79	0.59	3.35
25	125	2.08	3.1	0.96	0.34	0.82	0.62	3.53
26	130	2.17	4.2	1.31	0.34	1.11	0.96	5.47
27	135	2.25	5.0	1.55	0.34	1.32	1.21	6.88
28	140	2.33	3.5	1.09	0.34	0.92	0.75	4.23
29	145	2.42	6.8	2.11	0.34	1.80	1.77	10.05
30	150	2.50	7.3	2.27	0.34	1.93	1.93	10.94
31	155	2.58	8.2	2.55	0.34	2.17	2.21	**12.52**
32	160	2.67	5.9	1.83	0.34	1.56	1.49	8.47
33	165	2.75	2.0	0.62	0.34	0.53	0.28	1.59
34	170	2.83	1.8	0.56	0.34	0.48	0.22	1.23
35	175	2.92	1.8	0.56	0.34	0.48	0.22	1.23
36	180	3.00	0.6	0.19	0.34	0.16	0.03	0.16

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.58
FLOOD VOLUME (acft)	0.74
FLOOD VOLUME (cuft)	32,347
PEAK FLOW RATE (cfs)	12.52

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITIONS 6-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.09
UNIT TIME-PERCENT OF LAG	457.7
TOTAL ADJUSTED STORM RAIN-INCHES	3.16
CONSTANT LOSS RATE-in/hr	0.342
LOW LOSS RATE - PERCENT	85%

Unit Time Period	Time		Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours			Max	Low		
1	5	0.08	0.5	0.190	0.34	0.16	0.03	0.16
2	10	0.17	0.6	0.228	0.34	0.19	0.03	0.19
3	15	0.25	0.6	0.228	0.34	0.19	0.03	0.19
4	20	0.33	0.6	0.228	0.34	0.19	0.03	0.19
5	25	0.42	0.6	0.228	0.34	0.19	0.03	0.19
6	30	0.50	0.7	0.265	0.34	0.23	0.04	0.23
7	35	0.58	0.7	0.265	0.34	0.23	0.04	0.23
8	40	0.67	0.7	0.265	0.34	0.23	0.04	0.23
9	45	0.75	0.7	0.265	0.34	0.23	0.04	0.23
10	50	0.83	0.7	0.265	0.34	0.23	0.04	0.23
11	55	0.92	0.7	0.265	0.34	0.23	0.04	0.23
12	60	1.00	0.8	0.303	0.34	0.26	0.05	0.26
13	65	1.08	0.8	0.303	0.34	0.26	0.05	0.26
14	70	1.17	0.8	0.303	0.34	0.26	0.05	0.26
15	75	1.25	0.8	0.303	0.34	0.26	0.05	0.26
16	80	1.33	0.8	0.303	0.34	0.26	0.05	0.26
17	85	1.42	0.8	0.303	0.34	0.26	0.05	0.26
18	90	1.50	0.8	0.303	0.34	0.26	0.05	0.26
19	95	1.58	0.8	0.303	0.34	0.26	0.05	0.26
20	100	1.67	0.8	0.303	0.34	0.26	0.05	0.26
21	105	1.75	0.8	0.303	0.34	0.26	0.05	0.26
22	110	1.83	0.8	0.303	0.34	0.26	0.05	0.26
23	115	1.92	0.8	0.303	0.34	0.26	0.05	0.26
24	120	2.00	0.9	0.341	0.34	0.29	0.05	0.29
25	125	2.08	0.8	0.303	0.34	0.26	0.05	0.26
26	130	2.17	0.9	0.341	0.34	0.29	0.05	0.29
27	135	2.25	0.9	0.341	0.34	0.29	0.05	0.29
28	140	2.33	0.9	0.341	0.34	0.29	0.05	0.29
29	145	2.42	0.9	0.341	0.34	0.29	0.05	0.29
30	150	2.50	0.9	0.341	0.34	0.29	0.05	0.29
31	155	2.58	0.9	0.341	0.34	0.29	0.05	0.29
32	160	2.67	0.9	0.341	0.34	0.29	0.05	0.29
33	165	2.75	1.0	0.379	0.34	0.32	0.04	0.21
34	170	2.83	1.0	0.379	0.34	0.32	0.04	0.21
35	175	2.92	1.0	0.379	0.34	0.32	0.04	0.21
36	180	3.00	1.0	0.379	0.34	0.32	0.04	0.21
37	185	3.08	1.0	0.379	0.34	0.32	0.04	0.21
38	190	3.17	1.1	0.417	0.34	0.35	0.07	0.42
39	195	3.25	1.1	0.417	0.34	0.35	0.07	0.42
40	200	3.33	1.1	0.417	0.34	0.35	0.07	0.42
41	205	3.42	1.2	0.455	0.34	0.39	0.11	0.64
42	210	3.50	1.3	0.493	0.34	0.42	0.15	0.86
43	215	3.58	1.4	0.531	0.34	0.45	0.19	1.07
44	220	3.67	1.4	0.531	0.34	0.45	0.19	1.07
45	225	3.75	1.5	0.569	0.34	0.48	0.23	1.29
46	230	3.83	1.5	0.569	0.34	0.48	0.23	1.29
47	235	3.92	1.6	0.607	0.34	0.52	0.26	1.50
48	240	4.00	1.6	0.607	0.34	0.52	0.26	1.50
49	245	4.08	1.7	0.645	0.34	0.55	0.30	1.72
50	250	4.17	1.8	0.683	0.34	0.58	0.34	1.93

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITIONS 6-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.09
UNIT TIME-PERCENT OF LAG	457.7
TOTAL ADJUSTED STORM RAIN-INCHES	3.16
CONSTANT LOSS RATE-in/hr	0.342
LOW LOSS RATE - PERCENT	85%

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs
51	255	4.25	1.9	0.720	0.34	0.61	0.38	2.15
52	260	4.33	2.0	0.758	0.34	0.64	0.42	2.36
53	265	4.42	2.1	0.796	0.34	0.68	0.45	2.58
54	270	4.50	2.1	0.796	0.34	0.68	0.45	2.58
55	275	4.58	2.2	0.834	0.34	0.71	0.49	2.79
56	280	4.67	2.3	0.872	0.34	0.74	0.53	3.01
57	285	4.75	2.4	0.910	0.34	0.77	0.57	3.22
58	290	4.83	2.4	0.910	0.34	0.77	0.57	3.22
59	295	4.92	2.5	0.948	0.34	0.81	0.61	3.44
60	300	5.00	2.6	0.986	0.34	0.84	0.64	3.65
61	305	5.08	3.1	1.176	0.34	1.00	0.83	4.73
62	310	5.17	3.6	1.365	0.34	1.16	1.02	5.81
63	315	5.25	3.9	1.479	0.34	1.26	1.14	6.45
64	320	5.33	4.2	1.593	0.34	1.35	1.25	7.10
65	325	5.42	4.7	1.782	0.34	1.51	1.44	8.17
66	330	5.50	5.6	2.124	0.34	1.80	1.78	**10.11**
67	335	5.58	1.9	0.720	0.34	0.61	0.38	2.15
68	340	5.67	0.9	0.341	0.34	0.29	0.05	0.29
69	345	5.75	0.6	0.228	0.34	0.19	0.03	0.19
70	350	5.83	0.5	0.190	0.34	0.16	0.03	0.16
71	355	5.92	0.3	0.114	0.34	0.10	0.02	0.10
72	360	6.00	0.2	0.076	0.34	0.06	0.01	0.06

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.43
FLOOD VOLUME (acft)	0.67
FLOOD VOLUME (cuft)	29,246
PEAK FLOW RATE (cfs)	10.11

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITION 24-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE: BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.3423
LAG TIME - MINUTES	1.09	MINIMUM LOSS RATE (for var. loss) - in/hr	0.171
UNIT TIME-PERCENT OF LAG	1373.0	LOW LOSS RATE - DECIMAL	0.85
TOTAL ADJUSTED STORM RAIN-INCHES	4.88	C	0.00317

Unit Time Period	Time		Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours			Max	Low		
1	15	0.25	0.2	0.039	0.604	0.033	0.006	0.03
2	30	0.50	0.3	0.059	0.597	0.050	0.009	0.05
3	45	0.75	0.3	0.059	0.590	0.050	0.009	0.05
4	60	1.00	0.4	0.078	0.584	0.066	0.012	0.07
5	75	1.25	0.3	0.059	0.577	0.050	0.009	0.05
6	90	1.50	0.3	0.059	0.570	0.050	0.009	0.05
7	105	1.75	0.3	0.059	0.563	0.050	0.009	0.05
8	120	2.00	0.4	0.078	0.556	0.066	0.012	0.07
9	135	2.25	0.4	0.078	0.549	0.066	0.012	0.07
10	150	2.50	0.4	0.078	0.543	0.066	0.012	0.07
11	165	2.75	0.5	0.098	0.536	0.083	0.015	0.08
12	180	3.00	0.5	0.098	0.530	0.083	0.015	0.08
13	195	3.25	0.5	0.098	0.523	0.083	0.015	0.08
14	210	3.50	0.5	0.098	0.517	0.083	0.015	0.08
15	225	3.75	0.5	0.098	0.510	0.083	0.015	0.08
16	240	4.00	0.6	0.117	0.504	0.100	0.018	0.10
17	255	4.25	0.6	0.117	0.497	0.100	0.018	0.10
18	270	4.50	0.7	0.137	0.491	0.116	0.020	0.12
19	285	4.75	0.7	0.137	0.485	0.116	0.020	0.12
20	300	5.00	0.8	0.156	0.478	0.133	0.023	0.13
21	315	5.25	0.6	0.117	0.472	0.100	0.018	0.10
22	330	5.50	0.7	0.137	0.466	0.116	0.020	0.12
23	345	5.75	0.8	0.156	0.460	0.133	0.023	0.13
24	360	6.00	0.8	0.156	0.454	0.133	0.023	0.13
25	375	6.25	0.9	0.176	0.448	0.149	0.026	0.15
26	390	6.50	0.9	0.176	0.442	0.149	0.026	0.15
27	405	6.75	1.0	0.195	0.436	0.166	0.029	0.17
28	420	7.00	1.0	0.195	0.430	0.166	0.029	0.17
29	435	7.25	1.0	0.195	0.424	0.166	0.029	0.17
30	450	7.50	1.1	0.215	0.418	0.183	0.032	0.18
31	465	7.75	1.2	0.234	0.413	0.199	0.035	0.20
32	480	8.00	1.3	0.254	0.407	0.216	0.038	0.22
33	495	8.25	1.5	0.293	0.401	0.249	0.044	0.25
34	510	8.50	1.5	0.293	0.396	0.249	0.044	0.25
35	525	8.75	1.6	0.312	0.390	0.265	0.047	0.27
36	540	9.00	1.7	0.332	0.385	0.282	0.050	0.28
37	555	9.25	1.9	0.371	0.379	0.315	0.056	0.32
38	570	9.50	2.0	0.390	0.374	0.332	0.017	0.09
39	585	9.75	2.1	0.410	0.369	0.348	0.041	0.24
40	600	10.00	2.2	0.429	0.363	0.365	0.066	0.38
41	615	10.25	1.5	0.293	0.358	0.249	0.044	0.25
42	630	10.50	1.5	0.293	0.353	0.249	0.044	0.25
43	645	10.75	2.0	0.390	0.348	0.332	0.043	0.24
44	660	11.00	2.0	0.390	0.343	0.332	0.048	0.27
45	675	11.25	1.9	0.371	0.338	0.315	0.033	0.19
46	690	11.50	1.9	0.371	0.333	0.315	0.038	0.22
47	705	11.75	1.7	0.332	0.328	0.282	0.004	0.02
48	720	12.00	1.8	0.351	0.323	0.299	0.029	0.16
49	735	12.25	2.5	0.488	0.318	0.415	0.170	0.97
50	750	12.50	2.6	0.508	0.313	0.431	0.194	1.10
51	765	12.75	2.8	0.547	0.308	0.465	0.238	1.35
52	780	13.00	2.9	0.566	0.304	0.481	0.262	1.49
53	795	13.25	3.4	0.664	0.299	0.564	0.364	2.07
54	810	13.50	3.4	0.664	0.295	0.564	0.369	**2.09**
55	825	13.75	2.3	0.449	0.290	0.382	0.159	0.90
56	840	14.00	2.3	0.449	0.286	0.382	0.163	0.93
57	855	14.25	2.7	0.527	0.281	0.448	0.246	1.39
58	870	14.50	2.6	0.508	0.277	0.431	0.230	1.31
59	885	14.75	2.6	0.508	0.273	0.431	0.235	1.33
60	900	15.00	2.5	0.488	0.269	0.415	0.219	1.24
61	915	15.25	2.4	0.468	0.265	0.398	0.204	1.16

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD SHORTCUT METHOD DEVELOPED CONDITION 24-HOUR STORM	PROJECT: ving Desert - Crossroads Phase Job No.: 2244 DATE: BY: RRR 6/23/23

UNIT HYDROGRAPH and EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	5.63	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.3423
LAG TIME - MINUTES	1.09	MINIMUM LOSS RATE (for var. loss) - in/hr	0.171
UNIT TIME-PERCENT OF LAG	1373.0	LOW LOSS RATE - DECIMAL	0.85
TOTAL ADJUSTED STORM RAIN-INCHES	4.88	C	0.00317

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs
	Minutes	Hours	(Plate E-5.9)		Max	Low		
62	930	15.50	2.3	0.449	0.261	0.382	0.188	1.07
63	945	15.75	1.9	0.371	0.257	0.315	0.114	0.65
64	960	16.00	1.9	0.371	0.253	0.315	0.118	0.67
65	975	16.25	0.4	0.078	0.249	0.066	0.012	0.07
66	990	16.50	0.4	0.078	0.245	0.066	0.012	0.07
67	1005	16.75	0.3	0.059	0.241	0.050	0.009	0.05
68	1020	17.00	0.3	0.059	0.238	0.050	0.009	0.05
69	1035	17.25	0.5	0.098	0.234	0.083	0.015	0.08
70	1050	17.50	0.5	0.098	0.231	0.083	0.015	0.08
71	1065	17.75	0.5	0.098	0.227	0.083	0.015	0.08
72	1080	18.00	0.4	0.078	0.224	0.066	0.012	0.07
73	1095	18.25	0.4	0.078	0.220	0.066	0.012	0.07
74	1110	18.50	0.4	0.078	0.217	0.066	0.012	0.07
75	1125	18.75	0.3	0.059	0.214	0.050	0.009	0.05
76	1140	19.00	0.2	0.039	0.211	0.033	0.006	0.03
77	1155	19.25	0.3	0.059	0.208	0.050	0.009	0.05
78	1170	19.50	0.4	0.078	0.205	0.066	0.012	0.07
79	1185	19.75	0.3	0.059	0.202	0.050	0.009	0.05
80	1200	20.00	0.2	0.039	0.200	0.033	0.006	0.03
81	1215	20.25	0.3	0.059	0.197	0.050	0.009	0.05
82	1230	20.50	0.3	0.059	0.194	0.050	0.009	0.05
83	1245	20.75	0.3	0.059	0.192	0.050	0.009	0.05
84	1260	21.00	0.2	0.039	0.190	0.033	0.006	0.03
85	1275	21.25	0.3	0.059	0.187	0.050	0.009	0.05
86	1290	21.50	0.2	0.039	0.185	0.033	0.006	0.03
87	1305	21.75	0.3	0.059	0.183	0.050	0.009	0.05
88	1320	22.00	0.2	0.039	0.181	0.033	0.006	0.03
89	1335	22.25	0.3	0.059	0.180	0.050	0.009	0.05
90	1350	22.50	0.2	0.039	0.178	0.033	0.006	0.03
91	1365	22.75	0.2	0.039	0.176	0.033	0.006	0.03
92	1380	23.00	0.2	0.039	0.175	0.033	0.006	0.03
93	1395	23.25	0.2	0.039	0.174	0.033	0.006	0.03
94	1410	23.50	0.2	0.039	0.173	0.033	0.006	0.03
95	1425	23.75	0.2	0.039	0.172	0.033	0.006	0.03
96	1440	24.00	0.2	0.039	0.171	0.033	0.006	0.03

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.25
FLOOD VOLUME (acft)	0.59
FLOOD VOLUME (cuft)	25,564
PEAK FLOW (cfs)	2.09

RCFC & WCD
HYDROLOGY MANUAL

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	504.8
TOTAL ADJUSTED STORM RAIN-INCHES	1.98

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 1 HOUR STORM

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time Minutes	Hours	Effective Rain in/hr	Flood Hydrograph Flow cfs	Volume In cu-ft	Basin Volume cu-ft	Basin Losses Percolation Area sf	Basin Losses Maximum Percolation cu-ft	Basin Losses Percolation Out cu-ft	Total in Basin cu-ft	Total in Basin ac-ft	Basin WSEL ft	Basin Outflow Volume Out cu-ft	Basin Outflow Flow Out cfs
1	5	0.08	0.51	2.91	874	874	724	10	10	864	0.02	360.72	0	0.00
2	10	0.17	0.66	3.72	1,117	1,980	848	12	12	1,969	0.05	362.13	0	0.00
3	15	0.25	0.70	3.99	1,198	3,166	954	13	13	3,153	0.07	363.44	0	0.00
4	20	0.33	0.75	4.26	1,278	3,688	997	14	14	3,675	0.08	**363.99**	743	2.48
5	25	0.42	0.85	4.80	1,440	3,688	997	14	14	3,675	0.08	**363.99**	1,426	4.75
6	30	0.50	0.99	5.61	1,683	3,688	997	14	14	3,675	0.08	**363.99**	1,669	5.56
7	35	0.58	1.18	6.69	2,007	3,688	997	14	14	3,675	0.08	**363.99**	1,993	6.64
8	40	0.67	1.58	8.98	2,695	3,688	997	14	14	3,675	0.08	**363.99**	2,681	8.94
9	45	0.75	2.77	15.73	4,718	3,688	997	14	14	3,675	0.08	**363.99**	4,704	15.68
10	50	0.83	7.85	44.59	13,378	3,688	997	14	14	3,675	0.08	**363.99**	13,364	44.55
11	55	0.92	1.25	7.09	2,128	3,688	997	14	14	3,675	0.08	**363.99**	2,114	7.05
12	60	1.00	0.56	3.18	955	3,688	997	14	14	3,675	0.08	**363.99**	941	3.14

BASIN WORKSHEET SUMMARY

EFFECTIVE RAIN	1.64 in
FLOOD VOLUME	0.77 acft
	33,470 cuft
TOTAL VOLUME RETAINED	3,834 cuft
MAX WSEL	363.99 ft
PEAK FLOW RATE	44.59 cfs
AVERAGE PERCOLATION RATE	2.66 cf/min
TOTAL OUTFLOW	29,635 cuft
	98.78 cfs
MAXIMUM OUTFLOW	13,364 cuft
	44.55 cfs

RCFC & WCD
HYDROLOGY MANUAL

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	504.8
TOTAL ADJUSTED STORM RAIN-INCHES	2.59

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 3 HOUR STORM

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time Minutes	Hours	Effective Rain in/hr	Flood Hydrograph Flow cfs	Volume In cu-ft	Basin Volume cu-ft	Basin Losses Percolation Area sf	Basin Losses Maximum Percolation cu-ft	Basin Losses Percolation Out cu-ft	Total in Basin cu-ft	Total in Basin ac-ft	Basin WSEL ft	Basin Outflow Volume Out cu-ft	Basin Outflow Flow Out cfs
1	5	0.08	0.06	0.4	105	105	286	4	4	101	0.00	359.28	0	0.00
2	10	0.17	0.06	0.4	105	206	429	6	6	200	0.00	359.55	0	0.00
3	15	0.25	0.05	0.3	87	288	544	8	8	280	0.01	359.77	0	0.00
4	20	0.33	0.12	0.7	211	491	668	9	9	482	0.01	360.17	0	0.00
5	25	0.42	0.12	0.7	211	693	697	10	10	683	0.02	360.46	0	0.00
6	30	0.50	0.22	1.2	370	1,053	750	10	10	1,043	0.02	360.97	0	0.00
7	35	0.58	0.12	0.7	211	1,254	772	11	11	1,243	0.03	361.23	0	0.00
8	40	0.67	0.22	1.2	370	1,613	810	11	11	1,602	0.04	361.68	0	0.00
9	45	0.75	0.22	1.2	370	1,971	847	12	12	1,960	0.04	362.12	0	0.00
10	50	0.83	0.12	0.7	211	2,171	866	12	12	2,159	0.05	362.35	0	0.00
11	55	0.92	0.15	0.9	264	2,423	889	12	12	2,410	0.06	362.63	0	0.00
12	60	1.00	0.22	1.2	370	2,780	922	13	13	2,767	0.06	363.04	0	0.00
13	65	1.08	0.34	1.9	582	3,349	969	13	13	3,335	0.08	363.63	0	0.00
14	70	1.17	0.34	1.9	582	3,688	997	14	14	3,675	0.08	**363.99**	228	0.76
15	75	1.25	0.34	1.9	582	3,688	997	14	14	3,675	0.08	**363.99**	568	1.89
16	80	1.33	0.28	1.6	476	3,688	997	14	14	3,675	0.08	**363.99**	462	1.54
17	85	1.42	0.47	2.6	793	3,688	997	14	14	3,675	0.08	**363.99**	779	2.60
18	90	1.50	0.50	2.8	846	3,688	997	14	14	3,675	0.08	**363.99**	832	2.77
19	95	1.58	0.40	2.3	687	3,688	997	14	14	3,675	0.08	**363.99**	674	2.25
20	100	1.67	0.50	2.8	846	3,688	997	14	14	3,675	0.08	**363.99**	832	2.77
21	105	1.75	0.68	3.9	1,164	3,688	997	14	14	3,675	0.08	**363.99**	1,150	3.83
22	110	1.83	0.62	3.5	1,058	3,688	997	14	14	3,675	0.08	**363.99**	1,044	3.48
23	115	1.92	0.56	3.2	952	3,688	997	14	14	3,675	0.08	**363.99**	938	3.13
24	120	2.00	0.59	3.4	1,005	3,688	997	14	14	3,675	0.08	**363.99**	991	3.30
25	125	2.08	0.62	3.5	1,058	3,688	997	14	14	3,675	0.08	**363.99**	1,044	3.48
26	130	2.17	0.96	5.5	1,640	3,688	997	14	14	3,675	0.08	**363.99**	1,626	5.42
27	135	2.25	1.21	6.9	2,064	3,688	997	14	14	3,675	0.08	**363.99**	2,050	6.83
28	140	2.33	0.75	4.2	1,270	3,688	997	14	14	3,675	0.08	**363.99**	1,256	4.19
29	145	2.42	1.77	10.1	3,016	3,688	997	14	14	3,675	0.08	**363.99**	3,003	10.01
30	150	2.50	1.93	10.9	3,281	3,688	997	14	14	3,675	0.08	**363.99**	3,267	10.89
31	155	2.58	2.21	12.5	3,757	3,688	997	14	14	3,675	0.08	**363.99**	3,744	12.48
32	160	2.67	1.49	8.5	2,540	3,688	997	14	14	3,675	0.08	**363.99**	2,526	8.42
33	165	2.75	0.28	1.6	476	3,688	997	14	14	3,675	0.08	**363.99**	462	1.54
34	170	2.83	0.22	1.2	370	3,688	997	14	14	3,675	0.08	**363.99**	356	1.19
35	175	2.92	0.22	1.2	370	3,688	997	14	14	3,675	0.08	**363.99**	356	1.19
36	180	3.00	0.03	0.2	48	3,688	997	14	14	3,675	0.08	**363.99**	34	0.11

BASIN WORKSHEET SUMMARY

EFFECTIVE RAIN	1.58 in
FLOOD VOLUME	0.74 acft
	32,347 cuft
TOTAL VOLUME RETAINED	4,124 cuft
MAX WSEL	363.99 ft
PEAK FLOW RATE	12.52 cfs
AVERAGE PERCOLATION RATE	2.50 cf/min
TOTAL BASIN OUTFLOW	28,222 cuft
	94.07 cfs
MAXIMUM BASIN OUTFLOW	3,744 cuft
	12.48 cfs

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITION BASIN STAGE STORAGE - 6 HOUR STORM

PROJECT: Living Desert - Crossroads Pha

6/23/23

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	504.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16

BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
1	5	0.08	0.03	0.16	48	48	206	3	3	46	0.00	359.13	0	0.00
2	10	0.17	0.03	0.19	58	104	284	4	4	100	0.00	359.28	0	0.00
3	15	0.25	0.03	0.19	58	158	361	5	5	153	0.00	359.42	0	0.00
4	20	0.33	0.03	0.19	58	211	436	6	6	205	0.00	359.57	0	0.00
5	25	0.42	0.03	0.19	58	263	509	7	7	256	0.01	359.71	0	0.00
6	30	0.50	0.04	0.23	68	324	595	8	8	316	0.01	359.87	0	0.00
7	35	0.58	0.04	0.23	68	383	652	9	9	374	0.01	360.02	0	0.00
8	40	0.67	0.04	0.23	68	442	661	9	9	433	0.01	360.10	0	0.00
9	45	0.75	0.04	0.23	68	501	669	9	9	491	0.01	360.18	0	0.00
10	50	0.83	0.04	0.23	68	559	678	9	9	550	0.01	360.27	0	0.00
11	55	0.92	0.04	0.23	68	618	686	10	10	608	0.01	360.35	0	0.00
12	60	1.00	0.05	0.26	77	686	696	10	10	676	0.02	360.45	0	0.00
13	65	1.08	0.05	0.26	77	753	706	10	10	744	0.02	360.55	0	0.00
14	70	1.17	0.05	0.26	77	821	716	10	10	811	0.02	360.64	0	0.00
15	75	1.25	0.05	0.26	77	889	726	10	10	879	0.02	360.74	0	0.00
16	80	1.33	0.05	0.26	77	956	736	10	10	946	0.02	360.83	0	0.00
17	85	1.42	0.05	0.26	77	1,023	745	10	10	1,013	0.02	360.93	0	0.00
18	90	1.50	0.05	0.26	77	1,091	754	10	10	1,080	0.02	361.02	0	0.00
19	95	1.58	0.05	0.26	77	1,158	761	11	11	1,147	0.03	361.11	0	0.00

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD
SHORTCUT METHOD
DEVELOPED CONDITION BASIN STAGE STORAGE - 6 HOUR STORM

PROJECT: Living Desert - Crossroads Pha

6/23/23

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	504.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16

BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
20	100	1.67	0.05	0.26	77	1,224	768	11	11	1,214	0.03	361.19	0	0.00
21	105	1.75	0.05	0.26	77	1,291	776	11	11	1,281	0.03	361.28	0	0.00
22	110	1.83	0.05	0.26	77	1,358	783	11	11	1,347	0.03	361.36	0	0.00
23	115	1.92	0.05	0.26	77	1,425	790	11	11	1,414	0.03	361.44	0	0.00
24	120	2.00	0.05	0.29	87	1,501	798	11	11	1,490	0.03	361.54	0	0.00
25	125	2.08	0.05	0.26	77	1,567	805	11	11	1,556	0.04	361.62	0	0.00
26	130	2.17	0.05	0.29	87	1,643	813	11	11	1,632	0.04	361.72	0	0.00
27	135	2.25	0.05	0.29	87	1,719	821	11	11	1,708	0.04	361.81	0	0.00
28	140	2.33	0.05	0.29	87	1,795	830	12	12	1,783	0.04	361.91	0	0.00
29	145	2.42	0.05	0.29	87	1,871	837	12	12	1,859	0.04	362.00	0	0.00
30	150	2.50	0.05	0.29	87	1,946	845	12	12	1,934	0.04	362.09	0	0.00
31	155	2.58	0.05	0.29	87	2,022	852	12	12	2,010	0.05	362.18	0	0.00
32	160	2.67	0.05	0.29	87	2,097	859	12	12	2,085	0.05	362.26	0	0.00
33	165	2.75	0.04	0.21	63	2,148	863	12	12	2,136	0.05	362.32	0	0.00
34	170	2.83	0.04	0.21	63	2,199	868	12	12	2,187	0.05	362.38	0	0.00
35	175	2.92	0.04	0.21	63	2,250	873	12	12	2,237	0.05	362.44	0	0.00
36	180	3.00	0.04	0.21	63	2,300	878	12	12	2,288	0.05	362.49	0	0.00
37	185	3.08	0.04	0.21	63	2,351	882	12	12	2,339	0.05	362.55	0	0.00
38	190	3.17	0.07	0.42	127	2,466	893	12	12	2,454	0.06	362.68	0	0.00
39	195	3.25	0.07	0.42	127	2,581	904	13	13	2,569	0.06	362.81	0	0.00
40	200	3.33	0.07	0.42	127	2,696	915	13	13	2,683	0.06	362.95	0	0.00
41	205	3.42	0.11	0.64	192	2,875	930	13	13	2,862	0.07	363.14	0	0.00
42	210	3.50	0.15	0.86	257	3,119	950	13	13	3,106	0.07	363.39	0	0.00
43	215	3.58	0.19	1.07	321	3,427	975	14	14	3,413	0.08	363.71	0	0.00
44	220	3.67	0.19	1.07	321	3,688	997	14	14	3,675	0.08	**363.99**	46	0.15
45	225	3.75	0.23	1.29	386	3,688	997	14	14	3,675	0.08	**363.99**	372	1.24
46	230	3.83	0.23	1.29	386	3,688	997	14	14	3,675	0.08	**363.99**	372	1.24
47	235	3.92	0.26	1.50	450	3,688	997	14	14	3,675	0.08	**363.99**	436	1.45
48	240	4.00	0.26	1.50	450	3,688	997	14	14	3,675	0.08	**363.99**	436	1.45
49	245	4.08	0.30	1.72	515	3,688	997	14	14	3,675	0.08	**363.99**	501	1.67
50	250	4.17	0.34	1.93	580	3,688	997	14	14	3,675	0.08	**363.99**	566	1.89
51	255	4.25	0.38	2.15	644	3,688	997	14	14	3,675	0.08	**363.99**	630	2.10
52	260	4.33	0.42	2.36	709	3,688	997	14	14	3,675	0.08	**363.99**	695	2.32
53	265	4.42	0.45	2.58	773	3,688	997	14	14	3,675	0.08	**363.99**	759	2.53
54	270	4.50	0.45	2.58	773	3,688	997	14	14	3,675	0.08	**363.99**	759	2.53

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD
SHORTCUT METHOD
DEVELOPED CONDITION BASIN STAGE STORAGE - 6 HOUR STORM

PROJECT: Living Desert - Crossroads Pha

6/23/23

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	504.8
TOTAL ADJUSTED STORM RAIN-INCHES	3.16

BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
55	275	4.58	0.49	2.79	838	3,688	997	14	14	3,675	0.08	**363.99**	824	2.75
56	280	4.67	0.53	3.01	902	3,688	997	14	14	3,675	0.08	**363.99**	889	2.96
57	285	4.75	0.57	3.22	967	3,688	997	14	14	3,675	0.08	**363.99**	953	3.18
58	290	4.83	0.57	3.22	967	3,688	997	14	14	3,675	0.08	**363.99**	953	3.18
59	295	4.92	0.61	3.44	1,032	3,688	997	14	14	3,675	0.08	**363.99**	1,018	3.39
60	300	5.00	0.64	3.65	1,096	3,688	997	14	14	3,675	0.08	**363.99**	1,082	3.61
61	305	5.08	0.83	4.73	1,419	3,688	997	14	14	3,675	0.08	**363.99**	1,405	4.68
62	310	5.17	1.02	5.81	1,742	3,688	997	14	14	3,675	0.08	**363.99**	1,728	5.76
63	315	5.25	1.14	6.45	1,936	3,688	997	14	14	3,675	0.08	**363.99**	1,922	6.41
64	320	5.33	1.25	7.10	2,129	3,688	997	14	14	3,675	0.08	**363.99**	2,116	7.05
65	325	5.42	1.44	8.17	2,452	3,688	997	14	14	3,675	0.08	**363.99**	2,439	8.13
66	330	5.50	1.78	10.11	3,034	3,688	997	14	14	3,675	0.08	**363.99**	3,020	10.07
67	335	5.58	0.38	2.15	644	3,688	997	14	14	3,675	0.08	**363.99**	630	2.10
68	340	5.67	0.05	0.29	87	3,688	997	14	14	3,675	0.08	**363.99**	73	0.24
69	345	5.75	0.03	0.19	58	3,688	997	14	14	3,675	0.08	**363.99**	44	0.15
70	350	5.83	0.03	0.16	48	3,688	997	14	14	3,675	0.08	**363.99**	35	0.12
71	355	5.92	0.02	0.10	29	3,688	997	14	14	3,675	0.08	**363.99**	15	0.05
72	360	6.00	0.01	0.06	19	3,688	997	14	14	3,675	0.08	**363.99**	6	0.02

BASIN WORKSHEET SUMMARY

EFFECTIVE RAIN	1.43 in
FLOOD VOLUME	0.67 acft
	29,198 cuft
TOTAL VOLUME RETAINED	4,473 cuft
MAX WSEL	363.99 ft
PEAK FLOW RATE	10.11 cfs
AVERAGE PERCOLATION RATE	2.35 cf/min
TOTAL OUTFLOW	24,725 cuft
	82.42 cfs
MAXIMUM OUTFLOW	3,020 cuft
	10.07 cfs

RCFC & WCD
HYDROLOGY MANUAL

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	15
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	1514.3
TOTAL ADJUSTED STORM RAIN-INCHES	4.88

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 24 HOUR STORM

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
1	15	0.25	0.006	0.0	30	30	180	8	8	22	0.00	359.06	0	0.00
2	30	0.50	0.009	0.0	45	67	233	10	10	58	0.00	359.16	0	0.00
3	45	0.75	0.009	0.0	45	102	283	12	12	91	0.00	359.25	0	0.00
4	60	1.00	0.012	0.1	60	151	350	15	15	136	0.00	359.38	0	0.00
5	75	1.25	0.009	0.0	45	181	393	16	16	164	0.00	359.45	0	0.00
6	90	1.50	0.009	0.0	45	209	433	18	18	191	0.00	359.53	0	0.00
7	105	1.75	0.009	0.0	45	236	471	20	20	216	0.00	359.60	0	0.00
8	120	2.00	0.012	0.1	60	276	528	22	22	254	0.01	359.70	0	0.00
9	135	2.25	0.012	0.1	60	314	581	24	24	290	0.01	359.80	0	0.00
10	150	2.50	0.012	0.1	60	350	632	26	26	323	0.01	359.89	0	0.00
11	165	2.75	0.015	0.1	75	398	654	27	27	371	0.01	360.01	0	0.00
12	180	3.00	0.015	0.1	75	446	661	28	28	418	0.01	360.08	0	0.00
13	195	3.25	0.015	0.1	75	493	668	28	28	465	0.01	360.15	0	0.00
14	210	3.50	0.015	0.1	75	540	675	28	28	512	0.01	360.21	0	0.00
15	225	3.75	0.015	0.1	75	587	682	28	28	558	0.01	360.28	0	0.00
16	240	4.00	0.018	0.1	90	648	691	29	29	619	0.01	360.37	0	0.00
17	255	4.25	0.018	0.1	90	709	700	29	29	680	0.02	360.45	0	0.00
18	270	4.50	0.020	0.1	105	785	711	30	30	755	0.02	360.56	0	0.00
19	285	4.75	0.020	0.1	105	860	722	30	30	830	0.02	360.67	0	0.00
20	300	5.00	0.023	0.1	120	949	735	31	31	919	0.02	360.80	0	0.00
21	315	5.25	0.018	0.1	90	1,008	743	31	31	977	0.02	360.88	0	0.00
22	330	5.50	0.020	0.1	105	1,082	753	31	31	1,051	0.02	360.98	0	0.00
23	345	5.75	0.023	0.1	120	1,171	763	32	32	1,139	0.03	361.10	0	0.00
24	360	6.00	0.023	0.1	120	1,258	772	32	32	1,226	0.03	361.21	0	0.00
25	375	6.25	0.026	0.1	135	1,361	783	33	33	1,328	0.03	361.34	0	0.00
26	390	6.50	0.026	0.1	135	1,463	794	33	33	1,430	0.03	361.46	0	0.00
27	405	6.75	0.029	0.2	150	1,579	807	34	34	1,546	0.04	361.61	0	0.00
28	420	7.00	0.029	0.2	150	1,695	819	34	34	1,661	0.04	361.76	0	0.00
29	435	7.25	0.029	0.2	150	1,811	831	35	35	1,776	0.04	361.90	0	0.00
30	450	7.50	0.032	0.2	165	1,941	844	35	35	1,906	0.04	362.06	0	0.00
31	465	7.75	0.035	0.2	180	2,085	858	36	36	2,049	0.05	362.22	0	0.00
32	480	8.00	0.038	0.2	194	2,244	872	36	36	2,208	0.05	362.40	0	0.00
33	495	8.25	0.044	0.2	224	2,432	890	37	37	2,395	0.05	362.62	0	0.00
34	510	8.50	0.044	0.2	224	2,619	908	38	38	2,581	0.06	362.83	0	0.00
35	525	8.75	0.047	0.3	239	2,821	925	39	39	2,782	0.06	363.05	0	0.00
36	540	9.00	0.050	0.3	254	3,037	943	39	39	2,997	0.07	363.28	0	0.00
37	555	9.25	0.056	0.3	284	3,281	963	40	40	3,241	0.07	363.53	0	0.00
38	570	9.50	0.017	0.1	85	3,326	967	40	40	3,286	0.08	363.58	0	0.00
39	585	9.75	0.041	0.2	212	3,497	981	41	41	3,456	0.08	363.76	0	0.00
40	600	10.00	0.066	0.4	338	3,688	997	42	42	3,647	0.08	**363.96**	106	0.12
41	615	10.25	0.044	0.2	224	3,688	997	42	42	3,647	0.08	**363.96**	183	0.20
42	630	10.50	0.044	0.2	224	3,688	997	42	42	3,647	0.08	**363.96**	183	0.20
43	645	10.75	0.043	0.2	218	3,688	997	42	42	3,647	0.08	**363.96**	177	0.20
44	660	11.00	0.048	0.3	244	3,688	997	42	42	3,647	0.08	**363.96**	203	0.23
45	675	11.25	0.033	0.2	170	3,688	997	42	42	3,647	0.08	**363.96**	129	0.14

RCFC & WCD
HYDROLOGY MANUAL

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	15
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	1514.3
TOTAL ADJUSTED STORM RAIN-INCHES	4.88

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 24 HOUR STORM

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
46	690	11.50	0.038	0.2	196	3,688	997	42	42	3,647	0.08	**363.96**	154	0.17
47	705	11.75	0.004	0.0	22	3,669	995	41	41	3,627	0.08	363.94	0	0.00
48	720	12.00	0.029	0.2	146	3,688	997	42	42	3,647	0.08	**363.96**	85	0.09
49	735	12.25	0.170	1.0	869	3,688	997	42	42	3,647	0.08	**363.96**	827	0.92
50	750	12.50	0.194	1.1	993	3,688	997	42	42	3,647	0.08	**363.96**	951	1.06
51	765	12.75	0.238	1.4	1,217	3,688	997	42	42	3,647	0.08	**363.96**	1,175	1.31
52	780	13.00	0.262	1.5	1,340	3,688	997	42	42	3,647	0.08	**363.96**	1,298	1.44
53	795	13.25	0.364	2.1	1,862	3,688	997	42	42	3,647	0.08	**363.96**	1,821	2.02
54	810	13.50	0.369	2.1	1,885	3,688	997	42	42	3,647	0.08	**363.96**	1,844	2.05
55	825	13.75	0.159	0.9	811	3,688	997	42	42	3,647	0.08	**363.96**	770	0.86
56	840	14.00	0.163	0.9	834	3,688	997	42	42	3,647	0.08	**363.96**	792	0.88
57	855	14.25	0.246	1.4	1,255	3,688	997	42	42	3,647	0.08	**363.96**	1,213	1.35
58	870	14.50	0.230	1.3	1,177	3,688	997	42	42	3,647	0.08	**363.96**	1,136	1.26
59	885	14.75	0.235	1.3	1,199	3,688	997	42	42	3,647	0.08	**363.96**	1,157	1.29
60	900	15.00	0.219	1.2	1,120	3,688	997	42	42	3,647	0.08	**363.96**	1,079	1.20
61	915	15.25	0.204	1.2	1,042	3,688	997	42	42	3,647	0.08	**363.96**	1,000	1.11
62	930	15.50	0.188	1.1	963	3,688	997	42	42	3,647	0.08	**363.96**	921	1.02
63	945	15.75	0.114	0.6	584	3,688	997	42	42	3,647	0.08	**363.96**	542	0.60
64	960	16.00	0.118	0.7	604	3,688	997	42	42	3,647	0.08	**363.96**	563	0.63
65	975	16.25	0.012	0.1	60	3,688	997	42	42	3,647	0.08	**363.96**	18	0.02
66	990	16.50	0.012	0.1	60	3,688	997	42	42	3,647	0.08	**363.96**	18	0.02
67	1005	16.75	0.009	0.0	45	3,688	997	42	42	3,647	0.08	**363.96**	3	0.00
68	1020	17.00	0.009	0.0	45	3,688	997	42	42	3,647	0.08	**363.96**	3	0.00
69	1035	17.25	0.015	0.1	75	3,688	997	42	42	3,647	0.08	**363.96**	33	0.04
70	1050	17.50	0.015	0.1	75	3,688	997	42	42	3,647	0.08	**363.96**	33	0.04
71	1065	17.75	0.015	0.1	75	3,688	997	42	42	3,647	0.08	**363.96**	33	0.04
72	1080	18.00	0.012	0.1	60	3,688	997	42	42	3,647	0.08	**363.96**	18	0.02
73	1095	18.25	0.012	0.1	60	3,688	997	42	42	3,647	0.08	**363.96**	18	0.02
74	1110	18.50	0.012	0.1	60	3,688	997	42	42	3,647	0.08	**363.96**	18	0.02
75	1125	18.75	0.009	0.0	45	3,688	997	42	42	3,647	0.08	**363.96**	3	0.00
76	1140	19.00	0.006	0.0	30	3,677	996	42	42	3,635	0.08	363.94	0	0.00
77	1155	19.25	0.009	0.0	45	3,680	996	42	42	3,639	0.08	363.95	0	0.00
78	1170	19.50	0.012	0.1	60	3,688	997	42	42	3,647	0.08	**363.96**	10	0.01
79	1185	19.75	0.009	0.0	45	3,688	997	42	42	3,647	0.08	**363.96**	3	0.00
80	1200	20.00	0.006	0.0	30	3,677	996	42	42	3,635	0.08	363.94	0	0.00
81	1215	20.25	0.009	0.0	45	3,680	996	42	42	3,639	0.08	363.95	0	0.00
82	1230	20.50	0.009	0.0	45	3,684	997	42	42	3,642	0.08	363.95	0	0.00
83	1245	20.75	0.009	0.0	45	3,687	997	42	42	3,645	0.08	363.96	0	0.00
84	1260	21.00	0.006	0.0	30	3,675	996	41	41	3,634	0.08	363.94	0	0.00
85	1275	21.25	0.009	0.0	45	3,679	996	42	42	3,637	0.08	363.95	0	0.00
86	1290	21.50	0.006	0.0	30	3,667	995	41	41	3,626	0.08	363.93	0	0.00
87	1305	21.75	0.009	0.0	45	3,671	996	41	41	3,629	0.08	363.94	0	0.00
88	1320	22.00	0.006	0.0	30	3,659	995	41	41	3,618	0.08	363.93	0	0.00
89	1335	22.25	0.009	0.0	45	3,662	995	41	41	3,621	0.08	363.93	0	0.00
90	1350	22.50	0.006	0.0	30	3,651	994	41	41	3,609	0.08	363.92	0	0.00

RCFC & WCD
HYDROLOGY MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD

SHORTCUT METHOD

DEVELOPED CONDITIONS BASIN STAGE STORAGE - 24 HOUR STORM

DRAINAGE AREA-ACRES	5.63
UNIT TIME-MINUTES	15
LAG TIME - MINUTES	0.99
UNIT TIME-PERCENT OF LAG	1514.3
TOTAL ADJUSTED STORM RAIN-INCHES	4.88

PROJECT:	ving Desert - Crossroads Phase
DRAINAGE AREA	Drainage Area A
CONCENTRATION POINT	Retention Basin
BASIN PERCOLATION RATE	2.0 in/hr
DRYWELLS	
NUMBER	0
DRYWELL PERCOLATION RATE	0.00 cfs

Unit Time Period	Time		Effective Rain	Flood Hydrograph Flow	Volume In	Basin Volume	Basin Losses			Total in Basin		Basin WSEL	Basin Outflow	
	Minutes	Hours					Percolation Area	Maximum Percolation	Percolation Out				Volume Out	Flow Out
			in/hr	cfs	cu-ft	cu-ft	sf	cu-ft	cu-ft	cu-ft	ac-ft	ft	cu-ft	cfs
91	1365	22.75	0.006	0.0	30	3,639	993	41	41	3,598	0.08	363.91	0	0.00
92	1380	23.00	0.006	0.0	30	3,628	992	41	41	3,587	0.08	363.89	0	0.00
93	1395	23.25	0.006	0.0	30	3,617	991	41	41	3,575	0.08	363.88	0	0.00
94	1410	23.50	0.006	0.0	30	3,605	990	41	41	3,564	0.08	363.87	0	0.00
95	1425	23.75	0.006	0.0	30	3,594	989	41	41	3,553	0.08	363.86	0	0.00
96	1440	24.00	0.006	0.0	30	3,583	988	41	41	3,541	0.08	363.85	0	0.00

BASIN WORKSHEET SUMMARY

EFFECTIVE RAIN	1.25 in
FLOOD VOLUME	0.59 acft
	25,564 cuft
TOTAL VOLUME RETAINED	7,040 cuft
MAX WSEL	363.96 ft
PEAK FLOW RATE	2.09 cfs
AVERAGE PERCOLATION RATE	2.43 cf/min
TOTAL OUTFLOW	18,524 cuft
	20.58 cfs
MAXIMUM OUTFLOW	1,844 cuft
	2.05 cfs

BASIN VOLUME WORKSHEET

PROECT Living Desert - Crossroads Phase 3
JOB No. 2244

BASIN CHARACTERISTICS

CONTOUR ELEVATION	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	TOTAL (acre-ft)
359	0	0		138	0	0	0.00
360	1	1	511	649	362	362	0.01
361	1	2	102	751	699	1,061	0.02
362	1	3	85	836	793	1,855	0.04
363	1	4	82	918	877	2,731	0.06
364	1	5	79	997	957	3,688	0.08

WHERE: $$V = \frac{1}{3}(E_1 - E_2)\left(A_1 + A_2 + \sqrt{A_1 A_2}\right)$$

Appendix F
Existing Conditions Exhibit

BIGHORN CAFE (PHASE 2.75)

HEAT STORAGE BUILDING (PH. 2.75)

EXISTING MODEL TRAINS EXHIBIT

GAZELLE/ HORNBILL HABITAT

ORYX HABITAT

EXISTING PALM GARDEN

EXISTING ADMIN BLDG.

EXISTING TICKETING/ GIFT SHOP BUILDING

EXISTING KEEPER CENTER

MB 74/5-56

CITY OF INDIAN WELLS
CITY OF PALM DESERT

29
32
28
33

MH

E/W

LEGEND

- EXISTING & PROPOSED BUILDINGS/HARDSCAPE
- PROPOSED STORMWATER BUILDINGS/HARDSCAPE
- FLOW ARROW
- TRIBUTARY DRAINAGE AREAS

NORTH

0' 30' 60' 90' 120'

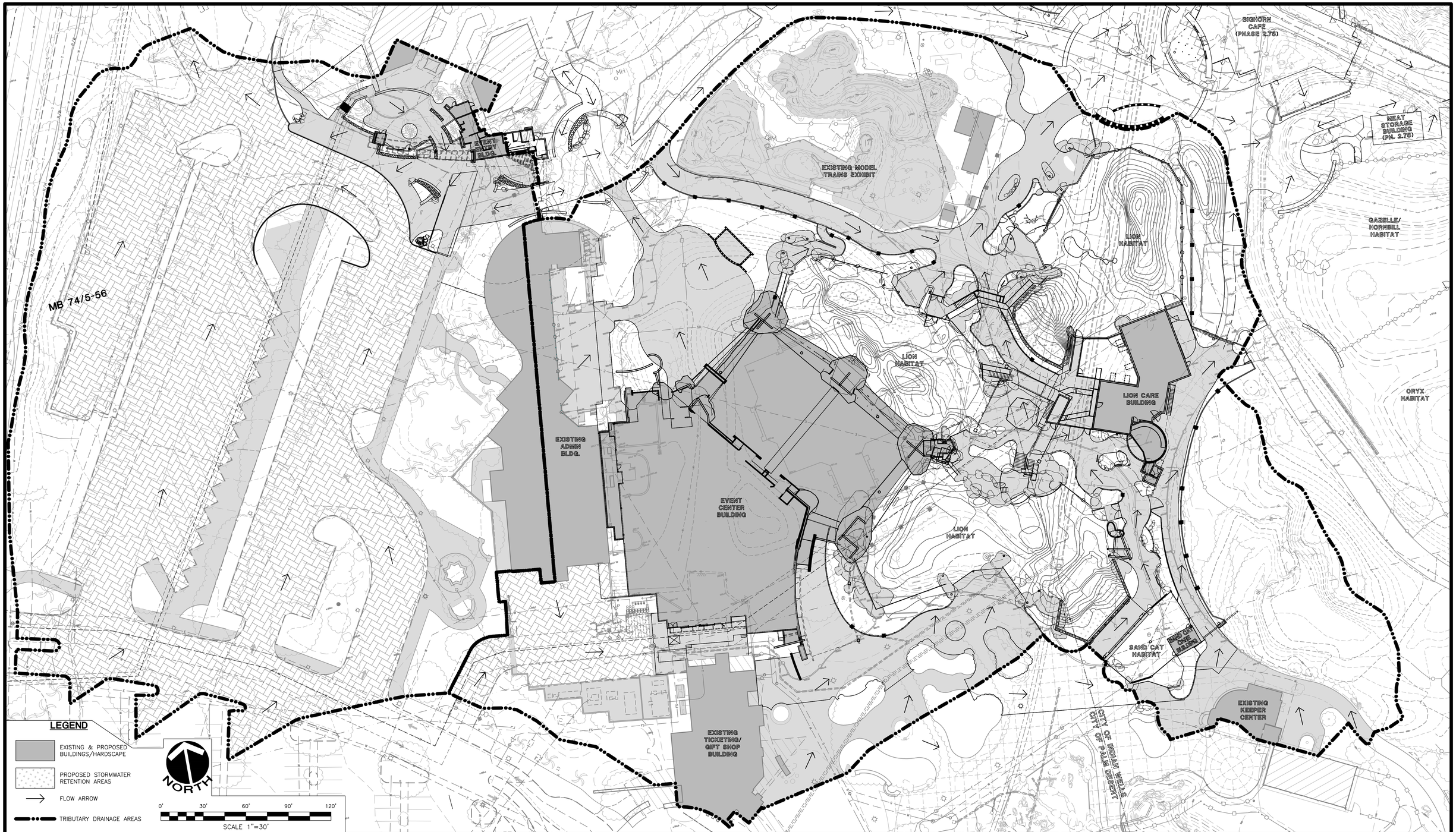
SCALE 1"=30'

THE LIVING DESERT
CROSSROADS OF CONSERVATION PHASE 3
PRELIMINARY DRAINAGE EXHIBIT

JUNE 23, 2023

MSA CONSULTING, INC.
Civil Engineering • Land Surveying • Landscape Architecture
Planning • Environmental Services • Dry Utility Coordination • GIS
34200 Bob Hope Drive Rancho Mirage, CA 92270 | 760.320.9811 | MSAConsultinginc.com

Appendix G
Hydrology Exhibit



DRAINAGE AREA A

STORM EVENT SUMMARY (PROPOSED CONDITION)

DURATION		1–HOUR		3–HOUR		6–HOUR		24–HOUR	
		EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
EFFECTIVE RAIN	(in)	1.43	1.44	1.08	1.12	1.00	1.03	0.71	0.75
FLOOD VOLUME	(cu–ft)	18,948	18,837	14,373	14,588	13,320	13,485	9,468	9,772
	(acre–ft)	0.43	0.43	0.33	0.33	0.31	0.31	0.22	0.22
INCREMENTAL INCREASE	(cu–ft)		–111		215		165		304
	(acre–ft)		0.00		0.00		0.00		0.01
PEAK FLOW	(cfs)		N/A		7.30		5.75		0.73

THE LIVING DESERT
CROSSROADS OF CONSERVATION PHASE 3
PRELIMINARY DRAINAGE EXHIBIT

DRAINAGE AREA B

STORM EVENT SUMMARY (PROPOSED CONDITION)

DURATION		1–HOUR		3–HOUR		6–HOUR		24–HOUR	
		EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
EFFECTIVE RAIN	(in)	1.53	1.64	1.30	1.58	1.20	1.43	0.95	1.25
FLOOD VOLUME	(cu–ft)	31,337	33,470	26,656	32,347	24,556	29,246	19,483	25,564
	(acre–ft)	0.72	0.77	0.61	0.74	0.56	0.67	0.45	0.59
INCREMENTAL INCREASE	(cu–ft)		2,132		5,690		4,690		6,081
	(acre–ft)		0.05		0.13		0.11		0.14
PEAK FLOW	(cfs)		N/A		12.52		10.11		2.09

JUNE 23, 2023

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