PRELIMINARY HYDROLOGY REPORT

FOR

Jefferson Square Residential

LOCATED AT

SWC of Jefferson Street and Fred Waring Drive
La Quinta, CA

Prepared for

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DRC Project No. 21-177

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SECTION I Introduction

This preliminary hydrology report has been prepared for the addition / renovation to the existing 10.5-acre (13.0 tributary acres) Jefferson Square retail center located west of Jefferson Street and south of Fred Waring Drive in the City of La Quinta, County of Riverside. The project location is shown on the attached Vicinity Map. The proposed site drainage pattern substantially conforms to the condition described in the original approved *Final Hydrology and Hydraulic Study* prepared for the Jefferson Square retail center dated August 29, 2008 by Development Resource Consultants, Inc.

SECTION II Methodology

For both the existing and proposed conditions, the peak storm discharge for the drainage areas were calculated using the Riverside County Hydrology Manual. The Rational Method Equation (1978 April), using AES Software (Ratscx), was used to calculate the 10-year and 100-year storm events. The rational method analysis was completed to preliminarily size the on-site storm drain system to convey the 100-year storm event runoff.

The site is situated within hydrologic soil group "A" as identified in the Hydrology Manual. The Synthetic Unit Hydrograph Short-Cut Method was used in the original hydrology study to determine the required storage volume of the fully-developed site for the 1-hour, 3-hour, 6-hour and 24-hour duration events for the 100-year return frequency. The (now existing) retention basins were then designed for the 100-year storm event as required by the City and are capable of percolating the entire 100-year storm retention volume in less than 72 hours.

SECTION III Project Discussion

The project site will disturb approximately 3.5 acres of the existing 10.5 acres Jefferson Square retail center. The proposed addition / renovation consists of construction of a new 3-story apartment complex occupying 61,144 square feet and two condominium buildings occupying 41,430 square feet. Construction activities include construction of new buildings, parking lot pavement, ribbon gutter, driveways, walkways, landscaping planters, and related utilities.

Existing Conditions

The site is currently in use as a retail center with a CVS/Pharmacy store and various other smaller shops. A vacant building that was the former Fresh and Easy store is also located on the site. The remainder of the site is improved with parking lots and two graded pads. The Esplanade community is located to the north. To the south of the site is the Monticello community and Monticello Park is located directly to the west. East of the site is a shopping center, which is within the City of Indio. In the original hydrology study, the site was broken down into three distinct drainage watersheds with some individual subareas.

Watershed "A" collects runoff from the existing front parking lot, two out-parcel buildings and Jefferson Street and Fred Waring Drive. The runoff is collected by the existing drain inlets onsite and the existing catch basins in the streets. Storm drain pipes then discharge into an existing underground retention and infiltration basin (**Basin "A"**) located south of Pad A and west of Jefferson Street. Approximately 6.84 acres is tributary to Watershed A in the existing condition.

Watershed "B" collects the runoff from the existing major building roofs, the rear drive aisle along the west edge, and the commercially graded pad. The runoff is collected by surface flowlines and existing drain inlets onsite that discharge into an existing open retention basin (**Basin "B")** located on the west edge of the property behind the former Fresh & Easy store. Approximately 3.70 acres is tributary to Watershed B in the existing condition.

Watershed "C" collects runoff from along the south boundary of the Site and from street runoff. The runoff is collected by the existing drain inlets onsite and the existing catch basin in the street. Storm drain pipes then discharge into an existing open retention basin (**Basin "C")** located at the southeast corner of the site. Approximately 2.45 acres is tributary to Watershed C in the existing condition.

Watershed	**Area (AC.)**	**Q_{10} (CFS)**	**Q_{100} (CFS)**	**Retention Basin Volume Required (CF)**	**Retention Basin Volume Provided (CF)**
A	6.84	19.9	34.2	52,933	53,012
B	3.70	12.2	21.0	27,010	28,031
C	2.45	7.8	13.2	17,834	18,937
Total:	**12.99**	**39.9**	**68.4**	**97,777**	**99,980**

The above table summarizes the data and results for the 10-year and 100-year storm events based on the previous approved hydrology study for the Jefferson Square retail center and describes the required and provided volume of the existing retention basins that will remain. Selected pages of the previously approved *Final Hydrology and Hydraulic Report* can be found in **Appendix B** of this report to support the existing condition narrative.

Proposed Conditions

The proposed development will be consistent with the previously approved hydrology report prepared for the Jefferson Square retail center. The total disturbed area is approximately 3.4 acres of the site. Tributary areas to each watershed will be designed in such a way that substantially matches the existing condition. The proposed residential characteristics and increased pervious area of the proposed development offset the effects of the reduced time of concentration due to adjustments in the subarea delineation and the ultimate result is discharge values close to or below existing conditions.

Watershed "A" matches the existing condition with the addition of a proposed condominium building in a portion of the existing parking field. The runoff is collected by both existing and proposed drain inlets onsite and the existing catch basins in the streets. Storm drain pipes then discharge into an existing underground retention and infiltration basin (**Basin "A"**) located south of Pad A and west of Jefferson Street. Approximately 6.84 acres is tributary to Watershed A in the proposed condition.

Watershed "B" matches the existing condition with the addition of a proposed apartment complex on the existing commercial pad and associated parking area. The runoff is collected by surface flowlines and both existing and proposed drain inlets onsite that discharge into an existing open retention basin (**Basin "B")** located on the west edge of the property behind the former Fresh & Easy store. Approximately 3.68 acres is tributary to Watershed B in the proposed condition.

Watershed "C" matches the existing condition with the addition of a proposed condominium building on the existing commercial pad. The runoff is collected by the existing drain inlets onsite and the existing catch basin in the street. Storm drain pipes then discharge into an existing open retention basin (**Basin "C")** located at the southeast corner of the site. Approximately 2.47 acres is tributary to Watershed C in the existing condition.

Watershed	**Area (AC.)**	**Q_{10} (CFS)**	**Q_{100} (CFS)**	**Retention Basin Volume Required (CF)**	**Retention Basin Volume Provided (CF)**
A	6.84	19.9	34.1	52,933	53,012
B	3.66	12.3	21.2	27,010	28,031
C	2.49	6.8	12.1	17,834	18,937
Total:	**12.99**	**39.0**	**67.4**	**97,777**	**99,980**

The above table summarizes the data and results for the 10-year and 100-year storm event due to the proposed development. Runoff flow rates from the proposed additional / innovation to the previously approved Jefferson Square retail development are essentially the same and reduce the peak flow by approximately 1.5%. Supporting calculations can be found in **Appendix D** of this report.

Based on the previous approved hydrology report, percolation testing was performed on the project site by Krazan & Associates, Inc. dated July 8, 2008. Krazan & Associates have reviewed the project site and provided an updated letter dated September 21, 2022 confirming that the original results of the study remain in effect. The updated letter is included in **Appendix C**. The worst-case percolation rate was determined to be 5.1 inch/hour. A conservative percolation rate of 2 inches per hour was used to determine the draw-down time. One drywell in each subarea was also used to percolate deep storage runoff to subsurface soils. The calculations in the original study show that each basin would infiltrate the stored volume in less than 72 hours. Refer to **Appendix B & C** for the supporting calculations and percolation test results from the original study.

On-Site Retention Basin Emergency Outlet

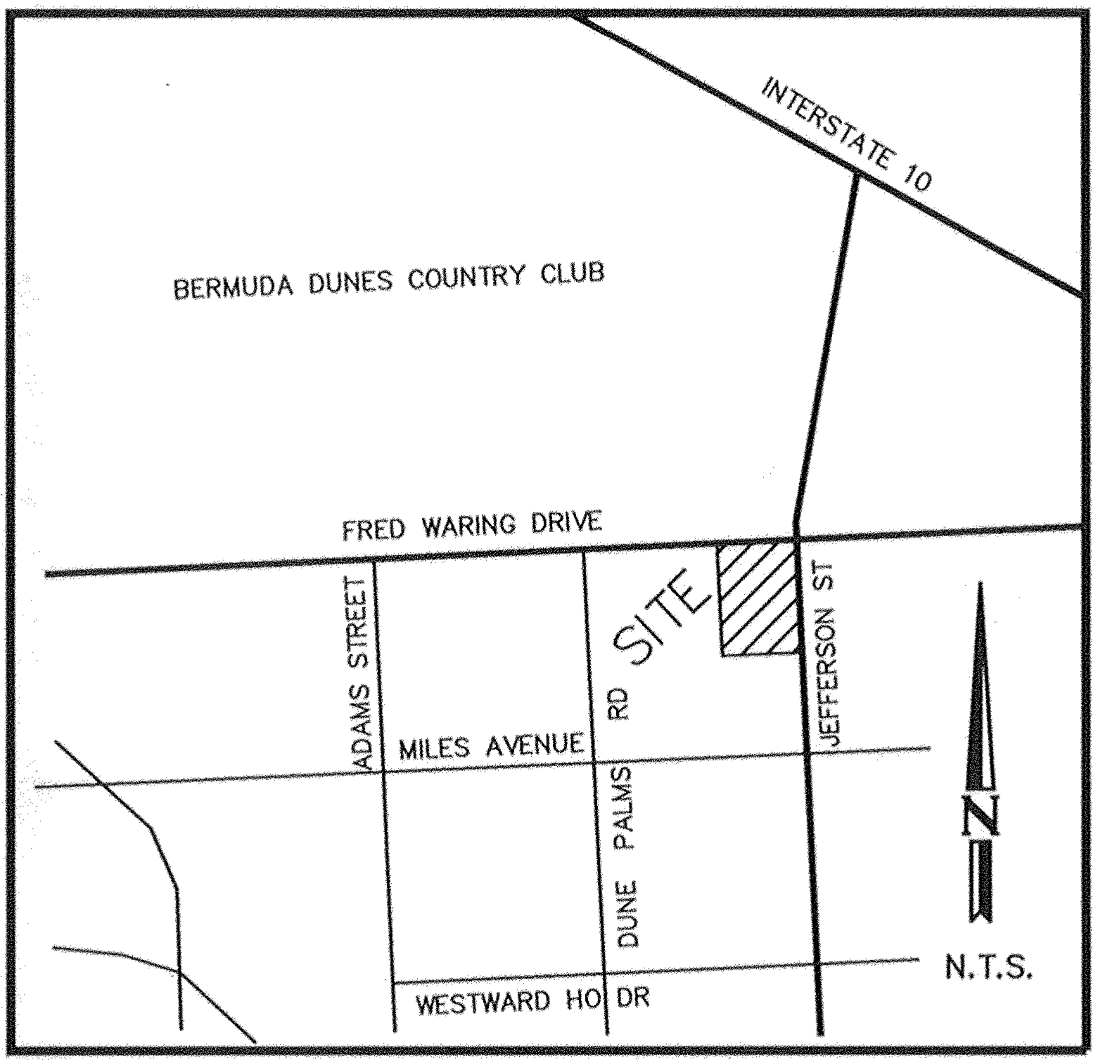
The emergency overflow outlet paths for each drainage basin constructed as part of Jefferson Square retail center will remain in place and undisturbed. Basin “A” outlets to the existing 14’ catch basin at the SWC of Jefferson St. and Fred Waring Dr and to the public infrastructure without damaging the onsite buildings. Basin “B” outlets through the lowest tributary inlet located on the north side of the basin and sheet flows to Fred Waring Drive to public infrastructure. Basin “C” outlets to the catch basin south of the southernmost driveway along Jefferson Street and to public infrastructure. Therefore, all the building structures on-site will be protected. See **Appendix B** for a diagram illustrating the emergency overflow route as part of Jefferson Square retail center drainage design.

Conclusion

In conclusion, the proposed development will conform with current City of La Quinta drainage design requirements and to the previously approved hydrology report for the Jefferson Square retail center and will provide adequate protection for the proposed on-site improvements and structures without introducing adverse effects on the neighboring developments.

Technical Appendix A

Vicinity Map



VICINITY MAP

NOT TO SCALE

Technical Appendix B

Selected Reference Pages from the Final Hydrology & Hydraulic Report For Jefferson Square Retail Center

FINAL
HYDROLOGY & HYDRAULIC STUDY

FOR

JEFFERSON SQUARE
SWC JEFFERSON ST. & FRED WARING DR.
LA QUINTA, CALIFORNIA

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I. INTRODUCTION/SUMMARY

JEFFERSON SQUARE
SWC JEFFERSON ST. & FRED WARING DR.
LA QUINTA, CA

Project Description

This report contains the hydrology and hydraulic calculations for a proposed 10.5 acre Commercial Project located west of Jefferson Street and south of Fred Waring Drive in the City of La Quinta, County of Riverside. The project location is shown on the attached Vicinity Map.

Existing Drainage Condition

The site is currently vacant and barren with little vegetative cover. Presently, stormwater runoff sheet flows easterly to Jefferson Street. Approx. 4.5 acres of the Site continues in a southerly direction to a 28 ft catch basin located at approx. 500 ft south of Independent Way (**Drainage Area "E1"**). The runoff is then conveyed to an open-air retention basin near Independent Way thru a 36" RCP. Approx. 6.0 acres of the Site and approx. 0.3 acres of the street drain to the SWC of Jefferson Street and Fred Waring Drive (**Drainage Area "E2"**). According to recorded plans, runoff from Fred Waring Dr. half street drains southerly to Monticello Ave. via curb & gutter. There is no existing cross gutter at the intersection of Fred Waring Dr. & Monticello Ave. If the curb & gutter is overloaded, a high point at the southeast corner of the intersection which allow the runoff to continue draining southerly on the other side of Monticello Ave. Runoff east of the intersection which consist of approx. 1.0 acre of the Fred Waring Drive half street drains easterly towards Jefferson Street (**Drainage Area "E3"**). Runoff from both Drainage Areas E2 & E3 are conveyed to an temporary open retention basin through two parkway drains. Refer to the "Existing Hydrology Map" for a map of the existing drainage pattern (back sleeve).

The results of the Existing Drainage Condition for the 10-Year and 100-Year Storm Events are summarized as follows:

Drainage Area	Area (AC.)	Q_{10} (CFS)	Q_{100} (CFS)
E1	5.3	5.0	10.8
E2	6.7	6.2	13.5
E3	1.0	3.0	5.2
Total:	**13.0**	**14.2**	**29.5**

Proposed Drainage Condition

The Proposed Commercial Development will consist of the construction of paved parking areas and drive aisles, landscaped areas and buildings. The site will be approx. 90% impervious due to building roofs, asphalt paving and sidewalks. In the proposed condition, the site can be broken down into three distinct drainage watersheds, each with individual subareas. **Watershed "A"** collects runoff from the front parking lot, two out-parcel buildings, and Jefferson Street & Fred Waring Drive. The runoff will be picked up by drain inlets and the existing catch basins in the streets. The storm drain pipes will then discharge into a proposed underground retention and infiltration basin (**Basin "A"**) at the southeast corner of the Site. **Watershed "B"** collects all the runoff from the major building roofs and the rear drive aisle to the west. The runoff will be picked up by drain inlets and storm drain pipe that will discharge into a proposed below-grade open retention basin (**Basin "B"**) located along the west boundary. **Watershed "C"** collects runoff from approx. 1.9 acres along the south boundary of the Site and approx. 0.5 acres of Street Runoff. The runoff will sheet flow to a proposed below-grade open retention basin (**Basin "C"**) located along the south boundary. Refer to the "Proposed Hydrology Map" for a map of the proposed drainage areas and basins (back sleeve).

The results of the Proposed Drainage Condition for the 10-Year and 100-Year Storm Events are summarized as follows:

Watershed	**Area (AC.)**	**Q_{10} (CFS)**	**Q_{100} (CFS)**
A	6.8	19.9	34.2
B	3.7	12.2	21.0
C	2.5	7.8	13.2
Total:	**13.0**	**39.9**	**68.4**

Hydrologic Criteria

This study will be the basis for the design of the drainage systems within the proposed Commercial Development. The Hydrology Study for this project was performed in accordance with the current Riverside County Hydrology Manual, published in 1978. Peak storm flows were determined using the computer engineering software program developed by Advanced Engineering Software (AES), 2003 version, based on the Rational Method of Hydrology and Synthetic Unit Hydrograph. The program uses a nodal system to define stream routing (in street, pipe or natural stream) and subarea characteristics, (i.e. acres, land use and soil type). Peak flow rates for 10-year and 100-year storm events are included in this report. Synthetic Unit Hydrograph Short-Cut Method will be used to determine the required storage volume of the fully-developed site for the 1-hour, 3-hour, 6-hour, and 24-hour duration events for the 100-year return frequency. Retention basins are design for the 100-year storm event and capable of percolating the entire 100-year storm retention capacity in less than 72 hours.

Results

As a result of the Rational Method calculations, the existing undeveloped condition for the site and adjacent streets produces 29.5 CFS of runoff during the 100-year event. In the proposed developed condition, the site produces 68.4 CFS of runoff during the 100-year storm event (A difference of 38.9 CFS from the Existing Drainage Condition). The entire 100-year storm runoff volume will be captured on-site and percolated to the subsurface soils, as discussed earlier.

On-Site Retention Basin

Basin "A"

For the purpose of sizing the basin, we determined the total storage volume required by calculating the storm volume of the Proposed Condition Unit Hydrograph for 100-year storm event, 3-hour frequency (the worst-case scenario). The total amount of runoff that needs to be stored is 52,933 CF or 1.2 acre-feet. For this Report, we are assuming the use of a combination underground storage system consisting of five barrels of 96" CMP, 79 feet long, 2 – 52 feet long headers for storage only , one 41' deep Maxwell drywell, and 5'-0" deep single storm trap units for infiltration and storage chamber. The chamber will be accessible by two manholes and has sufficient height for a person to enter and perform maintenance procedures. The total storage volume for the combination underground system is 53,000 CF or 101% of the required storage volume.

The bottom of the 5'-0" deep storm trap units will of native granular material and will be used for infiltration of runoff into the ground soils. The subsurface soils are silty sands and no significant clayey soils were observed based on the borings taken at the job site. A percolation test performed on the project site. The worst-cast percolation rate is 4.2 inch/hour. A conservative percolation rate of 2 inches per hour is being used to determine the draw down time. One drywell is also used to percolate deep storage runoff to subsurface. The calculations show that the basin would infiltrate the stored volume in 46 hours (≤ 72 hours, therefore O.K.). Refer to Section XIII for the supporting calculations and percolation test results.

Basin "B"

For the purpose of sizing the basin, we determined the total storage volume required by calculating the storm volume of the Proposed Condition Unit Hydrograph for 100-year storm event, 3-hour frequency (worst-case scenario). The total amount of runoff that needs to be stored is 27,010 CF or 0.6 acre-feet. For this report, we are assuming the use of below-grade open basin, 3:1 side slopes, 4.2 feet deep and 189 ft x 20 ft bottom. The total storage volume for the open basin is 28,031 CF or 104% of the required storage volume.

The subsurface soils are silty sands and no significant clayey soils were observed based on the borings taken at the job site. A percolation test performed on the project site. The worst-cast percolation rate is 5.1 inch/hour. A conservative percolation rate of 2 inches per hour is being used to determine the draw down time. One drywell is also used to percolate deep storage runoff to subsurface. The calculations show that the basin would infiltrate the stored volume in 19 hours (≤ 72 hours, therefore O.K.). Refer to Section XIII for the supporting calculations and percolation test results.

Basin "C"

For the purpose of sizing the basin, we determined the total storage volume required by calculating the storm volume of the Proposed Condition Unit Hydrograph for 100-year storm event, 3-hour frequency (worst-case scenario). The total amount of runoff that needs to be stored is 17,834 CF or 0.41 acre-feet. For this report, we are assuming the use of below-grade open basin, 3:1 side slopes, 4.1 feet deep and 76 feet x 34 feet bottom. The total storage volume for the open basin is 18,937 CF or 106% of the required storage volume.

The subsurface soils are silty sands and no significant clayey soils were observed based on the borings taken at the job site. A percolation test performed on the project site. The worst-cast percolation rate is 6.5 inch/hour. A conservative percolation rate of 2 inches per hour is being used to determine the draw down time. One drywell is also used to percolate deep storage runoff to subsurface. The calculations show that the basin would infiltrate the stored volume in 17 hours (≤ 72 hours, therefore O.K.). Refer to Section XIII for the supporting calculations and percolation test results.

Storm Drain Improvements

The proposed storm drain system is composed of Storm Drain Line 'A', 'B', 'C', 'D' & 'E' along with numerous on-site catch basins, grate inlets and laterals. Refer to the "Hydraulic Map" for a map storm drain layout and inlet locations. Hydraulics calculations were performed using Los Angeles County Water Surface Profile Gradient (WSPG). As shown on the pipe hydraulic calculation, line 'A', 'B', 'C', 'D' & 'E' has the capacity to meet or exceed the runoff generated from the 100-year storm event. Catch basins and grate inlets are sized to collect the runoff generated from 100-year storm event. Catch Basin sizing and depth of flow calculations were using L.A. County, Design manual, 1972, Plate 2.6-0651. Grate inlet calculations were performed using the Caltrans Highway Drainage Design Equation 4-6.

On-Site Retention Emergency Outlet

Basin "A": At a storage volume exceeding 52,993 CF, discharge will begin to outlet to the proposed 14' catch basin at the SWC of Jefferson St. & Fred Waring Dr. The runoff then will spill over to the other side of Fred Waring Dr. Therefore, all the building structures on-site will be protected. See Section X for a diagram illustrate the emergency overflow route.

Basin "B": At a storage volume exceeding 27,010 CF, discharge will begin spill out at the drain inlet (low point) in front of Shop A. The runoff will then sheet flow to Fred Waring Drive. Therefore, all the building structures on-site will be protected. See Section X for a diagram illustrate the emergency overflow route.

Basin "C": At a storage volume exceeding 17,834 CF, discharge will begin to outlet at the catch basin by the south driveway along Jefferson Street. The runoff then will continue south to an existing 28' catch basin near Independent Way. Therefore, all the building structures on-site will be protected. See Section XIII for supporting calculations and diagram.

Conclusion

In conclusion, the proposed development will not adversely affect the existing drainage pattern in the area and will provide adequate protection for the proposed on-site improvements and structures.

V. PROPOSED CONDITION RATIONAL METHOD CALCULATIONS

PROPOSED HYDROLOGY CALCULATIONS

FOR

JEFFERSON SQUARE
LA QUINTA, CALIFORNIA

HYDROLOGY SUMMARY

DRAINAGE AREA	AREA (AC.)	Q_{10} (CFS)	Q_{100} (CFS)
A1	1.58	4.87	8.31
A2	2.57	7.60	13.02
A3	2.69	7.44	12.84
TOTAL:	6.84	19.90	34.16
B1	1.38	4.83	8.23
B2	2.32	7.40	12.76
TOTAL:	3.70	12.23	20.98
C	2.45	7.76	13.23
TOTAL SITE:	12.99	39.89	68.37
		3.07 CFS/AC.	5.26 CFS/AC.

PROPOSED CONDITION

10-YEAR

```
****************************************************************************
         RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
      RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                 (RCFC&WCD) 1978 HYDROLOGY MANUAL
       (c) Copyright 1982-2006 Advanced Engineering Software (aes)
                 (Rational Tabling Version 6.0D)
             Release Date: 06/01/2005  License ID 1510

                      Analysis prepared by:

                 Development Resource Consultants
                       8175 E. Kaiser Blvd
                     Anaheim Hills, CA  92808
                          (714) 685-6860

************************** DESCRIPTION OF STUDY ****************************
* C07-304 JEFFERSON SQUARE, LA QUINTA, CA                                  *
* PROPOSED CONDIDTION                                                      *
* 10-YEAR STORM EVENT                                                      *
 --------------------------------------------------------------------------
 --------------------------------------------------------------------------
  FILE NAME: 7304PRO.DAT
  TIME/DATE OF STUDY: 10:58 02/20/2008
 --------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 --------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.630
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  2.100
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   1.247
  SLOPE OF INTENSITY DURATION CURVE = 0.6000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:  CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
 NO.  (FT)     (FT)    SIDE / SIDE/ WAY   (FT)    (FT)  (FT)  (FT)    (n)
 ===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020  0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =   6.0 (FT*FT/S)
   *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
    OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A1                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
 --------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 ==========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    907.00
  UPSTREAM ELEVATION(FEET) =      55.70
  DOWNSTREAM ELEVATION(FEET) =      39.50
  ELEVATION DIFFERENCE(FEET) =      16.20
  TC = 0.303*[(  907.00**3)/(    16.20)]**.2 =   10.333
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.583
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8603
```

```
 SOIL CLASSIFICATION IS "A"
 SUBAREA RUNOFF(CFS) =      4.87
 TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      4.87
****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.68
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.87
 PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =  11.06
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1112.00 FEET.
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A2                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.439
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8593
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =    2.57   SUBAREA RUNOFF(CFS) =     7.60
 TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      12.47
 TC(MIN.) =  11.06
****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   445.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.47
 PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =  12.32
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1557.00 FEET.
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A3                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.224
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8579
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =     7.44
 TOTAL AREA(ACRES) =        6.8   TOTAL RUNOFF(CFS) =      19.90
 TC(MIN.) =  12.32
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA B1                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   420.00
 UPSTREAM ELEVATION(FEET) =     49.00
 DOWNSTREAM ELEVATION(FEET) =     44.50
 ELEVATION DIFFERENCE(FEET) =      4.50
 TC = 0.303*[(  420.00**3)/(     4.50)]**.2 =     8.412
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.054
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8630
 SOIL CLASSIFICATION IS "A"
 SUBAREA RUNOFF(CFS) =       4.83
 TOTAL AREA(ACRES) =       1.38   TOTAL RUNOFF(CFS) =       4.83
****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.67
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =        4.83
 PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =    9.77
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     800.00 FEET.
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA B2                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.706
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8610
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =     2.32   SUBAREA RUNOFF(CFS) =     7.40
 TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =      12.23
 TC(MIN.) =    9.77
+--------------------------------------------------------------------------+
| PROPOSED DRAINAGE AREA C                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   706.00
 UPSTREAM ELEVATION(FEET) =     48.50
 DOWNSTREAM ELEVATION(FEET) =     39.00
 ELEVATION DIFFERENCE(FEET) =      9.50
 TC = 0.303*[(  706.00**3)/(     9.50)]**.2 =     9.893
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.678
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8608
 SOIL CLASSIFICATION IS "A"
 SUBAREA RUNOFF(CFS) =       7.76
 TOTAL AREA(ACRES) =       2.45   TOTAL RUNOFF(CFS) =       7.76
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

PROPOSED CONDITION
100-YEAR

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                  (RCFC&WCD) 1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2006 Advanced Engineering Software (aes)
                  (Rational Tabling Version 6.0D)
              Release Date: 06/01/2005  License ID 1510

                        Analysis prepared by:

                  Development Resource Consultants
                         8175 E. Kaiser Blvd
                       Anaheim Hills, CA  92808
                           (714) 685-6860
************************** DESCRIPTION OF STUDY ***************************
* C07-304 JEFFERSON SQUARE, LA QUINTA, CA                                 *
* PROPOSED CONDIDTION                                                     *
* 100-YEAR STORM EVENT                                                    *
--------------------------------------------------------------------------
--------------------------------------------------------------------------
  FILE NAME: 7304PRO.DAT
  TIME/DATE OF STUDY: 10:58 02/20/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.630
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  2.100
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.100
  SLOPE OF INTENSITY DURATION CURVE = 0.6000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:  CURB  GUTTER-GEOMETRIES: MANNING
     WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT WIDTH  LIP   HIKE  FACTOR
 NO.  (FT)    (FT)     SIDE / SIDE/ WAY   (FT)   (FT)  (FT)  (FT)    (n)
 ===  =====  =========  ================= ====== ===== ====== ===== =======
  1   30.0    20.0    0.018/0.018/0.020  0.67   2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A1                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   907.00
  UPSTREAM ELEVATION(FEET) =      55.70
  DOWNSTREAM ELEVATION(FEET) =      39.50
  ELEVATION DIFFERENCE(FEET) =      16.20
  TC = 0.303*[(  907.00**3)/(    16.20)]**.2 =   10.333
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.033
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8712
  SOIL CLASSIFICATION IS "A"
```

```
  SUBAREA RUNOFF(CFS) =        8.31
  TOTAL AREA(ACRES) =        1.58   TOTAL RUNOFF(CFS) =        8.31
****************************************************************************
  FLOW PROCESS FROM NODE       2.00 TO NODE       3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    205.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        8.31
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =  10.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1112.00 FEET.
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A2                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
  FLOW PROCESS FROM NODE       3.00 TO NODE       3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.819
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8705
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =     2.57   SUBAREA RUNOFF(CFS) =   13.02
  TOTAL AREA(ACRES) =         4.2   TOTAL RUNOFF(CFS) =       21.32
  TC(MIN.) =  10.98
****************************************************************************
  FLOW PROCESS FROM NODE       3.00 TO NODE       4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    445.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.60
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       21.32
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =  12.10
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1557.00 FEET.
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A3                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
  FLOW PROCESS FROM NODE       4.00 TO NODE       4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.489
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8694
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =     2.69   SUBAREA RUNOFF(CFS) =   12.84
  TOTAL AREA(ACRES) =         6.8   TOTAL RUNOFF(CFS) =       34.16
  TC(MIN.) =  12.10
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA B1                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
  FLOW PROCESS FROM NODE      10.00 TO NODE      20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   420.00
  UPSTREAM ELEVATION(FEET) =     49.00
  DOWNSTREAM ELEVATION(FEET) =     44.50
  ELEVATION DIFFERENCE(FEET) =      4.50
  TC = 0.303*[(  420.00**3)/(      4.50)]**.2 =    8.412
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.826
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8736
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =       8.23
  TOTAL AREA(ACRES) =       1.38   TOTAL RUNOFF(CFS) =       8.23
****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    380.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =    5.31
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        8.23
  PIPE TRAVEL TIME(MIN.) =   1.19     Tc(MIN.) =   9.60
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     800.00 FEET.
+--------------------------------------------------------------------------+
| PROPOSED SUBAREA B2                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.304
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8721
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.32   SUBAREA RUNOFF(CFS) =   12.76
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =      20.98
  TC(MIN.) =    9.60
+--------------------------------------------------------------------------+
| PROPOSED DRAINAGE AREA C                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+
****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   706.00
  UPSTREAM ELEVATION(FEET) =     48.50
  DOWNSTREAM ELEVATION(FEET) =     39.00
  ELEVATION DIFFERENCE(FEET) =      9.50
  TC = 0.303*[(  706.00**3)/(      9.50)]**.2 =    9.893
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.193
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8717
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      13.23
  TOTAL AREA(ACRES) =       2.45   TOTAL RUNOFF(CFS) =      13.23
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

VIII. RETENTION BASIN DESIGN
BUOYANCE FORCE CALCULATIONS
CMP LIFE EXPECTANCY CALCULATIONS
PERCOLATION TEST RESULT REFERENC

BASIN 'A'

RETENTION BASIN SIZING (BASIN 'A')

JEFFERSON SQUARE, LA QUINTA, CA

USE DESIGN VOLUME: 52,993 CUBIC FEET

1. CON/SPAN LENGTH (INFILTRATION BASIN)

USE 5' DEEP SINGLE TRAP STANDARD STORMTRAP UNITS:

TOTAL VOLUME PROVIDED = 27,000 CF (SEE ATTACHED DETAIL BY MANUFACTURER)

2. DRYWELL

ONE MAXWELL PLUS DRYWELL, 41.3' DEEP, 34 FT BELOW WATER SURFACE AT 96" CMP STORAGE BASIN

STORAGE IN THE 6' DIA. SHAFT: VOLUME = 3.14 x (3 FT)^2 x 24' = 678 CF

STORAGE IN THE 4' DIA. SHAFT: VOLUME = 3.14 x (2 FT)^2 x 10' = 126 CF

TOTAL VOLUME = 678 SF + 138 SF = 804 SF

3. CMP PIPE

2- 5 LF 48" CMP, Volume = 10 x 3.14 x 2^2 = 126 CF

USE 96" CMP PIPE WITH TWO MANIFOLD:

REQUIRED STORAGE VOLUME = 52,993 CF - 27,000 CF - 804 CF - 126 CF =25,063 CUBIC FEET

TOTAL VOLUME PROVIDED = 25,082 CF (SEE ATTACHED EXCEL SHEET)

THEREFORE, FOOTPRINT = 95' x 52'

DRAW-DOWN TIME

TOTAL DEAD STORAGE VOLUME = 52,993 CUBIC FEET

AVG AREA = 4,648 SF, 1 DRYWELL PROPOSED

USE PERCOLATION RATE OF 2 INCH/HOUR AND 0.1 CFS PER DRYWELL:

TOTAL PERCOLATION = 4,648 SF x 1/12 x 2 INCH/HOUR x 1/ 3,600 + 1 DRYWELL x 0.1 CFS/DRYWELL
= 0.315 CFS

DRAW TIME = $\dfrac{\text{52,993 CUBIC FEET}}{\text{0.315 CFS* 3,600 S / 1 HOUR}}$

=46 HOURS (< 72 HOURS, THEREFORE, O.K.)

5'-0" DEEP STORMTRAP SYSTEM

BASIN 'A'

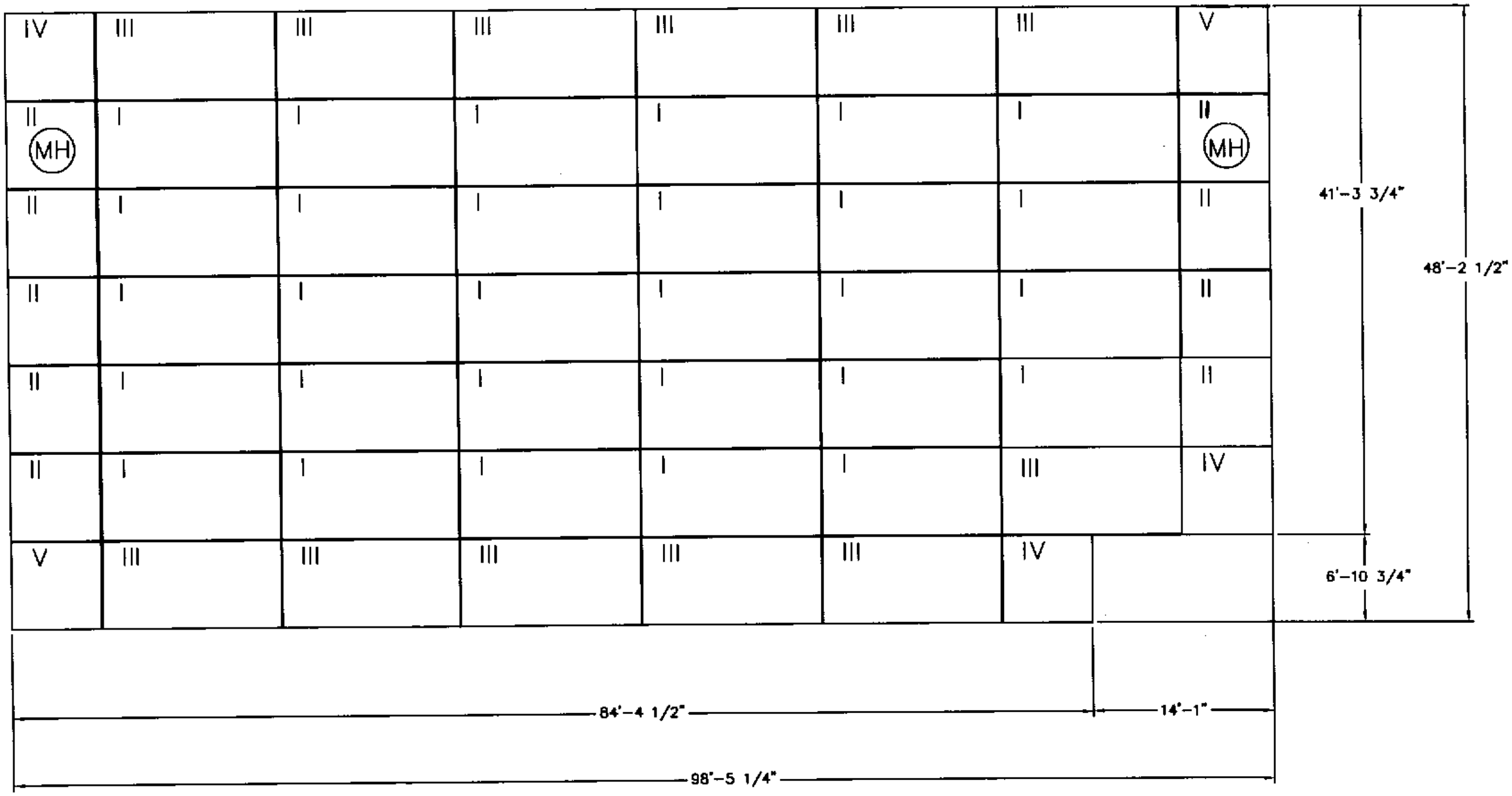
BILL OF MATERIALS

QTY.	PART NO.	DESCRIPTION
29	TYPE I	5'-0" SINGLETRAP TYPE I
9	TYPE II	5'-0" SINGLETRAP TYPE II
12	TYPE III	5'-0" SINGLETRAP TYPE III
3	TYPE IV	5'-0" SINGLETRAP TYPE IV
2	TYPE V	5'-0" SINGLETRAP TYPE V
23	JOINT TAPE	JOINT TAPE – 14.5' PER ROLL
9	JOINT WRAP	JOINT WRAP – 150' PER ROLL

TOTAL VOLUME STORAGED IN CHAMBERS = 21,253 CUBIC FEET

TOTAL VOLUME STORAGE IN STONE (40% VOID) = 5,747 CUBIC FEET

TOTAL VOLUME PROVIDED = 27,000 CUBIC FEET



BASIN 'A'

Footprint Calculator - Underground Detention Systems

Input in Yellow

[redacted] or

Req'd acre-ft **0.58** Req'd cu.ft **25063.00**

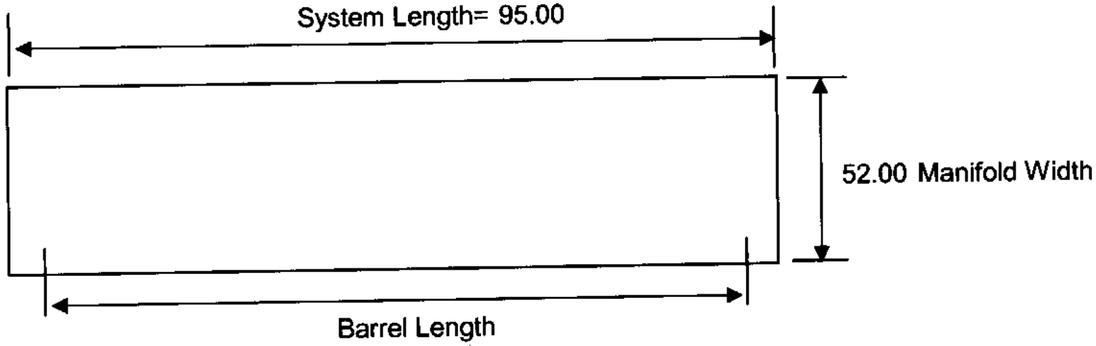
Target Volume 25063.00 *cu. ft.*

[redacted]

# of Barrels	**5**	
Shape or Dia.	**96**	*inches*
Volume/LF	50.27	*cu. ft.*
Enter Spacing	**3.00**	*ft.*
Manifold Width	52.00	*ft.*
# of Manifolds	**2.00**	
LF of Manifolds	104.00	*ft.*
Rq. Barrel Length	78.92	
Enter Valid Length	**79.00**	*ft*
Total Linear Feet	**499.00**	*LF*

[redacted] GOOD

25082.48 cu.ft.



Footprint Dimensions

Project ID	#6554
Sales Engineer	Jason Autry
Project Name	Wildwood Office Park
Project City	Roswell
Project State	Georgia
Customer Contact	

Notes:

CONTECH CONSTRUCTION PRODUCTS INC.
Engineering Services

Version 1.1

Sheet 1 of 1

Project: JEFFERSON SQUARE
By: Y.H.
Date: 5/28/08
Job No.: C07 - 304
Ckd:
Date:

DETERMINATION OF BUOYANCY FORCE ON BASIN

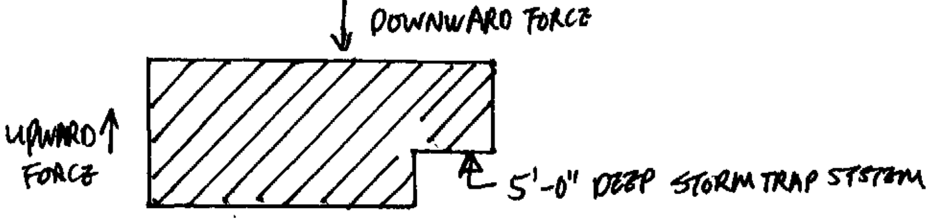
BASIN 'A':

- UNDERGROUND SYSTEM
  - 96" CMP STORAGE SYSTEM
  - 5'-0" DEEP STORMTRAP INFILTRATION SYSTEM
- ELEVATION DIFFERENCE BETWEEN THE TWO SYSTEMS = 3 FEET

A.) UPWARD BUOYANCY FORCE:

UPWARD BUOYANCY FORCE = 3' x 2.31' = 6.93 PSI = 998 #/CF

B). DOWNWARD FORCE ON STORMTRAP SYSTEM:



NOT TO SCALE

- COVER OVER THE STORMTRAP SYSTEM = 12 FT.
- SOIL DENSITY = 120 #/CF

DOWNWARD FORCE = 12 FT x 120 #/CF
= 1,440 #/CF

DOWNWARD FORCE > UPWARD FORCE

∴ O.K.

Sht 1 of 1

DRC Development Resource Consultants

Project: JEFFERSON SQUARE
Job No: C07-304
By: Y. H.
Ckd:
Date: 12-19-07
Date:

DETERMINATION OF CMP STORAGE BASIN SERVICE LIFE

- BASED ON THE GEOTECHNICAL ENGINEERING INVESTIGATION FOR THE PROJECT:

Resistivity = 12,500 ohms-cm
sulfate = Less than 5 mg/kg
chloride = 23.4 mg/kg
pH = 9.02

FROM CALTRANS METHOD FOR ESTIMATING THE SERVICE LIFE OF STEEL CULVERT CHART FOR ESTIMATING YEARS TO PERFORATION OF STEEL CULVERTS (SEE ATTACHED FIGURE):

FOR pH OF ENVIRONMENT NORMALLY GREATER THAN 7.3:

$YEARS = 1.47\ R^{0.41}$, which R = RESISTIVITY IN ohm-cm

$YEARS = (1.47)\times(12{,}500)^{0.41}$

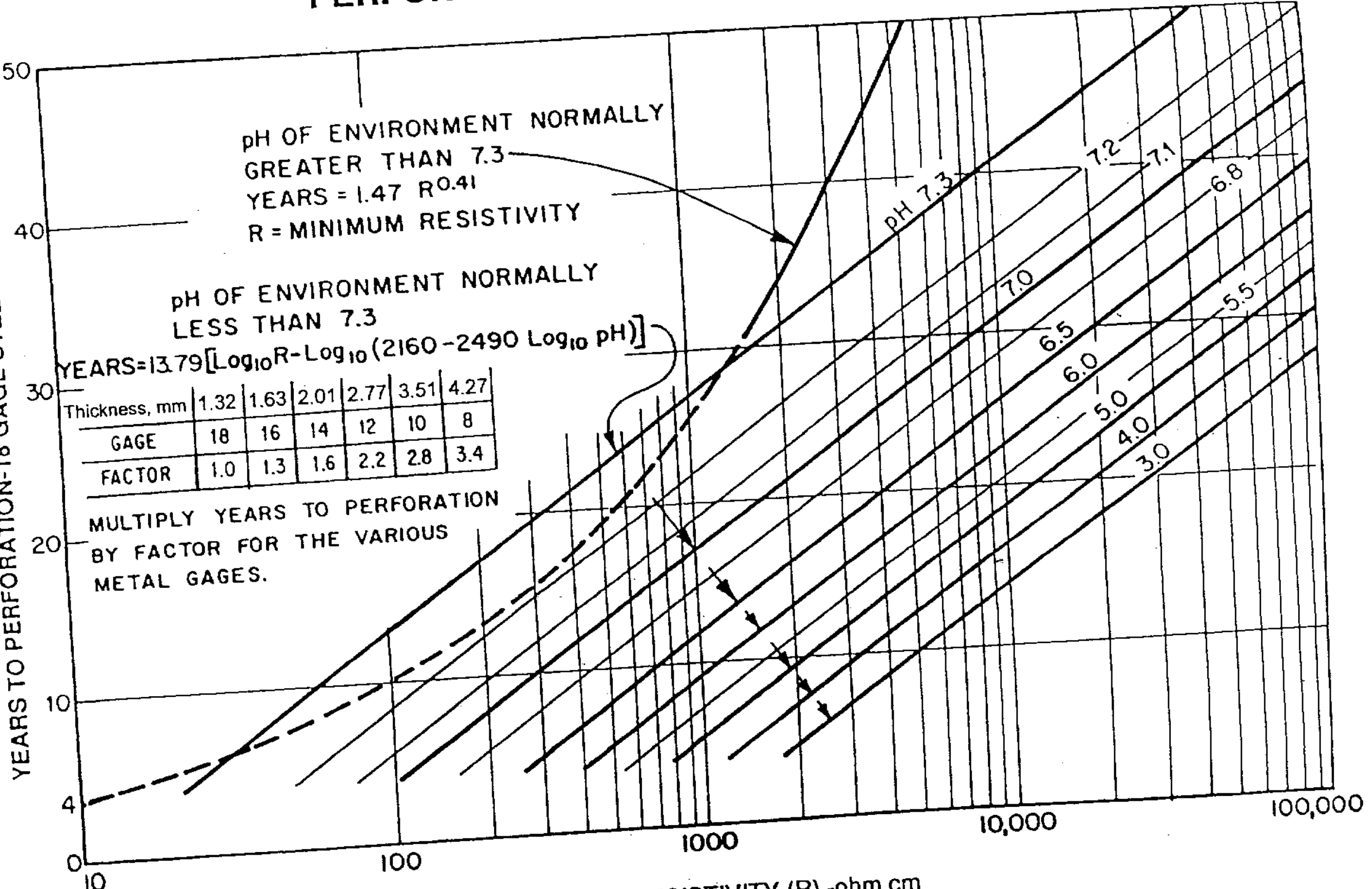
YEARS = 70. FOR 18 GAGE CMP STORAGE BASIN

- USE 14 GAGE CMP STORAGE BASIN, BASED ON THE CHART, FACTOR = 1.6.

$\therefore$ YEARS = 70 × 1.6 = 112

THEREFORE, THE PROPOSED 14 GAGE CMP STORAGE BASIN WILL HAVE THE LIFE EXPECTANCY OF 100 YEARS OR GREATER.

CHART FOR ESTIMATING YEARS TO PERFORATION OF STEEL CULVERTS



pH OF ENVIRONMENT NORMALLY GREATER THAN 7.3

$\text{YEARS} = 1.47\ R^{0.41}$

R = MINIMUM RESISTIVITY

pH OF ENVIRONMENT NORMALLY LESS THAN 7.3

$\text{YEARS} = 13.79\left[\text{Log}_{10}R - \text{Log}_{10}(2160 - 2490\ \text{Log}_{10}\ \text{pH})\right]$

Thickness, mm	1.32	1.63	2.01	2.77	3.51	4.27
GAGE	18	16	14	12	10	8
FACTOR	1.0	1.3	1.6	2.2	2.8	3.4

MULTIPLY YEARS TO PERFORATION BY FACTOR FOR THE VARIOUS METAL GAGES.

FIGURE 1

BASIN 'B'

RETENTION BASIN SIZING (BASIN 'B')
JEFFERSON SQUARE, LA QUINTA, CA

ON-SITE RETENTION VOLUME CALCULATION
AVERAGE END AREA METHOD

Elevation (FT)	Area (SF)	Avg Area (SF)	Depth (FT)	Avg Volume (CF)
0	3,579			
		4,240	1	4,240
1	4,900			
		5,600	1	5,600
2	6,300			
		7,055	1	7,055
3	7,810			
		8,578	1	8,578
4	9,345			
		9,500	0.2	1,900
4.2	9,655			
			TOTAL (CF):	27,372

DRYWELL

ONE MAXWELL PLUS DRYWELL, 30' BELOW BASIN BOTTOM

STORAGE IN THE 6' DIA. SHAFT: VOLUME = 3.14 x (3 FT)^2 x 18' = 508 CF

STORAGE IN THE 4' DIA. SHAFT: VOLUME = 3.14 x (2 FT)^2 x 12' = 151 CF

TOTAL VOLUME PROVIDED

TOTAL VOLUME = 27,372 CF + 508 CF + 151 CF = 28,031 CF

PERCOLATION CALCULATION:

TOTAL DEAD STORAGE VOLUME = 27,010 CUBIC FEET

AVG AREA = 6,500 SF, 1 DRYWELL PROPOSED

USE PERCOLATION RATE OF 2 INCH/HOUR AND 0.1 CFS PER DRYWELL:

TOTAL PERCOLATION = 6,500 SF x 1/12 x 2 INCH/HOUR x 1/ 3,600 + 1 DRYWELL x 0.1 CFS/DRYWELL
= 0.4 CFS

$$\text{DRAW TIME} = \frac{\text{27,010 CUBIC FEET}}{\text{0.4 CFS* 3,600 S / 1 HOUR}}$$

=19 HOURS (< 72 HOURS, THEREFORE, O.K.)

BASIN 'C'

RETENTION BASIN SIZING (BASIN 'C')

JEFFERSON SQUARE, LA QUINTA, CA

ON-SITE RETENTION VOLUME CALCULATION
AVERAGE END AREA METHOD

Elevation (FT)	Area (SF)	Avg Area (SF)	Depth (FT)	Avg Volume (CF)
0	2,575			
		2,988	1	2,988
1	3,400			
		3,880	1	3,880
2	4,360			
		4,855	1	4,855
3	5,350			
		5,908	1	5,908
4	6,465			
		6,483	0.1	648
4.1	6,500			
			TOTAL (CF):	18,278

DRYWELL

ONE MAXWELL PLUS DRYWELL, 30' BELOW BASIN BOTTOM

STORAGE IN THE 6' DIA. SHAFT: VOLUME = 3.14 x (3 FT)^2 x 18' = 508 CF

STORAGE IN THE 4' DIA. SHAFT: VOLUME = 3.14 x (2 FT)^2 x 12' = 151 CF

TOTAL VOLUME PROVIDED

TOTAL VOLUME = 18,278 CF + 508 CF + 151 CF = 18,937 CF

PERCOLATION CALCULATION:

TOTAL DEAD STORAGE VOLUME = 17,834 CUBIC FEET

AVG AREA = 4,360 SF, 1 DRYWELL PROPOSED

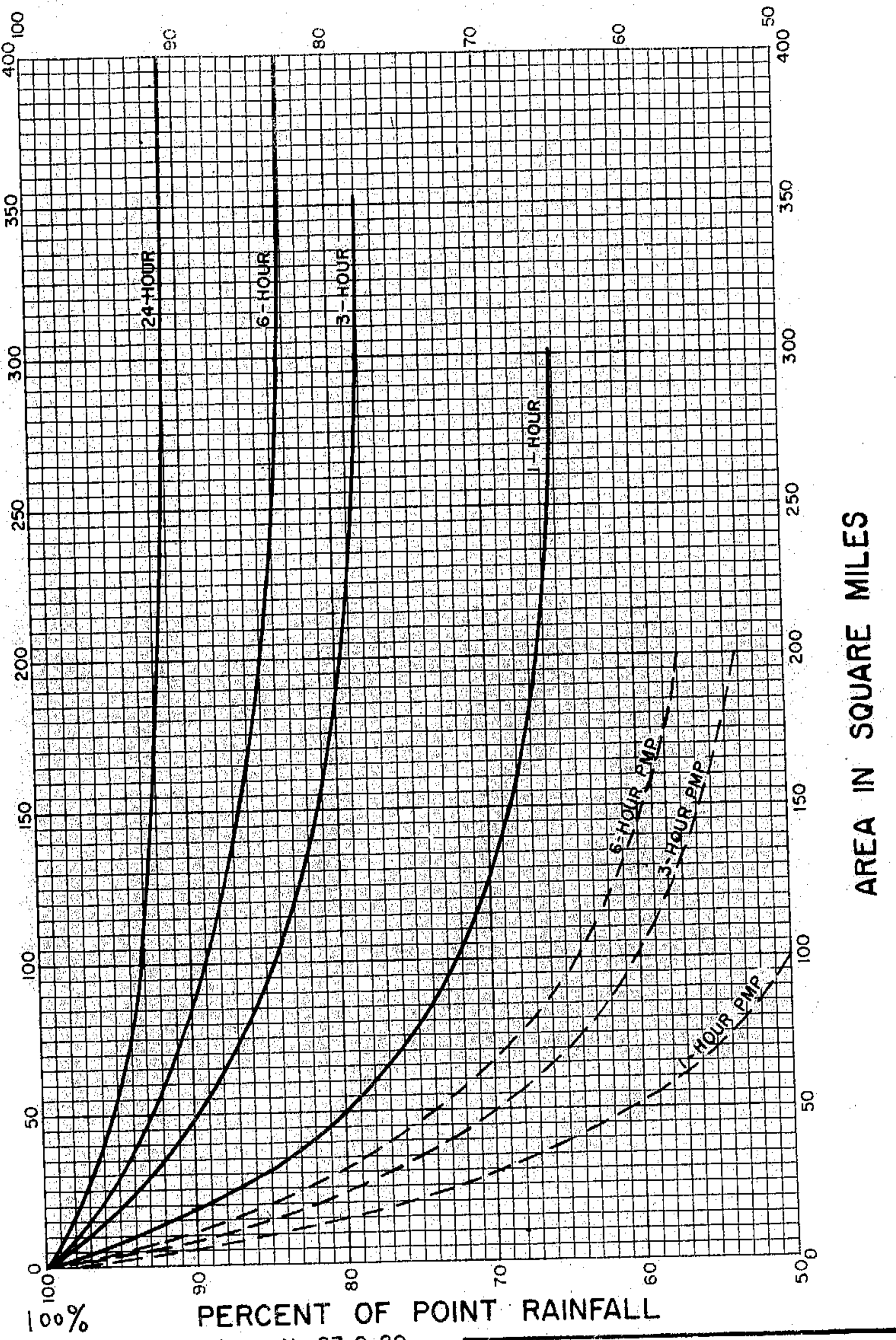
USE PERCOLATION RATE OF 2 INCH/HOUR AND 0.1 CFS PER DRYWELL:

TOTAL PERCOLATION = 4,360 SF x 1/12 x 2 INCH/HOUR x 1/ 3,600 + 1 DRYWELL x 0.1 CFS/DRYWELL
= 0.3 CFS

DRAW TIME = 17,834 CUBIC FEET
0.3 CFS* 3,600 S / 1 HOUR

=17 HOURS (< 72 HOURS, THEREFORE, O.K.)

VI. SMALL AREA UNIT HYDROGRAPH CRITERIA



Reference: Bibliography items No. 27 & 29.

RCFC & WCD

HYDROLOGY MANUAL

DEPTH-AREA-DURATION RELATIONSHIPS

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

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

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS
FOR
PERVIOUS AREA

ACTUAL IMPERVIOUS COVER

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

Notes:

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

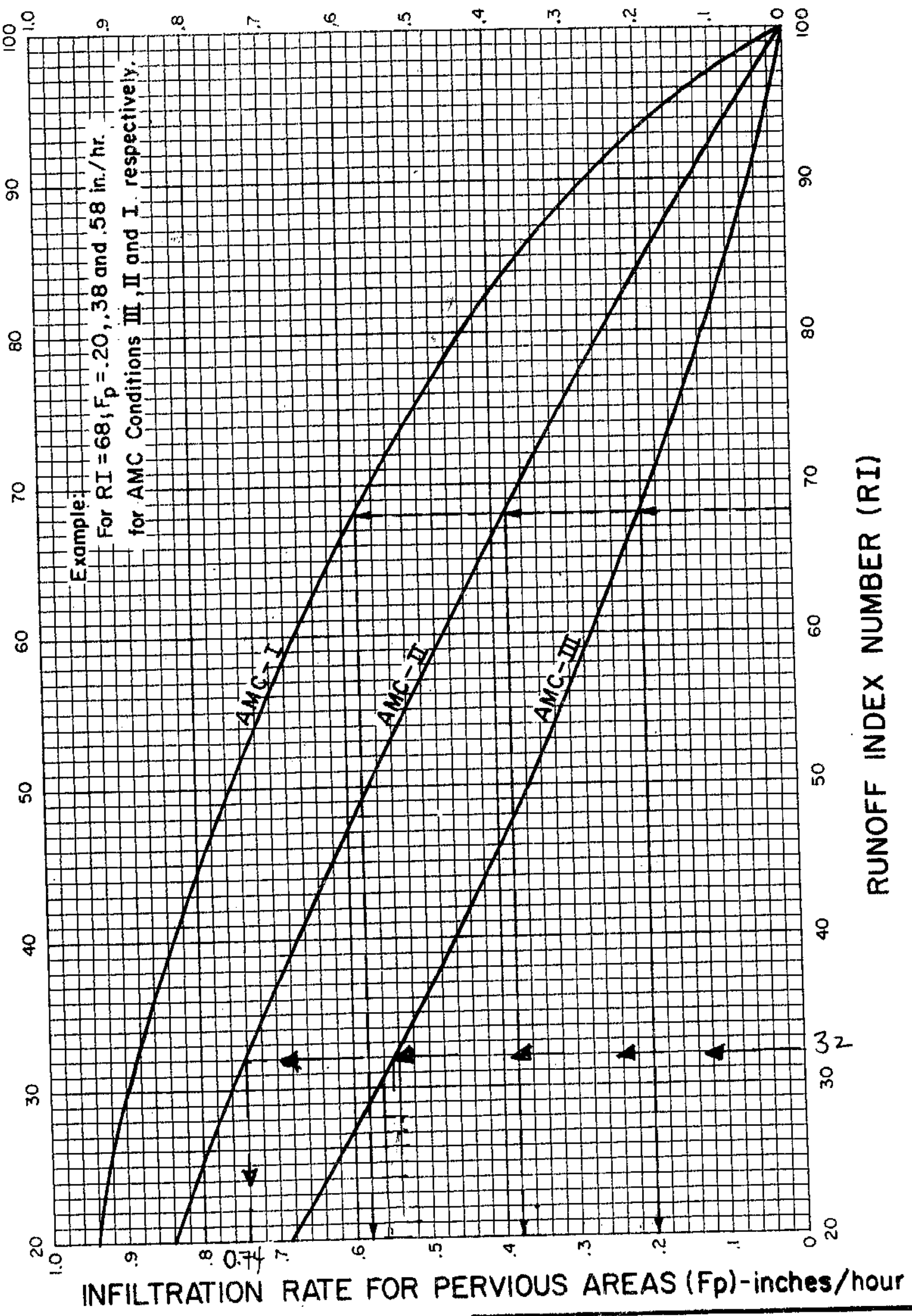
2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some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

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

RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER
FOR
DEVELOPED AREAS

NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.



INFILTRATION RATE FOR PERVIOUS AREAS (Fp)-inches/hour

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HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

RCFC & WCD
HYDROLOGY
MANUAL

SYNTHETIC UNIT HYDROGRAPH METHOD
Basic Data Calculation Form

Project Jefferson Square
By K.H. Date 8-1-07
Checked ______ Date ______

Sheet 1 / 1

LOSS RATE DATA

AVERAGE ADJUSTED LOSS RATE

[1] SOIL GROUP (PLATE C-1)	[2] COVER TYPE	[3] RI NUMBER (PLATE E-6.1)	[4] PERVIOUS AREA INFILTRATION RATE-IN/HR (PLATE E-6.2)	[5] LAND USE	[6] DECIMAL PERCENT OF AREA IMPERVIOUS (PLATE E-6.3)	[7] ADJUSTED INFILTRATION RATE-IN/HR [4](1-.9[6])	[8] AREA ~~SQ. INCHES~~ (AC.)	[9] $\frac{[8]}{\Sigma[8]}$	[10] AVERAGE ADJUSTED INFILTRATION RATE-IN/HR [7]*[9]
A	Commercial Landscaping	32	0.74	Commercial	0.90	0.141	12.99	1	0.141
							Σ[8]- 12.99		Σ[10]- 0.141

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

F_m = Minimum Loss Rate ≅ $F/2 = \Sigma[10]/2 =$ 0.0713 IN./HR.

$C = (F-F_m)/54 = (\Sigma[10]-F_m)/54 =$ 0.0013

$F_T = C(24-(T/60))^{1.55}+F_m =$ 0.0013 $(24-(T/60))^{1.55} +$ 0.0713 IN./HR.

Where:

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

JEFFERSON SQUARE, LA QUINTA, CA
DETERMINE 1- HOUR STORM RAINFALL PATTERNS IN PERCENT (For 100-YEAR 1-HOUR)

FOR PROPOSED CONDITION:

Unit Time Period	[1] Rainfall Pattern (%)	[2] Runoff Ratio	[3] Rainfall Ratio	Rainfall Pattern (%)	Runoff	Adjusted
	(Peak 1 Hour)	Ratio = 31.30 cfs/ 15.84 cfs	Ratio = 2.70"/2.10"	[1] x [2]x[3]	(cfs)	Rainfall Pattern (%)
	For 10-Year 3-Hour Storm Event			For 100-Year 1-Hour Storm Event	For 100-Year 1-Hour Storm Event	For 10-Year 1-Hour Storm Event
1	3.1	1.98	1.29	7.9	12.28	3.0
2	2.9	1.98	1.29	7.4	11.47	3.1
3	3.0	1.98	1.29	7.6	11.87	3.2
4	3.1	1.98	1.29	7.9	12.28	3.2
5	4.2	1.98	1.29	10.7	16.71	3.5
6	5.0	1.98	1.29	12.7	19.94	5.0
7	3.5	1.98	1.29	8.9	13.89	5.2
8	6.8	1.98	1.29	17.3	27.20	17.0
9	7.3	1.98	1.29	18.5	29.22	18.5
10	8.2	1.98	1.29	20.8	32.85	20.8
11	5.9	1.98	1.29	15.0	23.57	14.5
12	2.0	1.98	1.29	5.1	7.84	3.0
						100.0

Note:

1). Qpeak For 100-Year 3-Hour Storm Event is 15.84 CFS, Rational Qpeak is 31.30 cfs (watershed A)
2) Rainfall For 100-Year 3-Hour Storm Event is 2.70", Rainfall For 10-Year 1-Hour Storm Event is 2.10"
3) Adjusted Rainfall Pattern (%) in the beginning and end of the rain in order to obtain 100% rainfall pattern

RAINFALL PATTERNS IN PERCENT

3-HOUR STORM

TIME PERIOD	5-MIN PERIOD	10-MIN PERIOD	15-MIN PERIOD	30-MIN PERIOD
1	1.3	2.6	3.7	8.5
2	1.3	2.6	4.8	10.0
3	1.1	3.3	5.1	13.9
4	1.5	3.3	4.9	17.4
5	1.5	3.3	6.6	29.9
6	1.8	3.4	7.3	20.3
7	1.5	4.4	8.4	
8	1.8	4.2	9.0	
9	1.8	5.3	12.3	
10	1.5	5.1	17.6	
11	1.6	6.4	16.1	
12	1.8	5.9	4.2	
13	2.2	7.3		
14	2.2	8.5		
15	2.2	14.1		
16	2.0	14.1		
17	2.6	3.8		
18	2.7	2.4		
19	2.4			
20	2.7			
21	3.3			
22	3.1			
23	2.9			
24	3.0			
25	3.1			
26	4.2			
27	5.0			
28	3.5			
29	6.8			
30	7.3			
31	8.2			
32	5.9			
33	2.0			
34	1.8			
35	1.8			
36	.6			

6-HOUR STORM

TIME PERIOD	5-MIN PERIOD	10-MIN PERIOD	15-MIN PERIOD	30-MIN PERIOD
1	.5	1.1	1.7	3.6
2	.6	1.2	1.9	4.3
3	.6	1.3	2.1	4.8
4	.6	1.4	2.2	4.9
5	.6	1.4	2.4	5.3
6	.7	1.5	2.4	5.8
7	.7	1.6	2.4	6.8
8	.7	1.6	2.5	9.0
9	.7	1.6	2.6	11.6
10	.7	1.6	2.7	14.4
11	.7	1.6	2.8	25.1
12	.8	1.7	3.0	4.4
13	.8	1.7	3.2	
14	.8	1.8	3.6	
15	.8	1.8	4.3	
16	.8	1.8	4.7	
17	.8	2.0	5.4	
18	.8	2.0	6.2	
19	.8	2.1	6.9	
20	.8	2.2	7.5	
21	.8	2.5	10.6	
22	.8	2.8	14.5	
23	.8	3.0	3.4	
24	.9	3.2	1.0	
25	.8	3.5		
26	.9	3.9		
27	.9	4.2		
28	.9	4.5		
29	.9	4.8		
30	.9	5.1		
31	.9	6.7		
32	.9	8.1		
33	1.0	10.3		
34	1.0	2.8		
35	1.0	1.1		
36	1.0	.5		
37	1.0			
38	1.1			
39	1.1			
40	1.1			
41	1.2			
42	1.3			
43	1.4			
44	1.4			
45	1.5			
46	1.5			
47	1.6			
48	1.6			

TIME PERIOD	5-MIN PERIOD
49	1.7
50	1.8
51	1.9
52	2.0
53	2.1
54	2.1
55	2.2
56	2.3
57	2.4
58	2.4
59	2.5
60	2.6
61	3.1
62	3.6
63	3.9
64	4.2
65	4.7
66	5.6
67	1.9
68	.9
69	.6
70	.5
71	.3
72	.2

24-HOUR STORM

TIME PERIOD	15-MIN PERIOD	30-MIN PERIOD	60-MIN PERIOD
1	.2	.5	1.2
2	.3	.7	1.3
3	.3	.6	1.8
4	.4	.7	2.1
5	.3	.8	2.8
6	.3	1.0	2.9
7	.3	1.0	3.8
8	.4	1.1	4.6
9	.4	1.3	6.3
10	.4	1.5	8.2
11	.5	1.3	7.0
12	.5	1.6	7.3
13	.5	1.8	10.8
14	.5	2.0	11.4
15	.5	2.1	10.4
16	.6	2.5	8.5
17	.6	3.0	1.4
18	.7	3.3	1.9
19	.7	3.9	1.3
20	.8	4.3	1.2
21	.6	3.0	1.1
22	.7	4.0	1.0
23	.8	3.8	.9
24	.8	3.5	.8
25	.9	5.1	
26	.9	5.7	
27	1.0	6.8	
28	1.0	4.6	
29	1.0	5.3	
30	1.1	5.1	
31	1.2	4.7	
32	1.3	3.8	
33	1.5	.8	
34	1.5	.6	
35	1.6	1.0	
36	1.7	.9	
37	1.9	.8	
38	2.0	.5	
39	2.1	.7	
40	2.2	.5	
41	1.5	.6	
42	1.5	.5	
43	2.0	.5	
44	2.0	.5	
45	1.9	.5	
46	1.9	.4	
47	1.7	.4	
48	1.8	.4	

TIME PERIOD	15-MIN PERIOD
49	2.5
50	2.6
51	2.8
52	2.9
53	3.4
54	3.4
55	2.3
56	2.3
57	2.7
58	2.6
59	2.6
60	2.5
61	2.4
62	2.3
63	1.9
64	1.9
65	.4
66	.4
67	.3
68	.3
69	.5
70	.5
71	.5
72	.4
73	.4
74	.4
75	.3
76	.2
77	.3
78	.4
79	.3
80	.2
81	.3
82	.3
83	.3
84	.2
85	.3
86	.2
87	.3
88	.2
89	.3
90	.2
91	.2
92	.2
93	.2
94	.2
95	.2
96	.2

NOTES:

1. 3 and 6-hour patterns based on the Indio area thunderstorm of September 24,1939.
2. 24-hour patterns based on the general storm of March 2 & 3,1938.

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HYDROLOGY MANUAL

RAINFALL PATTERNS
IN PERCENT

VII. SMALL UNIT HYDROGRAPH CALCULATIONS –PROPOSED CONDITION

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN A

100 YEAR 1 HOUR

Storm Period, years:	100
Storm Period, hrs:	1
Area, acres:	6.84
Point Rainfall, inches:	2.10
Unit Time, min:	5
Loss Rate, in/hr:	0.143
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Max. Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Flow Volume CF	Perc. Volume CF	Volume To Store CF	Total Storage Volume CF
1	3.0	0.756	0.1430	-	0.613	4.19	1,258	83	1,175	1,175
2	3.1	0.781	0.1430	-	0.638	4.37	1,310	83	1,227	2,401
3	3.2	0.806	0.1430	-	0.663	4.54	1,361	83	1,278	3,680
4	3.2	0.806	0.1430	-	0.663	4.54	1,361	83	1,278	4,958
5	3.5	0.882	0.1430	-	0.739	5.05	1,516	83	1,433	6,391
6	5.0	1.260	0.1430	-	1.117	7.64	2,292	83	2,209	8,601
7	5.2	1.310	0.1430	-	1.167	7.99	2,396	83	2,313	10,913
8	17.0	4.284	0.1430	-	4.141	28.32	8,497	83	8,414	19,327
9	18.5	4.662	0.1430	-	4.519	30.91	9,273	83	9,190	28,517
10	20.8	5.242	0.1430	-	5.099	34.87	10,462	83	10,379	38,897
11	14.5	3.654	0.1430	-	3.511	24.02	7,205	83	7,122	46,018
12	3.0	0.756	0.1430	-	0.613	4.19	1,258	83	1,175	47,193
	100.0				**23.5**		**48,189**			**47,193**

Effective Rain	**1.96**	**Inches**	**6,900**	**CF/AC**
Storm Volume	**1.08**	**Ac-Ft**		

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on using 5' deep single trap standard storm trap unit, 6" stone below the bottom, effective percolation area = 5,980 square feet
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *5,980 square feet * 0.08333 hours * 1 feet / 12 inches
= 83 cubic feet per unit time

Note:
1. Storm Rainfall = (60 x 2.10 x %Pattern) / (100 x 5) = 0.252 x %Pattern

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN A

100 YEAR 3 HOUR

Storm Period, years:	100
Storm Period, hrs:	3
Area, acres:	6.84
Point Rainfall, inches:	2.70
Unit Time, min:	5
Loss Rate, in/hr:	0.143
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Flow Volume CF	Perc. Rate CF	Volume To Store CF	Total Storage CF
1	1.3	0.421	0.1430	-	0.278	1.90	571	83	488	488
2	1.3	0.421	0.1430	-	0.278	1.90	571	83	488	976
3	1.1	0.356	0.1430	-	0.213	1.46	438	83	355	1,331
4	1.5	0.486	0.1430	-	0.343	2.35	704	83	621	1,951
5	1.5	0.486	0.1430	-	0.343	2.35	704	83	621	2,572
6	1.8	0.583	0.1430	-	0.440	3.01	903	83	820	3,393
7	1.5	0.486	0.1430	-	0.343	2.35	704	83	621	4,013
8	1.8	0.583	0.1430	-	0.440	3.01	903	83	820	4,834
9	1.8	0.583	0.1430	-	0.440	3.01	903	83	820	5,654
10	1.5	0.486	0.1430	-	0.343	2.35	704	83	621	6,275
11	1.6	0.518	0.1430	-	0.375	2.57	770	83	687	6,962
12	1.8	0.583	0.1430	-	0.440	3.01	903	83	820	7,782
13	2.2	0.713	0.1430	-	0.570	3.90	1,169	83	1,086	8,869
14	2.2	0.713	0.1430	-	0.570	3.90	1,169	83	1,086	9,955
15	2.2	0.713	0.1430	-	0.570	3.90	1,169	83	1,086	11,041
16	2.0	0.648	0.1430	-	0.505	3.45	1,036	83	953	11,994
17	2.6	0.842	0.1430	-	0.699	4.78	1,435	83	1,352	13,347
18	2.7	0.875	0.1430	-	0.732	5.01	1,502	83	1,419	14,765
19	2.4	0.778	0.1430	-	0.635	4.34	1,302	83	1,219	15,984
20	2.7	0.875	0.1430	-	0.732	5.01	1,502	83	1,419	17,403
21	3.3	1.069	0.1430	-	0.926	6.34	1,901	83	1,818	19,221
22	3.1	1.004	0.1430	-	0.861	5.89	1,768	83	1,685	20,905
23	2.9	0.940	0.1430	-	0.797	5.45	1,635	83	1,552	22,457
24	3.0	0.972	0.1430	-	0.829	5.67	1,701	83	1,618	24,075
25	3.1	1.004	0.1430	-	0.861	5.89	1,768	83	1,685	25,760
26	4.2	1.361	0.1430	-	1.218	8.33	2,499	83	2,416	28,175
27	5.0	1.620	0.1430	-	1.477	10.10	3,031	83	2,948	31,123
28	3.5	1.134	0.1430	-	0.991	6.78	2,034	83	1,951	33,074
29	6.8	2.203	0.1430	-	2.060	14.09	4,228	83	4,145	37,218
30	7.3	2.365	0.1430	-	2.222	15.20	4,560	83	4,477	41,695
31	8.2	2.657	0.1430	-	2.514	17.19	5,158	83	5,075	46,771
32	5.9	1.912	0.1430	-	1.769	12.10	3,629	83	3,546	50,317
33	2.0	0.648	0.1430	-	0.505	3.45	1,036	83	953	51,270
34	1.8	0.583	0.1430	-	0.440	3.01	903	83	820	52,090
35	1.8	0.583	0.1430	-	0.440	3.01	903	83	820	52,911
36	0.6	0.194	0.1430	-	0.051	0.35	105	83	22	52,933
	100.0				19.3		55,921			52,933

AT PEAK ←

Effective Rain	1.61 Inches	7,739 CF/AC
Storm Volume	1.22 Ac-Ft	

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on using 5' deep single trap standard storm trap unit, 6" stone below the bottom, effective percolation area = 5,980 square feet
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *5,980 square feet * 0.08333 hours * 1 feet / 12 inches
= 83 cubic feet per unit time

Note:
1. Storm Rainfall = (60 x 2.70 x %Pattern) / (100 x 5) = 0.324 x %Pattern

JEFFERSON SQUARE, LA QUINTA
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN A

100 YEAR 6 HOUR

Storm Period, years:	100
Storm Period, hrs:	6
Area, acres:	6.84
Point Rainfall, inches:	3.20
Unit Time, min:	5
Loss Rate, in/hr:	0.1425
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Runoff Volume CF	Perc. Volume CF	Volume To Store CF	Total Storage CF
1	0.5	0.192	0.1425	-	0.050	0.34	102	83	19	19
2	0.6	0.230	0.1425	-	0.088	0.60	180	83	97	116
3	0.6	0.230	0.1425	-	0.088	0.60	180	83	97	213
4	0.6	0.230	0.1425	-	0.088	0.60	180	83	97	311
5	0.6	0.230	0.1425	-	0.088	0.60	180	83	97	408
6	0.7	0.269	0.1425	-	0.126	0.86	259	83	176	584
7	0.7	0.269	0.1425	-	0.126	0.86	259	83	176	760
8	0.7	0.269	0.1425	-	0.126	0.86	259	83	176	937
9	0.7	0.269	0.1425	-	0.126	0.86	259	83	176	1,113
10	0.7	0.269	0.1425	-	0.126	0.86	259	83	176	1,289
11	0.7	0.269	0.1425	-	0.126	0.86	259	83	176	1,465
12	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	1,720
13	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	1,975
14	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	2,230
15	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	2,485
16	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	2,740
17	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	2,995
18	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	3,250
19	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	3,505
20	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	3,760
21	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	4,015
22	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	4,270
23	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	4,525
24	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	4,858
25	0.8	0.307	0.1425	-	0.165	1.13	338	83	255	5,113
26	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	5,447
27	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	5,781
28	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	6,115
29	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	6,448
30	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	6,782
31	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	7,116
32	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	7,450
33	1.0	0.384	0.1425	-	0.242	1.65	496	83	413	7,862
34	1.0	0.384	0.1425	-	0.242	1.65	496	83	413	8,275
35	1.0	0.384	0.1425	-	0.242	1.65	496	83	413	8,687
36	1.0	0.384	0.1425	-	0.242	1.65	496	83	413	9,100
37	1.0	0.384	0.1425	-	0.242	1.65	496	83	413	9,512
38	1.1	0.422	0.1425	-	0.280	1.91	574	83	491	10,004
39	1.1	0.422	0.1425	-	0.280	1.91	574	83	491	10,495
40	1.1	0.422	0.1425	-	0.280	1.91	574	83	491	10,987
41	1.2	0.461	0.1425	-	0.318	2.18	653	83	570	11,557
42	1.3	0.499	0.1425	-	0.357	2.44	732	83	649	12,206
43	1.4	0.538	0.1425	-	0.395	2.70	811	83	728	12,933
44	1.4	0.538	0.1425	-	0.395	2.70	811	83	728	13,661
45	1.5	0.576	0.1425	-	0.434	2.97	890	83	807	14,468
46	1.5	0.576	0.1425	-	0.434	2.97	890	83	807	15,274
47	1.6	0.614	0.1425	-	0.472	3.23	968	83	885	16,160
48	1.6	0.614	0.1425	-	0.472	3.23	968	83	885	17,045
49	1.7	0.653	0.1425	-	0.510	3.49	1,047	83	964	18,009
50	1.8	0.691	0.1425	-	0.549	3.75	1,126	83	1,043	19,052
51	1.9	0.730	0.1425	-	0.587	4.02	1,205	83	1,122	20,174
52	2.0	0.768	0.1425	-	0.626	4.28	1,284	83	1,201	21,374

53	2.1	0.806	0.1425	-	0.664	4.54	1,362	83	1,279	22,654
54	2.1	0.806	0.1425	-	0.664	4.54	1,362	83	1,279	23,933
55	2.2	0.845	0.1425	-	0.702	4.80	1,441	83	1,358	25,291
56	2.3	0.883	0.1425	-	0.741	5.07	1,520	83	1,437	26,728
57	2.4	0.922	0.1425	-	0.779	5.33	1,599	83	1,516	28,244
58	2.4	0.922	0.1425	-	0.779	5.33	1,599	83	1,516	29,759
59	2.5	0.960	0.1425	-	0.818	5.59	1,678	83	1,595	31,354
60	2.6	0.998	0.1425	-	0.856	5.85	1,756	83	1,673	33,027
61	3.1	1.190	0.1425	-	1.048	7.17	2,150	83	2,067	35,094
62	3.6	1.382	0.1425	-	1.240	8.48	2,544	83	2,461	37,556
63	3.9	1.498	0.1425	-	1.355	9.27	2,781	83	2,698	40,253
64	4.2	1.613	0.1425	-	1.470	10.06	3,017	83	2,934	43,187
65	4.7	1.805	0.1425	-	1.662	11.37	3,411	83	3,328	46,515
66	5.6	2.150	0.1425	-	2.008	13.73	4,120	83	4,037	50,553
67	1.9	0.730	0.1425	-	0.587	4.02	1,205	83	1,122	51,674
68	0.9	0.346	0.1425	-	0.203	1.39	417	83	334	52,008
69	0.6	0.230	0.1425	-	0.088	0.60	180	83	97	52,106
70	0.5	0.192	0.1425	-	0.050	0.34	102	83	19	52,124
71	0.3	0.115	-	0.02	0.094	0.65	194	83	111	52,235
72	0.2	0.077	-	0.01	0.063	0.43	129	83	46	52,281
	100.0				**22.5**		**58,257**			**52,281**

Effective Rain	**1.87** Inches	**7,643 CF/AC**
Storm Volume	**1.20** Ac-Ft	

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on using 5' deep single trap standard storm trap unit, 6" stone below the bottom, effective percolation area = 5,980 square feet
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *5,980 square feet * 0.08333 hours * 1 feet / 12 inches
= 83 cubic feet per unit time

Note:

1. Storm Rainfall = (60 x 3.20 x %Pattern) / (100 x 5) = 0.384 x %Pattern

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN A

100 YEAR-24 HOUR

Storm Period, years:	100
Storm Period, hrs:	24
Area, acres:	6.30
Point Rainfall, inches:	4.25
Unit Time, min:	15
Loss Rate, in/hr:	$F_T = 0.0013*((24-(T/60))$^$1.55+0.0713$
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Time (T) (Minutes)	Max. Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Runoff Volume CF	perc. Rate CF	Volume To Store CF	Total Storage CF
1	0.2	0.034	7.5	-	0.0061	0.028	0.18	158	158	0	0
2	0.3	0.051	22.5	-	0.0092	0.042	0.26	237	237	-	0
3	0.3	0.051	37.5	-	0.0092	0.042	0.26	237	237	-	0
4	0.4	0.068	52.5	-	0.0122	0.056	0.35	316	316	-	0
5	0.3	0.051	67.5	-	0.0092	0.042	0.26	237	237	-	0
6	0.3	0.051	82.5	-	0.0092	0.042	0.26	237	237	-	0
7	0.3	0.051	97.5	-	0.0092	0.042	0.26	237	237	-	0
8	0.4	0.068	112.5	-	0.0122	0.056	0.35	316	249	67	67
9	0.4	0.068	127.5	-	0.0122	0.056	0.35	316	249	67	134
10	0.4	0.068	142.5	-	0.0122	0.056	0.35	316	249	67	202
11	0.5	0.085	157.5	-	0.0153	0.070	0.44	395	249	146	348
12	0.5	0.085	172.5	-	0.0153	0.070	0.44	395	249	146	494
13	0.5	0.085	187.5	-	0.0153	0.070	0.44	395	249	146	640
14	0.5	0.085	202.5	-	0.0153	0.070	0.44	395	249	146	786
15	0.5	0.085	217.5	-	0.0153	0.070	0.44	395	249	146	933
16	0.6	0.102	232.5	-	0.0184	0.084	0.53	474	249	225	1,158
17	0.6	0.102	247.5	-	0.0184	0.084	0.53	474	249	225	1,383
18	0.7	0.119	262.5	-	0.0214	0.098	0.61	553	249	304	1,687
19	0.7	0.119	277.5	-	0.0214	0.098	0.61	553	249	304	1,992
20	0.8	0.136	292.5	-	0.0245	0.112	0.70	632	249	383	2,375
21	0.6	0.102	307.5	-	0.0184	0.084	0.53	474	249	225	2,600
22	0.8	0.136	322.5	-	0.0245	0.112	0.70	632	249	383	2,983
23	0.8	0.136	337.5	-	0.0245	0.112	0.70	632	249	383	3,367
24	0.8	0.136	352.5	-	0.0245	0.112	0.70	632	249	383	3,750
25	0.9	0.153	367.5	-	0.0275	0.125	0.79	711	249	462	4,212
26	1.0	0.170	382.5	-	0.0306	0.139	0.88	790	249	541	4,754
27	1.0	0.170	397.5	-	0.0306	0.139	0.88	790	249	541	5,295
28	1.0	0.170	412.5	-	0.0306	0.139	0.88	790	249	541	5,837
29	1.0	0.170	427.5	-	0.0306	0.139	0.88	790	249	541	6,378
30	1.1	0.187	442.5	0.173	-	0.014	0.09	81	249	(168)	6,210
31	1.2	0.204	457.5	0.170	-	0.034	0.21	191	249	(58)	6,152
32	1.3	0.221	472.5	0.168	-	0.053	0.33	300	249	51	6,203
33	1.5	0.255	487.5	0.166	-	0.089	0.56	506	249	257	6,460
34	1.5	0.255	502.5	0.163	-	0.092	0.58	519	249	270	6,731
35	1.6	0.272	517.5	0.161	-	0.111	0.70	629	249	380	7,110
36	1.7	0.289	532.5	0.159	-	0.130	0.82	738	249	489	7,599
37	1.9	0.323	547.5	0.157	-	0.166	1.05	943	249	694	8,293
38	2.0	0.340	562.5	0.154	-	0.186	1.17	1,052	249	803	9,096
39	2.1	0.357	577.5	0.152	-	0.205	1.29	1,161	249	912	10,008
40	2.2	0.374	592.5	0.150	-	0.224	1.41	1,270	249	1,021	11,029
41	1.5	0.255	607.5	0.148	-	0.107	0.67	607	249	358	11,387
42	1.5	0.255	622.5	0.146	-	0.109	0.69	619	249	370	11,757
43	2.0	0.340	637.5	0.144	-	0.196	1.24	1,113	249	864	12,621
44	2.0	0.340	652.5	0.142	-	0.198	1.25	1,125	249	876	13,497
45	1.9	0.323	667.5	0.140	-	0.183	1.16	1,040	249	791	14,288
46	1.9	0.323	682.5	0.137	-	0.186	1.17	1,052	249	803	15,091
47	1.7	0.289	697.5	0.135	-	0.154	0.97	870	249	621	15,712
48	1.8	0.306	712.5	0.133	-	0.173	1.09	978	249	729	16,441
49	2.5	0.425	727.5	0.132	-	0.293	1.85	1,664	249	1,415	17,857
50	2.6	0.442	742.5	0.130	-	0.312	1.97	1,772	249	1,523	19,379
51	2.8	0.476	757.5	0.128	-	0.348	2.19	1,975	249	1,726	21,105
52	2.9	0.493	772.5	0.126	-	0.367	2.31	2,083	249	1,834	22,939
53	3.4	0.578	787.5	0.124	-	0.454	2.86	2,575	249	2,326	25,265
54	3.4	0.578	802.5	0.122	-	0.456	2.87	2,586	249	2,337	27,602
55	2.3	0.391	817.5	0.120	-	0.271	1.71	1,536	249	1,287	28,889
56	2.7	0.459	832.5	0.118	-	0.341	2.15	1,932	249	1,683	30,571
57	2.6	0.442	847.5	0.117	-	0.325	2.05	1,845	249	1,596	32,168

58	2.6	0.442	862.5	0.115	-	0.327	2.06	1,855	249	1,606	33,774
59	2.5	0.425	877.5	0.113	-	0.312	1.97	1,769	249	1,520	35,294
60	2.4	0.408	892.5	0.111	-	0.297	1.87	1,682	249	1,433	36,727
61	2.3	0.391	907.5	0.110	-	0.281	1.77	1,595	249	1,346	38,073
62	1.9	0.323	922.5	0.108	-	0.215	1.35	1,219	249	970	39,043
63	1.9	0.323	937.5	0.106	-	0.217	1.36	1,228	249	979	40,023
64	1.9	0.323	952.5	0.105	-	0.218	1.38	1,238	249	989	41,012
65	0.4	0.068	967.5	-	0.0122	0.056	0.35	316	249	67	41,079
66	0.4	0.068	982.5	-	0.0122	0.056	0.35	316	249	67	41,146
67	0.3	0.051	997.5	-	0.0092	0.042	0.26	237	249	(12)	41,134
68	0.5	0.085	1012.5	-	0.0153	0.070	0.44	395	249	146	41,280
69	0.5	0.085	1027.5	-	0.0153	0.070	0.44	395	249	146	41,426
70	0.5	0.085	1042.5	-	0.0153	0.070	0.44	395	249	146	41,573
71	0.4	0.068	1057.5	-	0.0122	0.056	0.35	316	249	67	41,640
72	0.4	0.068	1072.5	-	0.0122	0.056	0.35	316	249	67	41,707
73	0.4	0.068	1087.5	-	0.0122	0.056	0.35	316	249	67	41,774
74	0.3	0.051	1102.5	-	0.0092	0.042	0.26	237	249	(12)	41,762
75	0.3	0.051	1117.5	-	0.0092	0.042	0.26	237	249	(12)	41,750
76	0.2	0.034	1132.5	-	0.0061	0.028	0.18	158	249	(91)	41,659
77	0.3	0.051	1147.5	-	0.0092	0.042	0.26	237	249	(12)	41,647
78	0.5	0.085	1162.5	-	0.0153	0.070	0.44	395	249	146	41,794
79	0.3	0.051	1177.5	-	0.0092	0.042	0.26	237	249	(12)	41,782
80	0.2	0.034	1192.5	-	0.0061	0.028	0.18	158	249	(91)	41,691
81	0.3	0.051	1207.5	-	0.0092	0.042	0.26	237	249	(12)	41,679
82	0.3	0.051	1222.5	-	0.0092	0.042	0.26	237	249	(12)	41,667
83	0.3	0.051	1237.5	-	0.0092	0.042	0.26	237	249	(12)	41,655
84	0.3	0.051	1252.5	-	0.0092	0.042	0.26	237	249	(12)	41,643
85	0.3	0.051	1267.5	-	0.0092	0.042	0.26	237	249	(12)	41,631
86	0.2	0.034	1282.5	-	0.0061	0.028	0.18	158	249	(91)	41,541
87	0.3	0.051	1297.5	-	0.0092	0.042	0.26	237	249	(12)	41,529
88	0.2	0.034	1312.5	-	0.0061	0.028	0.18	158	249	(91)	41,438
89	0.3	0.051	1327.5	-	0.0092	0.042	0.26	237	249	(12)	41,426
90	0.2	0.034	1342.5	-	0.0061	0.028	0.18	158	249	(91)	41,335
91	0.2	0.034	1357.5	-	0.0061	0.028	0.18	158	249	(91)	41,244
92	0.2	0.034	1372.5	-	0.0061	0.028	0.18	158	249	(91)	41,153
93	0.2	0.034	1387.5	-	0.0061	0.028	0.18	158	249	(91)	41,062
94	0.2	0.034	1402.5	-	0.0061	0.028	0.18	158	249	(91)	40,971
95	0.2	0.034	1417.5	-	0.0061	0.028	0.18	158	249	(91)	40,880
96	0.2	0.034	1432.5	-	0.0061	0.028	0.18	158	249	(91)	40,789
	100.0					**11.4**		**64,610**			**40,789**

Effective Rain	**2.85 Inches**	**6,475 CF/AC**
Storm Volume	**0.94 Ac-Ft**	

<u>Percolation Calculations:</u>

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on using 5' deep single trap standard storm trap unit, 6" stone below the bottom, effective percolation area = 5,980 square feet
Unit time = 30 minutes * 1 hour / 60 minutes = 0.25 hours
Percolation Volume = 2 inch/hour *5,980 square feet * 0.08333 hours * 1 feet / 12 inches
= 249 cubic feet per unit time

Note:

1. 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.
2. Storm Rainfall = (60 x 4.25 x %Pattern) / (100 x 15) = 0.17 x %Pattern

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN B
100 YEAR - 1 HOUR

Storm Period, years:	100
Storm Period, hrs:	1
Area, acres:	3.70
Point Rainfall, inches:	2.10
Unit Time, min:	5
Loss Rate, in/hr:	0.143
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Max. Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain In/hr	Flow Rate CFS	Flow Volume CF	Perc. Volume CF	Volume To Store CF	Total Storage Volume CF
1	3.0	0.756	0.1430	-	0.613	2.27	680	81	599	599
2	3.1	0.781	0.1430	-	0.638	2.36	708	81	627	1,227
3	3.2	0.806	0.1430	-	0.663	2.45	736	81	655	1,882
4	3.2	0.806	0.1430	-	0.663	2.45	736	81	655	2,538
5	3.5	0.882	0.1430	-	0.739	2.73	820	81	739	3,277
6	5.0	1.260	0.1430	-	1.117	4.13	1,240	81	1,159	4,436
7	5.2	1.310	0.1430	-	1.167	4.32	1,296	81	1,215	5,651
8	17.0	4.284	0.1430	-	4.141	15.32	4,597	81	4,516	10,166
9	18.5	4.662	0.1430	-	4.519	16.72	5,016	81	4,935	15,101
10	20.8	5.242	0.1430	-	5.099	18.86	5,659	81	5,578	20,680
11	14.5	3.654	0.1430	-	3.511	12.99	3,897	81	3,816	24,496
12	3.0	0.756	0.1430	-	0.613	2.27	680	81	599	25,095
	100.0				**23.5**		**26,067**			**25,095**

Effective Rain	**1.96**	**Inches**	**6,782**	**CF/AC**
Storm Volume	**0.58**	**Ac-Ft**		

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on the layout, 3:1 slope open-air basin, effective percolation area = 6,500 SF
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *6,500 square feet * 0.08333 hours * 1 feet / 12 inches
= 90 cubic feet per unit time

Note:

1. Storm Rainfall = (60 x 2.10 x %Pattern) / (100 x 5) = 0.252 x %Pattern
2. Effective percolation area = Average basin area @2.1'

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN B

100 YEAR - 3HOUR

Storm Period, years:	100
Storm Period, hrs:	3
Area, acres:	3.70
Point Rainfall, inches:	2.70
Unit Time, min:	5
Loss Rate, in/hr:	0.143
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Flow Volume CF	Perc. Rate CF	Volume To Store CF	Total Storage CF
1	1.3	0.421	0.1430	-	0.278	1.03	309	90	219	219
2	1.3	0.421	0.1430	-	0.278	1.03	309	90	219	438
3	1.1	0.356	0.1430	-	0.213	0.79	237	90	147	584
4	1.5	0.486	0.1430	-	0.343	1.27	381	90	291	875
5	1.5	0.486	0.1430	-	0.343	1.27	381	90	291	1,166
6	1.8	0.583	0.1430	-	0.440	1.63	489	90	399	1,565
7	1.5	0.486	0.1430	-	0.343	1.27	381	90	291	1,855
8	1.8	0.583	0.1430	-	0.440	1.63	489	90	399	2,254
9	1.8	0.583	0.1430	-	0.440	1.63	489	90	399	2,653
10	1.5	0.486	0.1430	-	0.343	1.27	381	90	291	2,943
11	1.6	0.518	0.1430	-	0.375	1.39	417	90	327	3,270
12	1.8	0.583	0.1430	-	0.440	1.63	489	90	399	3,669
13	2.2	0.713	0.1430	-	0.570	2.11	632	90	542	4,211
14	2.2	0.713	0.1430	-	0.570	2.11	632	90	542	4,754
15	2.2	0.713	0.1430	-	0.570	2.11	632	90	542	5,296
16	2.0	0.648	0.1430	-	0.505	1.87	561	90	471	5,767
17	2.6	0.842	0.1430	-	0.699	2.59	776	90	686	6,453
18	2.7	0.875	0.1430	-	0.732	2.71	812	90	722	7,175
19	2.4	0.778	0.1430	-	0.635	2.35	704	90	614	7,790
20	2.7	0.875	0.1430	-	0.732	2.71	812	90	722	8,512
21	3.3	1.069	0.1430	-	0.926	3.43	1,028	90	938	9,450
22	3.1	1.004	0.1430	-	0.861	3.19	956	90	866	10,316
23	2.9	0.940	0.1430	-	0.797	2.95	884	90	794	11,110
24	3.0	0.972	0.1430	-	0.829	3.07	920	90	830	11,941
25	3.1	1.004	0.1430	-	0.861	3.19	956	90	866	12,807
26	4.2	1.361	0.1430	-	1.218	4.51	1,352	90	1,262	14,068
27	5.0	1.620	0.1430	-	1.477	5.46	1,639	90	1,549	15,618
28	3.5	1.134	0.1430	-	0.991	3.67	1,100	90	1,010	16,628
29	6.8	2.203	0.1430	-	2.060	7.62	2,287	90	2,197	18,825
30	7.3	2.365	0.1430	-	2.222	8.22	2,467	90	2,377	21,201
31	8.2	2.657	0.1430	-	2.514	9.30	2,790	90	2,700	23,902
32	5.9	1.912	0.1430	-	1.769	6.54	1,963	90	1,873	25,775
33	2.0	0.648	0.1430	-	0.505	1.87	561	90	471	26,245
34	1.8	0.583	0.1430	-	0.440	1.63	489	90	399	26,644
35	1.8	0.583	0.1430	-	0.440	1.63	489	90	399	27,043
36	0.6	0.194	0.1430	-	0.051	0.19	57	90	(33)	27,010
	100.0				19.3		30,250			27,010

Effective Rain	1.61 Inches	7,300 CF/AC
Storm Volume	0.62 Ac-Ft	

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on the layout, 3:1 slope open-air basin, effective percolation area = 6,500 SF
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *6,500 square feet * 0.08333 hours * 1 feet / 12 inches
= 90 cubic feet per unit time

Note:

1. Storm Rainfall = (60 x 2.70 x %Pattern) / (100 x 5) = 0.324 x %Pattern

JEFFERSON SQUARE, LA QUINTA
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN B

100 YEAR 6 HOUR

Storm Period, years:	100
Storm Period, hrs:	6
Area, acres:	3.70
Point Rainfall, inches:	3.20
Unit Time, min:	5
Loss Rate, in/hr:	0.143
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Runoff Volume CF	Perc. Volume CF	Volume To Store CF	Total Storage CF
1	0.5	0.192	0.1430	-	0.049	0.18	54	54	-	-
2	0.6	0.230	0.1430	-	0.087	0.32	97	90	7	7
3	0.6	0.230	0.1430	-	0.087	0.32	97	90	7	14
4	0.6	0.230	0.1430	-	0.087	0.32	97	90	7	21
5	0.6	0.230	0.1430	-	0.087	0.32	97	90	7	28
6	0.7	0.269	0.1430	-	0.126	0.47	140	90	50	78
7	0.7	0.269	0.1430	-	0.126	0.47	140	90	50	127
8	0.7	0.269	0.1430	-	0.126	0.47	140	90	50	177
9	0.7	0.269	0.1430	-	0.126	0.47	140	90	50	227
10	0.7	0.269	0.1430	-	0.126	0.47	140	90	50	276
11	0.7	0.269	0.1430	-	0.126	0.47	140	90	50	326
12	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	418
13	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	510
14	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	603
15	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	695
16	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	787
17	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	879
18	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	972
19	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	1,064
20	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	1,156
21	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	1,249
22	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	1,341
23	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	1,433
24	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	1,568
25	0.8	0.307	0.1430	-	0.164	0.61	182	90	92	1,660
26	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	1,795
27	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	1,930
28	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	2,065
29	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	2,200
30	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	2,335
31	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	2,469
32	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	2,604
33	1.0	0.384	0.1430	-	0.241	0.89	268	90	178	2,782
34	1.0	0.384	0.1430	-	0.241	0.89	268	90	178	2,959
35	1.0	0.384	0.1430	-	0.241	0.89	268	90	178	3,137
36	1.0	0.384	0.1430	-	0.241	0.89	268	90	178	3,314
37	1.0	0.384	0.1430	-	0.241	0.89	268	90	178	3,492
38	1.1	0.422	0.1430	-	0.279	1.03	310	90	220	3,712
39	1.1	0.422	0.1430	-	0.279	1.03	310	90	220	3,932
40	1.1	0.422	0.1430	-	0.279	1.03	310	90	220	4,152
41	1.2	0.461	0.1430	-	0.318	1.18	353	90	263	4,415
42	1.3	0.499	0.1430	-	0.356	1.32	395	90	305	4,720
43	1.4	0.538	0.1430	-	0.395	1.46	438	90	348	5,068
44	1.4	0.538	0.1430	-	0.395	1.46	438	90	348	5,416
45	1.5	0.576	0.1430	-	0.433	1.60	481	90	391	5,807
46	1.5	0.576	0.1430	-	0.433	1.60	481	90	391	6,198
47	1.6	0.614	0.1430	-	0.471	1.74	523	90	433	6,631
48	1.6	0.614	0.1430	-	0.471	1.74	523	90	433	7,064
49	1.7	0.653	0.1430	-	0.510	1.89	566	90	476	7,540
50	1.8	0.691	0.1430	-	0.548	2.03	609	90	519	8,059
51	1.9	0.730	0.1430	-	0.587	2.17	651	90	561	8,620
52	2.0	0.768	0.1430	-	0.625	2.31	694	90	604	9,224

53	2.1	0.806	0.1430	-	0.663	2.45	736	90	646	9,870
54	2.1	0.806	0.1430	-	0.663	2.45	736	90	646	10,516
55	2.2	0.845	0.1430	-	0.702	2.60	779	90	689	11,205
56	2.3	0.883	0.1430	-	0.740	2.74	822	90	732	11,937
57	2.4	0.922	0.1430	-	0.779	2.88	864	90	774	12,711
58	2.4	0.922	0.1430	-	0.779	2.88	864	90	774	13,485
59	2.5	0.960	0.1430	-	0.817	3.02	907	90	817	14,302
60	2.6	0.998	0.1430	-	0.855	3.16	949	90	859	15,162
61	3.1	1.190	0.1430	-	1.047	3.88	1,163	90	1,073	16,234
62	3.6	1.382	0.1430	-	1.239	4.59	1,376	90	1,286	17,520
63	3.9	1.498	0.1430	-	1.355	5.01	1,504	90	1,414	18,934
64	4.2	1.613	0.1430	-	1.470	5.44	1,631	90	1,541	20,475
65	4.7	1.805	0.1430	-	1.662	6.15	1,845	90	1,755	22,230
66	5.6	2.150	0.1430	-	2.007	7.43	2,228	90	2,138	24,368
67	1.9	0.730	0.1430	-	0.587	2.17	651	90	561	24,929
68	0.9	0.346	0.1430	-	0.203	0.75	225	90	135	25,064
69	0.6	0.230	0.1430	-	0.087	0.32	97	90	7	25,071
70	0.5	0.192	0.1430	-	0.049	0.18	54	90	(36)	25,035
71	0.3	0.115	-	0.02	0.094	0.35	105	90	15	25,050
72	0.2	0.077	-	0.01	0.063	0.23	70	90	(20)	25,030
	100.0				**22.5**		**31,475**			**25,030**

Effective Rain	**1.87** Inches	**6,765** CF/AC
Storm Volume	**0.57** Ac-Ft	

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on the layout, 3:1 slope open-air basin, effective percolation area = 6,500 SF
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *6,500 square feet * 0.08333 hours * 1 feet / 12 inches
= 90 cubic feet per unit time

Note:

1. Storm Rainfall = (60 x 3.20 x %Pattern) / (100 x 5) = 0.384 x %Pattern
2. Effective percolation area = Average basin area @ 2.1'

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN B

100 YEAR 24 HOUR

Storm Period, years:	100
Storm Period, hrs:	24
Area, acres:	3.70
Point Rainfall, inches:	4.25
Unit Time, min:	15
Loss Rate, in/hr:	$F_T = 0.0013*((24-(T/60))$^1.55+0.0713
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Time (T) (Minutes)	Max. Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Runoff Volume CF	perc. Rate CF	Volume To Store CF	Total Storage CF
1	0.2	0.034	7.5	-	0.0061	0.028	0.10	93	93	0	0
2	0.3	0.051	22.5	-	0.0092	0.042	0.15	139	139	0	0
3	0.3	0.051	37.5	-	0.0092	0.042	0.15	139	139	0	0
4	0.4	0.068	52.5	-	0.0122	0.056	0.21	186	186	0	0
5	0.3	0.051	67.5	-	0.0092	0.042	0.15	139	139	0	0
6	0.3	0.051	82.5	-	0.0092	0.042	0.15	139	139	0	0
7	0.3	0.051	97.5	-	0.0092	0.042	0.15	139	139	0	0
8	0.4	0.068	112.5	-	0.0122	0.056	0.21	186	186	0	0
9	0.4	0.068	127.5	-	0.0122	0.056	0.21	186	186	0	0
10	0.4	0.068	142.5	-	0.0122	0.056	0.21	186	186	0	0
11	0.5	0.085	157.5	-	0.0153	0.070	0.26	232	232	0	0
12	0.5	0.085	172.5	-	0.0153	0.070	0.26	232	232	0	0
13	0.5	0.085	187.5	-	0.0153	0.070	0.26	232	232	0	0
14	0.5	0.085	202.5	-	0.0153	0.070	0.26	232	232	0	0
15	0.5	0.085	217.5	-	0.0153	0.070	0.26	232	232	0	0
16	0.6	0.102	232.5	-	0.0184	0.084	0.31	279	271	8	8
17	0.6	0.102	247.5	-	0.0184	0.084	0.31	279	271	8	15
18	0.7	0.119	262.5	-	0.0214	0.098	0.36	325	271	54	69
19	0.7	0.119	277.5	-	0.0214	0.098	0.36	325	271	54	123
20	0.8	0.136	292.5	-	0.0245	0.112	0.41	371	271	100	223
21	0.6	0.102	307.5	-	0.0184	0.084	0.31	279	271	8	231
22	0.8	0.136	322.5	-	0.0245	0.112	0.41	371	271	100	331
23	0.8	0.136	337.5	-	0.0245	0.112	0.41	371	271	100	432
24	0.8	0.136	352.5	-	0.0245	0.112	0.41	371	271	100	532
25	0.9	0.153	367.5	-	0.0275	0.125	0.46	418	271	147	679
26	1.0	0.170	382.5	-	0.0306	0.139	0.52	464	271	193	872
27	1.0	0.170	397.5	-	0.0306	0.139	0.52	464	271	193	1,065
28	1.0	0.170	412.5	-	0.0306	0.139	0.52	464	271	193	1,258
29	1.0	0.170	427.5	-	0.0306	0.139	0.52	464	271	193	1,451
30	1.1	0.187	442.5	0.173	-	0.014	0.05	48	271	(223)	1,228
31	1.2	0.204	457.5	0.170	-	0.034	0.12	112	271	(159)	1,069
32	1.3	0.221	472.5	0.168	-	0.053	0.20	176	271	(95)	974
33	1.5	0.255	487.5	0.166	-	0.089	0.33	297	271	26	1,001
34	1.5	0.255	502.5	0.163	-	0.092	0.34	305	271	34	1,035
35	1.6	0.272	517.5	0.161	-	0.111	0.41	369	271	98	1,133
36	1.7	0.289	532.5	0.159	-	0.130	0.48	433	271	162	1,295
37	1.9	0.323	547.5	0.157	-	0.166	0.62	554	271	283	1,578
38	2.0	0.340	562.5	0.154	-	0.186	0.69	618	271	347	1,925
39	2.1	0.357	577.5	0.152	-	0.205	0.76	682	271	411	2,336
40	2.2	0.374	592.5	0.150	-	0.224	0.83	746	271	475	2,810
41	1.5	0.255	607.5	0.148	-	0.107	0.40	357	271	86	2,896
42	1.5	0.255	622.5	0.146	-	0.109	0.40	364	271	93	2,989
43	2.0	0.340	637.5	0.144	-	0.196	0.73	654	271	383	3,371
44	2.0	0.340	652.5	0.142	-	0.198	0.73	661	271	390	3,761
45	1.9	0.323	667.5	0.140	-	0.183	0.68	611	271	340	4,101
46	1.9	0.323	682.5	0.137	-	0.186	0.69	618	271	347	4,447
47	1.7	0.289	697.5	0.135	-	0.154	0.57	511	271	240	4,688
48	1.8	0.306	712.5	0.133	-	0.173	0.64	574	271	303	4,991
49	2.5	0.425	727.5	0.132	-	0.293	1.09	977	271	706	5,698
50	2.6	0.442	742.5	0.130	-	0.312	1.16	1,040	271	769	6,467
51	2.8	0.476	757.5	0.128	-	0.348	1.29	1,160	271	889	7,356
52	2.9	0.493	772.5	0.126	-	0.367	1.36	1,223	271	952	8,308
53	3.4	0.578	787.5	0.124	-	0.454	1.68	1,512	271	1,241	9,550
54	3.4	0.578	802.5	0.122	-	0.456	1.69	1,519	271	1,248	10,797
55	2.3	0.391	817.5	0.120	-	0.271	1.00	902	271	631	11,428
56	2.7	0.459	832.5	0.118	-	0.341	1.26	1,134	271	863	12,292
57	2.6	0.442	847.5	0.117	-	0.325	1.20	1,084	271	813	13,104

58	2.6	0.442	862.5	0.115	-	0.327	1.21	1,090	271	819	13,923
59	2.5	0.425	877.5	0.113	-	0.312	1.15	1,039	271	768	14,691
60	2.4	0.408	892.5	0.111	-	0.297	1.10	988	271	717	15,408
61	2.3	0.391	907.5	0.110	-	0.281	1.04	937	271	666	16,074
62	1.9	0.323	922.5	0.108	-	0.215	0.80	716	271	445	16,519
63	1.9	0.323	937.5	0.106	-	0.217	0.80	721	271	450	16,969
64	1.9	0.323	952.5	0.105	-	0.218	0.81	727	271	456	17,425
65	0.4	0.068	967.5	-	0.0122	0.056	0.21	186	271	(85)	17,340
66	0.4	0.068	982.5	-	0.0122	0.056	0.21	186	271	(85)	17,254
67	0.3	0.051	997.5	-	0.0092	0.042	0.15	139	271	(132)	17,123
68	0.5	0.085	1012.5	-	0.0153	0.070	0.26	232	271	(39)	17,084
69	0.5	0.085	1027.5	-	0.0153	0.070	0.26	232	271	(39)	17,045
70	0.5	0.085	1042.5	-	0.0153	0.070	0.26	232	271	(39)	17,006
71	0.4	0.068	1057.5	-	0.0122	0.056	0.21	186	271	(85)	16,921
72	0.4	0.068	1072.5	-	0.0122	0.056	0.21	186	271	(85)	16,835
73	0.4	0.068	1087.5	-	0.0122	0.056	0.21	186	271	(85)	16,750
74	0.3	0.051	1102.5	-	0.0092	0.042	0.15	139	271	(132)	16,618
75	0.3	0.051	1117.5	-	0.0092	0.042	0.15	139	271	(132)	16,487
76	0.2	0.034	1132.5	-	0.0061	0.028	0.10	93	271	(178)	16,308
77	0.3	0.051	1147.5	-	0.0092	0.042	0.15	139	271	(132)	16,177
78	0.5	0.085	1162.5	-	0.0153	0.070	0.26	232	271	(39)	16,138
79	0.3	0.051	1177.5	-	0.0092	0.042	0.15	139	271	(132)	16,006
80	0.2	0.034	1192.5	-	0.0061	0.028	0.10	93	271	(178)	15,828
81	0.3	0.051	1207.5	-	0.0092	0.042	0.15	139	271	(132)	15,696
82	0.3	0.051	1222.5	-	0.0092	0.042	0.15	139	271	(132)	15,564
83	0.3	0.051	1237.5	-	0.0092	0.042	0.15	139	271	(132)	15,433
84	0.3	0.051	1252.5	-	0.0092	0.042	0.15	139	271	(132)	15,301
85	0.3	0.051	1267.5	-	0.0092	0.042	0.15	139	271	(132)	15,169
86	0.2	0.034	1282.5	-	0.0061	0.028	0.10	93	271	(178)	14,991
87	0.3	0.051	1297.5	-	0.0092	0.042	0.15	139	271	(132)	14,859
88	0.2	0.034	1312.5	-	0.0061	0.028	0.10	93	271	(178)	14,681
89	0.3	0.051	1327.5	-	0.0092	0.042	0.15	139	271	(132)	14,549
90	0.2	0.034	1342.5	-	0.0061	0.028	0.10	93	271	(178)	14,371
91	0.2	0.034	1357.5	-	0.0061	0.028	0.10	93	271	(178)	14,193
92	0.2	0.034	1372.5	-	0.0061	0.028	0.10	93	271	(178)	14,015
93	0.2	0.034	1387.5	-	0.0061	0.028	0.10	93	271	(178)	13,837
94	0.2	0.034	1402.5	-	0.0061	0.028	0.10	93	271	(178)	13,659
95	0.2	0.034	1417.5	-	0.0061	0.028	0.10	93	271	(178)	13,480
96	0.2	0.034	1432.5	-	0.0061	0.028	0.10	93	271	(178)	13,302
	100.0					**11.4**		**37,946**			**13,302**

Effective Rain **2.85 Inches** **3,595 CF/AC**
Storm Volume **0.305 Ac-Ft**

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on the layout, 3:1 slope open-air basin, effective percolation area = 6,500 SF
Unit time = 15 minutes * 1 hour / 60 minutes = 0.25 hours
Percolation Volume = 2 inch/hour *6,500 square feet * 0.25 hours * 1 feet / 12 inches
= 271 cubic feet per unit time

Note:

1. 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.
2. Storm Rainfall = (60 x 4.25 x %Pattern) / (100 x 15) = 0.17 x %Pattern
3. Effective percolation area = Average basin area @ 2.1'

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN C

100YEAR - 1 HOUR

Storm Period, years:	100
Storm Period, hrs:	1
Area, acres:	2.45
Point Rainfall, inches:	2.10
Unit Time, min:	5
Loss Rate, in/hr:	0.143
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Max. Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Flow Volume CF	Perc. Volume CF	Volume To Store CF	Total Storage Volume CF
1	3.0	0.756	0.1430	-	0.613	1.50	451	81	370	370
2	3.1	0.781	0.1430	-	0.638	1.56	469	81	388	758
3	3.2	0.806	0.1430	-	0.663	1.63	488	81	407	1,164
4	3.2	0.806	0.1430	-	0.663	1.63	488	81	407	1,571
5	3.5	0.882	0.1430	-	0.739	1.81	543	81	462	2,033
6	5.0	1.260	0.1430	-	1.117	2.74	821	81	740	2,773
7	5.2	1.310	0.1430	-	1.167	2.86	858	81	777	3,550
8	17.0	4.284	0.1430	-	4.141	10.15	3,044	81	2,963	6,513
9	18.5	4.662	0.1430	-	4.519	11.07	3,321	81	3,240	9,753
10	20.8	5.242	0.1430	-	5.099	12.49	3,747	81	3,666	13,420
11	14.5	3.654	0.1430	-	3.511	8.60	2,581	81	2,500	15,919
12	3.0	0.756	0.1430	-	0.613	1.50	451	81	370	16,289
	100.0				**23.5**		**17,261**			**16,289**

Effective Rain	**1.96**	**Inches**	**6,648**	**CF/AC**
Storm Volume	**0.37**	**Ac-Ft**		

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on the layout, 3:1 slope open-air basin, effective percolation area = 8,400 SF
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *4,360 square feet * 0.08333 hours * 1 feet / 12 inches
= 61 cubic feet per unit time

Note:

1. Storm Rainfall = (60 x 2.10 x %Pattern) / (100 x 5) = 0.252 x %Pattern
2. Effective percolation area = Average basin area @2'

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN C

100 YEAR - 3 HOUR

Storm Period, years:	100
Storm Period, hrs:	3
Area, acres:	2.45
Point Rainfall, inches:	2.70
Unit Time, min:	5
Loss Rate, in/hr:	0.143
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Flow Volume CF	Perc. Rate CF	Volume To Store CF	Total Storage CF
1	1.3	0.421	0.1430	-	0.278	0.68	204	61	143	143
2	1.3	0.421	0.1430	-	0.278	0.68	204	61	143	287
3	1.1	0.356	0.1430	-	0.213	0.52	157	61	96	383
4	1.5	0.486	0.1430	-	0.343	0.84	252	61	191	574
5	1.5	0.486	0.1430	-	0.343	0.84	252	61	191	765
6	1.8	0.583	0.1430	-	0.440	1.08	324	61	263	1,028
7	1.5	0.486	0.1430	-	0.343	0.84	252	61	191	1,219
8	1.8	0.583	0.1430	-	0.440	1.08	324	61	263	1,481
9	1.8	0.583	0.1430	-	0.440	1.08	324	61	263	1,744
10	1.5	0.486	0.1430	-	0.343	0.84	252	61	191	1,935
11	1.6	0.518	0.1430	-	0.375	0.92	276	61	215	2,150
12	1.8	0.583	0.1430	-	0.440	1.08	324	61	263	2,412
13	2.2	0.713	0.1430	-	0.570	1.40	419	61	358	2,770
14	2.2	0.713	0.1430	-	0.570	1.40	419	61	358	3,128
15	2.2	0.713	0.1430	-	0.570	1.40	419	61	358	3,486
16	2.0	0.648	0.1430	-	0.505	1.24	371	61	310	3,796
17	2.6	0.842	0.1430	-	0.699	1.71	514	61	453	4,249
18	2.7	0.875	0.1430	-	0.732	1.79	538	61	477	4,726
19	2.4	0.778	0.1430	-	0.635	1.55	466	61	405	5,131
20	2.7	0.875	0.1430	-	0.732	1.79	538	61	477	5,608
21	3.3	1.069	0.1430	-	0.926	2.27	681	61	620	6,228
22	3.1	1.004	0.1430	-	0.861	2.11	633	61	572	6,800
23	2.9	0.940	0.1430	-	0.797	1.95	586	61	525	7,325
24	3.0	0.972	0.1430	-	0.829	2.03	609	61	548	7,873
25	3.1	1.004	0.1430	-	0.861	2.11	633	61	572	8,445
26	4.2	1.361	0.1430	-	1.218	2.98	895	61	834	9,279
27	5.0	1.620	0.1430	-	1.477	3.62	1,086	61	1,025	10,304
28	3.5	1.134	0.1430	-	0.991	2.43	728	61	667	10,971
29	6.8	2.203	0.1430	-	2.060	5.05	1,514	61	1,453	12,424
30	7.3	2.365	0.1430	-	2.222	5.44	1,633	61	1,572	13,997
31	8.2	2.657	0.1430	-	2.514	6.16	1,848	61	1,787	15,783
32	5.9	1.912	0.1430	-	1.769	4.33	1,300	61	1,239	17,022
33	2.0	0.648	0.1430	-	0.505	1.24	371	61	310	17,332
34	1.8	0.583	0.1430	-	0.440	1.08	324	61	263	17,595
35	1.8	0.583	0.1430	-	0.440	1.08	324	61	263	17,857
36	0.6	0.194	0.1430	-	0.051	0.13	38	61	(23)	17,834
	100.0				19.3		20,030			17,834

Effective Rain	1.61 Inches	7,279 CF/AC
Storm Volume	0.41 Ac-Ft	

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on the layout, 3:1 slope open-air basin, effective percolation area = 4,360 SF
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *4,360 square feet * 0.08333 hours * 1 feet / 12 inches
= 61 cubic feet per unit time

Note:
1. Storm Rainfall = (60 x 2.70 x %Pattern) / (100 x 5) = 0.324 x %Pattern

JEFFERSON SQUARE, LA QUINTA
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN C

100 YEAR - 6 HOUR

Storm Period, years:	100
Storm Period, hrs:	6
Area, acres:	2.45
Point Rainfall, inches:	3.20
Unit Time, min:	5
Loss Rate, in/hr:	0.143
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Runoff Volume CF	Perc. Volume CF	Volume To Store CF	Total Storage CF
1	0.5	0.192	0.1430	-	0.049	0.12	36	36	-	-
2	0.6	0.230	0.1430	-	0.087	0.21	64	61	3	3
3	0.6	0.230	0.1430	-	0.087	0.21	64	61	3	6
4	0.6	0.230	0.1430	-	0.087	0.21	64	61	3	10
5	0.6	0.230	0.1430	-	0.087	0.21	64	61	3	13
6	0.7	0.269	0.1430	-	0.126	0.31	92	61	31	44
7	0.7	0.269	0.1430	-	0.126	0.31	92	61	31	76
8	0.7	0.269	0.1430	-	0.126	0.31	92	61	31	107
9	0.7	0.269	0.1430	-	0.126	0.31	92	61	31	139
10	0.7	0.269	0.1430	-	0.126	0.31	92	61	31	170
11	0.7	0.269	0.1430	-	0.126	0.31	92	61	31	202
12	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	261
13	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	321
14	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	381
15	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	440
16	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	500
17	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	560
18	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	620
19	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	679
20	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	739
21	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	799
22	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	858
23	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	918
24	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	1,006
25	0.8	0.307	0.1430	-	0.164	0.40	121	61	60	1,066
26	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	1,153
27	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	1,241
28	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	1,329
29	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	1,417
30	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	1,505
31	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	1,593
32	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	1,681
33	1.0	0.384	0.1430	-	0.241	0.59	177	61	116	1,797
34	1.0	0.384	0.1430	-	0.241	0.59	177	61	116	1,913
35	1.0	0.384	0.1430	-	0.241	0.59	177	61	116	2,029
36	1.0	0.384	0.1430	-	0.241	0.59	177	61	116	2,145
37	1.0	0.384	0.1430	-	0.241	0.59	177	61	116	2,262
38	1.1	0.422	0.1430	-	0.279	0.68	205	61	144	2,406
39	1.1	0.422	0.1430	-	0.279	0.68	205	61	144	2,550
40	1.1	0.422	0.1430	-	0.279	0.68	205	61	144	2,695
41	1.2	0.461	0.1430	-	0.318	0.78	234	61	173	2,867
42	1.3	0.499	0.1430	-	0.356	0.87	262	61	201	3,068
43	1.4	0.538	0.1430	-	0.395	0.97	290	61	229	3,297
44	1.4	0.538	0.1430	-	0.395	0.97	290	61	229	3,526
45	1.5	0.576	0.1430	-	0.433	1.06	318	61	257	3,783
46	1.5	0.576	0.1430	-	0.433	1.06	318	61	257	4,041
47	1.6	0.614	0.1430	-	0.471	1.15	346	61	285	4,326
48	1.6	0.614	0.1430	-	0.471	1.15	346	61	285	4,612
49	1.7	0.653	0.1430	-	0.510	1.25	375	61	314	4,925
50	1.8	0.691	0.1430	-	0.548	1.34	403	61	342	5,267
51	1.9	0.730	0.1430	-	0.587	1.44	431	61	370	5,637
52	2.0	0.768	0.1430	-	0.625	1.53	459	61	398	6,036

53	2.1	0.806	0.1430	-	0.663	1.63	488	61	427	6,462
54	2.1	0.806	0.1430	-	0.663	1.63	488	61	427	6,889
55	2.2	0.845	0.1430	-	0.702	1.72	516	61	455	7,344
56	2.3	0.883	0.1430	-	0.740	1.81	544	61	483	7,827
57	2.4	0.922	0.1430	-	0.779	1.91	572	61	511	8,338
58	2.4	0.922	0.1430	-	0.779	1.91	572	61	511	8,849
59	2.5	0.960	0.1430	-	0.817	2.00	600	61	539	9,389
60	2.6	0.998	0.1430	-	0.855	2.10	629	61	568	9,957
61	3.1	1.190	0.1430	-	1.047	2.57	770	61	709	10,665
62	3.6	1.382	0.1430	-	1.239	3.04	911	61	850	11,515
63	3.9	1.498	0.1430	-	1.355	3.32	996	61	935	12,450
64	4.2	1.613	0.1430	-	1.470	3.60	1,080	61	1,019	13,469
65	4.7	1.805	0.1430	-	1.662	4.07	1,221	61	1,160	14,630
66	5.6	2.150	0.1430	-	2.007	4.92	1,475	61	1,414	16,044
67	1.9	0.730	0.1430	-	0.587	1.44	431	61	370	16,414
68	0.9	0.346	0.1430	-	0.203	0.50	149	61	88	16,502
69	0.6	0.230	0.1430	-	0.087	0.21	64	61	3	16,506
70	0.5	0.192	0.1430	-	0.049	0.12	36	61	(25)	16,481
71	0.3	0.115	-	0.02	0.094	0.23	69	61	8	16,489
72	0.2	0.077	-	0.01	0.063	0.15	46	61	(15)	16,474
	100.0				**22.5**		**20,841**			**16,474**

Effective Rain	**1.87** Inches	**6,724**	**CF/AC**
Storm Volume	**0.38** Ac-Ft		

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

Based on the layout, 3:1 slope open-air basin, effective percolation area = 4,360 SF
Unit time = 5 minutes * 1 hour / 60 minutes = 0.08333 hours
Percolation Volume = 2 inch/hour *4,360 square feet * 0.08333 hours * 1 feet / 12 inches
= 61 cubic feet per unit time

Note:

1. Storm Rainfall = (60 x 3.20 x %Pattern) / (100 x 5) = 0.384 x %Pattern

JEFFERSON SQUARE
SHORTCUT SYNTHETIC UNIT HYDROGRAPH

BASIN C

100 YEAR - 24 HOUR

Storm Period, years:	100
Storm Period, hrs:	24
Area, acres:	2.45
Point Rainfall, inches:	4.25
Unit Time, min:	15
Loss Rate, in/hr:	$F_T = 0.0013*((24-(T/60))^\wedge 1.55+0.0713$
Low Loss Rate:	18%
Land Use:	Commercial

Unit Time Period	% Pattern	Storm Rain in/hr	Time (T) (Minutes)	Max. Loss Rate in/hr	Low Loss Rate in/hr	Effective Rain in/hr	Flow Rate CFS	Runoff Volume CF	perc. Rate CF	Volume To Store CF	Total Storage CF
1	0.2	0.034	7.5	-	0.0061	0.028	0.07	61	61	0	0
2	0.3	0.051	22.5	-	0.0092	0.042	0.10	92	92	0	0
3	0.3	0.051	37.5	-	0.0092	0.042	0.10	92	92	0	0
4	0.4	0.068	52.5	-	0.0122	0.056	0.14	123	123	0	0
5	0.3	0.051	67.5	-	0.0092	0.042	0.10	92	92	0	0
6	0.3	0.051	82.5	-	0.0092	0.042	0.10	92	92	0	0
7	0.3	0.051	97.5	-	0.0092	0.042	0.10	92	92	0	0
8	0.4	0.068	112.5	-	0.0122	0.056	0.14	123	123	0	0
9	0.4	0.068	127.5	-	0.0122	0.056	0.14	123	123	0	0
10	0.4	0.068	142.5	-	0.0122	0.056	0.14	123	123	0	0
11	0.5	0.085	157.5	-	0.0153	0.070	0.17	154	154	0	0
12	0.5	0.085	172.5	-	0.0153	0.070	0.17	154	154	0	0
13	0.5	0.085	187.5	-	0.0153	0.070	0.17	154	154	0	0
14	0.5	0.085	202.5	-	0.0153	0.070	0.17	154	154	0	0
15	0.5	0.085	217.5	-	0.0153	0.070	0.17	154	154	0	0
16	0.6	0.102	232.5	-	0.0184	0.084	0.20	184	182	2	2
17	0.6	0.102	247.5	-	0.0184	0.084	0.20	184	182	2	5
18	0.7	0.119	262.5	-	0.0214	0.098	0.24	215	182	33	38
19	0.7	0.119	277.5	-	0.0214	0.098	0.24	215	182	33	71
20	0.8	0.136	292.5	-	0.0245	0.112	0.27	246	182	64	135
21	0.6	0.102	307.5	-	0.0184	0.084	0.20	184	182	2	138
22	0.8	0.136	322.5	-	0.0245	0.112	0.27	246	182	64	201
23	0.8	0.136	337.5	-	0.0245	0.112	0.27	246	182	64	265
24	0.8	0.136	352.5	-	0.0245	0.112	0.27	246	182	64	329
25	0.9	0.153	367.5	-	0.0275	0.125	0.31	277	182	95	424
26	1.0	0.170	382.5	-	0.0306	0.139	0.34	307	182	125	549
27	1.0	0.170	397.5	-	0.0306	0.139	0.34	307	182	125	675
28	1.0	0.170	412.5	-	0.0306	0.139	0.34	307	182	125	800
29	1.0	0.170	427.5	-	0.0306	0.139	0.34	307	182	125	925
30	1.1	0.187	442.5	0.173	-	0.014	0.03	31	182	(151)	775
31	1.2	0.204	457.5	0.170	-	0.034	0.08	74	182	(108)	667
32	1.3	0.221	472.5	0.168	-	0.053	0.13	117	182	(65)	602
33	1.5	0.255	487.5	0.166	-	0.089	0.22	197	182	15	617
34	1.5	0.255	502.5	0.163	-	0.092	0.22	202	182	20	637
35	1.6	0.272	517.5	0.161	-	0.111	0.27	244	182	62	699
36	1.7	0.289	532.5	0.159	-	0.130	0.32	287	182	105	804
37	1.9	0.323	547.5	0.157	-	0.166	0.41	367	182	185	989
38	2.0	0.340	562.5	0.154	-	0.186	0.45	409	182	227	1,216
39	2.1	0.357	577.5	0.152	-	0.205	0.50	451	182	269	1,485
40	2.2	0.374	592.5	0.150	-	0.224	0.55	494	182	312	1,797
41	1.5	0.255	607.5	0.148	-	0.107	0.26	236	182	54	1,851
42	1.5	0.255	622.5	0.146	-	0.109	0.27	241	182	59	1,910
43	2.0	0.340	637.5	0.144	-	0.196	0.48	433	182	251	2,161
44	2.0	0.340	652.5	0.142	-	0.198	0.49	437	182	255	2,416
45	1.9	0.323	667.5	0.140	-	0.183	0.45	405	182	223	2,639
46	1.9	0.323	682.5	0.137	-	0.186	0.45	409	182	227	2,866
47	1.7	0.289	697.5	0.135	-	0.154	0.38	339	182	157	3,022
48	1.8	0.306	712.5	0.133	-	0.173	0.42	380	182	198	3,221
49	2.5	0.425	727.5	0.132	-	0.293	0.72	647	182	465	3,686
50	2.6	0.442	742.5	0.130	-	0.312	0.77	689	182	507	4,193
51	2.8	0.476	757.5	0.128	-	0.348	0.85	768	182	586	4,779
52	2.9	0.493	772.5	0.126	-	0.367	0.90	810	182	628	5,407
53	3.4	0.578	787.5	0.124	-	0.454	1.11	1,001	182	819	6,226
54	3.4	0.578	802.5	0.122	-	0.456	1.12	1,006	182	824	7,050
55	2.3	0.391	817.5	0.120	-	0.271	0.66	597	182	415	7,465
56	2.7	0.459	832.5	0.118	-	0.341	0.83	751	182	569	8,034
57	2.6	0.442	847.5	0.117	-	0.325	0.80	718	182	536	8,570

58	2.6	0.442	862.5	0.115	-	0.327	0.80	722	182	540	9,109
59	2.5	0.425	877.5	0.113	-	0.312	0.76	688	182	506	9,615
60	2.4	0.408	892.5	0.111	-	0.297	0.73	654	182	472	10,088
61	2.3	0.391	907.5	0.110	-	0.281	0.69	620	182	438	10,526
62	1.9	0.323	922.5	0.108	-	0.215	0.53	474	182	292	10,818
63	1.9	0.323	937.5	0.106	-	0.217	0.53	478	182	296	11,114
64	1.9	0.323	952.5	0.105	-	0.218	0.53	481	182	299	11,413
65	0.4	0.068	967.5	-	0.0122	0.056	0.14	123	182	(59)	11,354
66	0.4	0.068	982.5	-	0.0122	0.056	0.14	123	182	(59)	11,295
67	0.3	0.051	997.5	-	0.0092	0.042	0.10	92	182	(90)	11,205
68	0.5	0.085	1012.5	-	0.0153	0.070	0.17	154	182	(28)	11,177
69	0.5	0.085	1027.5	-	0.0153	0.070	0.17	154	182	(28)	11,149
70	0.5	0.085	1042.5	-	0.0153	0.070	0.17	154	182	(28)	11,120
71	0.4	0.068	1057.5	-	0.0122	0.056	0.14	123	182	(59)	11,061
72	0.4	0.068	1072.5	-	0.0122	0.056	0.14	123	182	(59)	11,002
73	0.4	0.068	1087.5	-	0.0122	0.056	0.14	123	182	(59)	10,943
74	0.3	0.051	1102.5	-	0.0092	0.042	0.10	92	182	(90)	10,853
75	0.3	0.051	1117.5	-	0.0092	0.042	0.10	92	182	(90)	10,764
76	0.2	0.034	1132.5	-	0.0061	0.028	0.07	61	182	(121)	10,643
77	0.3	0.051	1147.5	-	0.0092	0.042	0.10	92	182	(90)	10,553
78	0.5	0.085	1162.5	-	0.0153	0.070	0.17	154	182	(28)	10,525
79	0.3	0.051	1177.5	-	0.0092	0.042	0.10	92	182	(90)	10,435
80	0.2	0.034	1192.5	-	0.0061	0.028	0.07	61	182	(121)	10,315
81	0.3	0.051	1207.5	-	0.0092	0.042	0.10	92	182	(90)	10,225
82	0.3	0.051	1222.5	-	0.0092	0.042	0.10	92	182	(90)	10,135
83	0.3	0.051	1237.5	-	0.0092	0.042	0.10	92	182	(90)	10,045
84	0.3	0.051	1252.5	-	0.0092	0.042	0.10	92	182	(90)	9,955
85	0.3	0.051	1267.5	-	0.0092	0.042	0.10	92	182	(90)	9,866
86	0.2	0.034	1282.5	-	0.0061	0.028	0.07	61	182	(121)	9,745
87	0.3	0.051	1297.5	-	0.0092	0.042	0.10	92	182	(90)	9,655
88	0.2	0.034	1312.5	-	0.0061	0.028	0.07	61	182	(121)	9,535
89	0.3	0.051	1327.5	-	0.0092	0.042	0.10	92	182	(90)	9,445
90	0.2	0.034	1342.5	-	0.0061	0.028	0.07	61	182	(121)	9,325
91	0.2	0.034	1357.5	-	0.0061	0.028	0.07	61	182	(121)	9,204
92	0.2	0.034	1372.5	-	0.0061	0.028	0.07	61	182	(121)	9,083
93	0.2	0.034	1387.5	-	0.0061	0.028	0.07	61	182	(121)	8,963
94	0.2	0.034	1402.5	-	0.0061	0.028	0.07	61	182	(121)	8,842
95	0.2	0.034	1417.5	-	0.0061	0.028	0.07	61	182	(121)	8,722
96	0.2	0.034	1432.5	-	0.0061	0.028	0.07	61	182	(121)	8,601
	100.0					**11.4**		**25,126**			**8,601**

Effective Rain	**2.85 Inches**	**3,511 CF/AC**
Storm Volume	**0.197 Ac-Ft**	

Percolation Calculations:

*Percolation volume = percolation rate * effective percolation area * unit time*

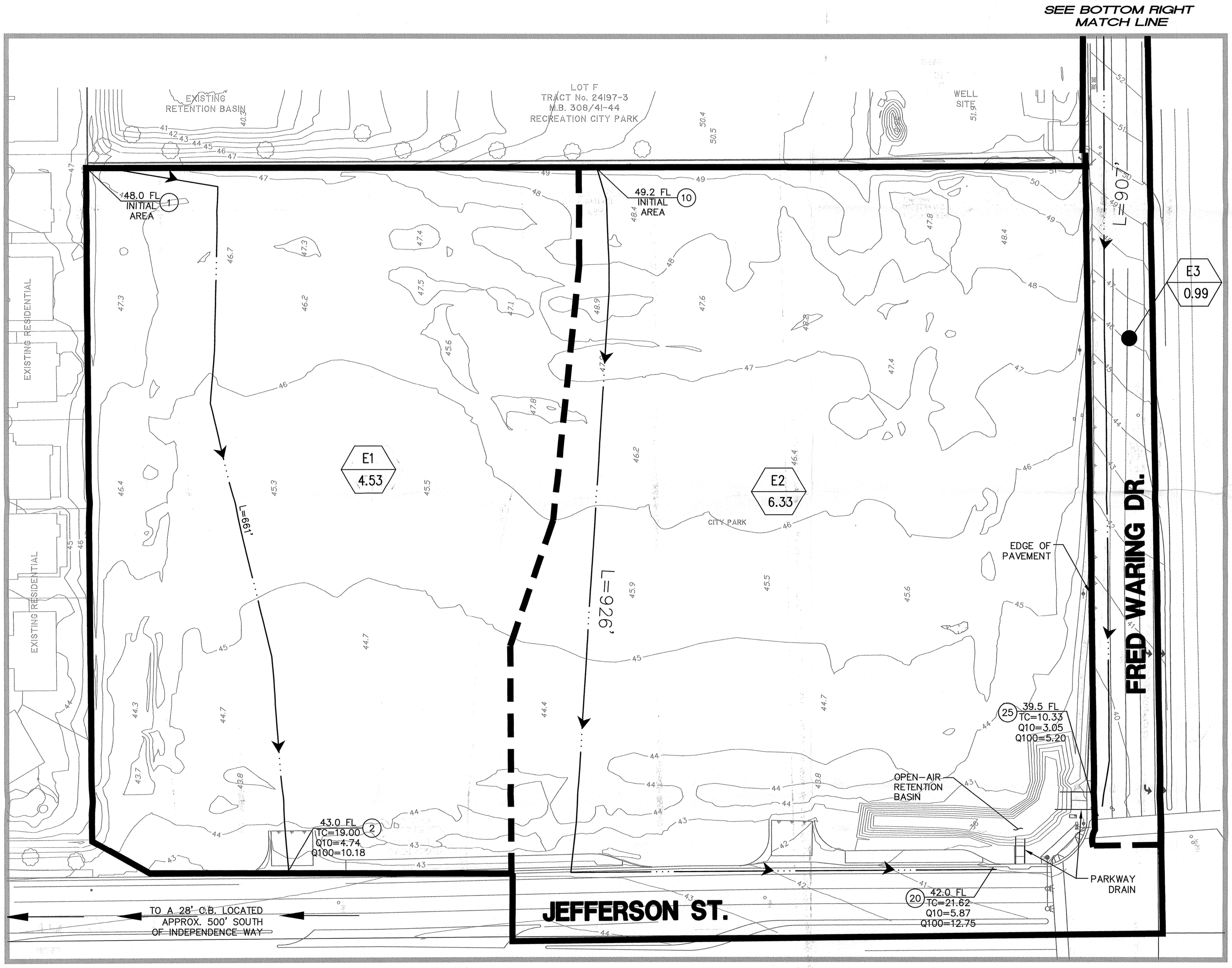
Based on the layout, 3:1 slope open-air basin, effective percolation area = SF feet
Unit time = 5 minutes * 1 hour / 60 minutes = 0.25 hours
Percolation Volume = 2 inch/hour *4,360 square feet * 0.25 hours * 1 feet / 12 inches
= 182 cubic feet per unit time

Note:

1. 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.
2. Storm Rainfall = (60 x 4.25 x %Pattern) / (100 x 15) = 0.17 x %Pattern
3. Effective percolation area = Average basin area @ 2'

BACK POCKETS

- EXISTING HYDROLOGY MAP
- PROPOSED HYDROLOGY MAP
- HYDRAULIC MAP



EXISTING HYDROLOGY MAP

FOR

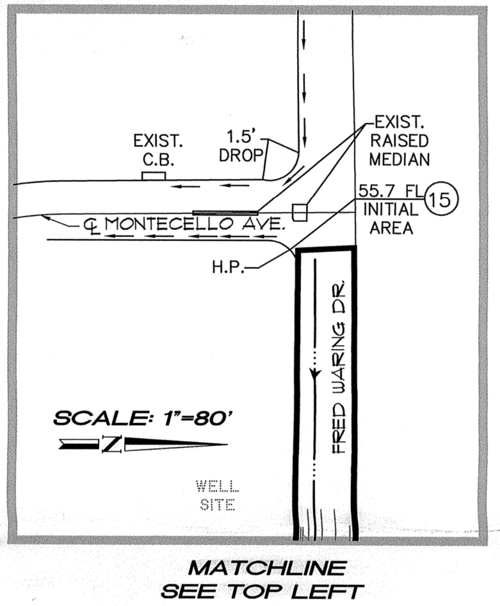
JEFFERSON SQUARE
LA QUINTA, CALIFORNIA

LEGEND

D1	SUBAREA
0.73 AC	ACREAGE
①	NODE
T_c=8.88	TIME OF CONCENTRATION IN MINUTES
Q_{10}=10.20	RUNOFF FOR 10 YEAR STORM EVENT IN CFS
Q_{100}=15.21	RUNOFF FOR 100 YEAR STORM EVENT IN CFS
849.0FS	ELEVATION
---▸---	FLOW PATH
▬ ▬ ▬	SUBAREA BOUNDARY
▬▬▬	DRAINAGE AREA BOUNDARY

HYDROLOGY SUMMARY

DRAINAGE AREA	AREA (AC.)	Q10 (CFS)	Q100 (CFS)
E1	4.53	4.74	10.18
E2	6.33	5.87	12.75
E3	0.99	3.05	5.20
PEAK FLOWRATE:	11.85	13.66	28.13
		1.15 CFS/AC.	2.37 CFS/AC.



MATCHLINE
SEE TOP LEFT

N

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 40 ft.

MARK	BY	DATE	REVISIONS	APPR.	DATE
ENGINEER				CITY	

DESIGNED BY: YH
DATE: 08-12-07
DRAWN BY: YH
DATE: 08-12-07
CHECKED BY: RWS
DATE: 08-12-07

PREPARED UNDER THE SUPERVISION OF:

RONALD W. SKLEPKO DATE

46216
R.C.E. NO. EXPIRATION DATE

SEAL-ENGINEER
RONALD W. SKLEPKO
No. 46216
Exp. 12-31-06

Development Resource Consultants, Inc.
Civil Engineering • Land Surveying • Land Planning
800 S. ROCHESTER, SUITE C
ONTARIO, CA 91761 (909) 230-5246

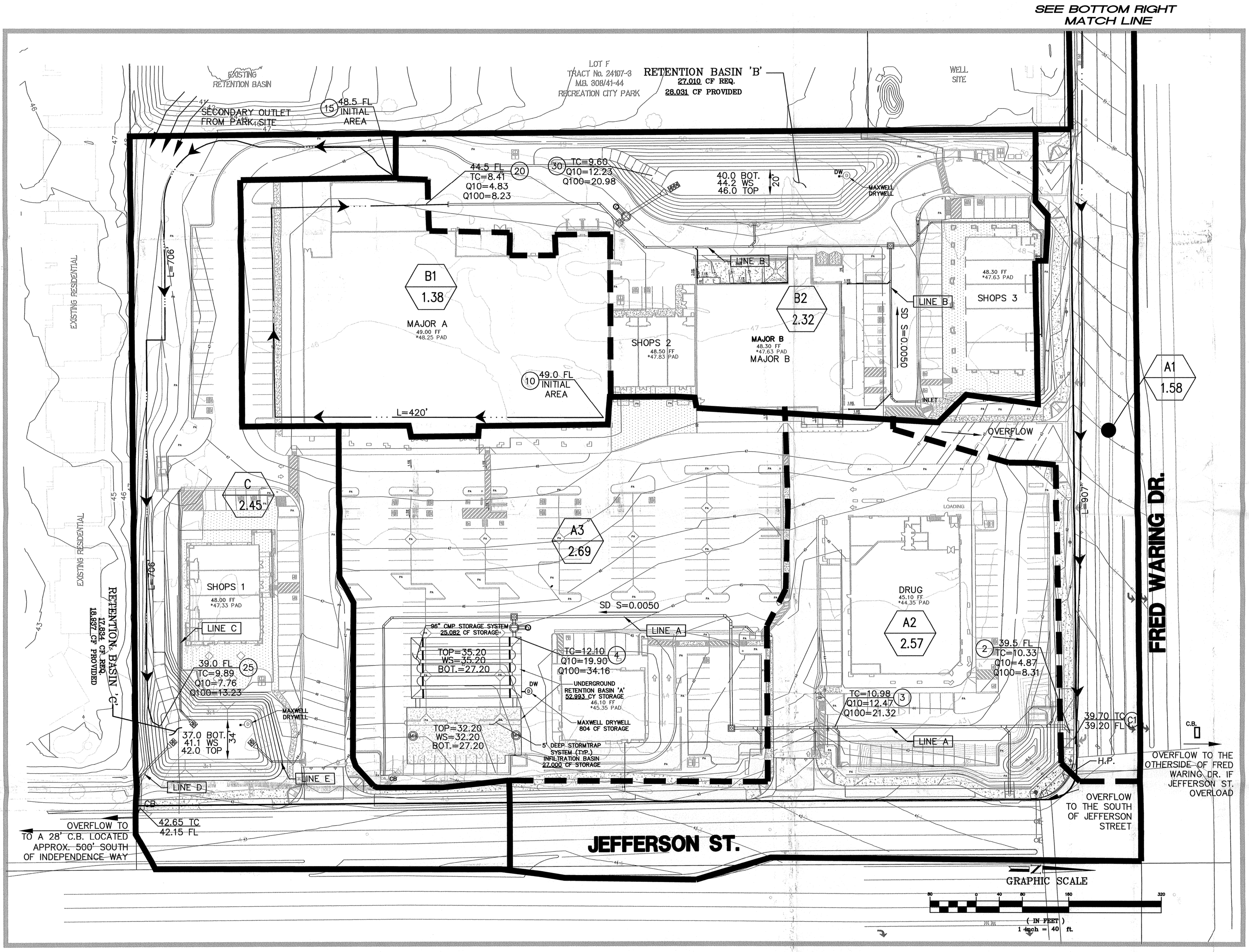
CITY OF LA QUINTA

EXISTING HYDROLOGY MAP
FOR
JEFFERSON SQUARE
SWC JEFFERSON ST. & FRED WARING DRIVE
LA QUNITA, CA

SHEET NO.
1
OF 1 SHTS

EXTERNAL REFERENCES: C07-304_AT-FT Combined C07304 bndy
FILENAME: M:\2007\C07-304 La Quinta Regency\Docs\Hydrology & Hydraulic Study\Final\C07-304 HYD_EX.dwg, LAST SAVED ON: Aug 29 2008 10:53am PLOTTED BY: YANG, ON: Aug 29 2008 10:53am, CFG:

PROPOSED HYDROLOGY MAP
FOR
JEFFERSON SQUARE
LA QUINTA, CALIFORNIA

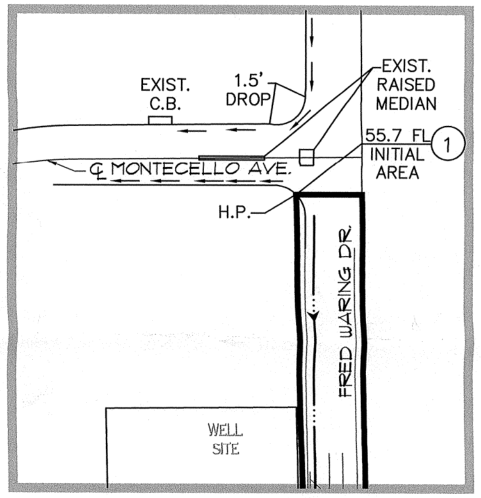


LEGEND

D1 / 0.73 AC	SUBAREA / ACREAGE
①	NODE
T_{10}=8.88	TIME OF CONCENTRATION IN MINUTES
Q_{10}=10.20	RUNOFF FOR 10 YEAR STORM EVENT IN CFS
Q_{100}=15.21	RUNOFF FOR 100 YEAR STORM EVENT IN CFS
849.0FS	ELEVATION
---→---	FLOW PATH
▬ ▪ ▬	SUBAREA BOUNDARY
▬▬	DRAINAGE AREA BOUNDARY
⊗	DRYWELL
(C1)	INLET #C1

HYDROLOGY SUMMARY

DRAINAGE AREA	AREA (AC.)	Q10 (CFS)	Q100 (CFS)
A1	1.58	4.87	8.31
A2	2.57	7.60	13.02
A3	2.69	7.44	12.84
TOTAL:	6.84	19.90	34.16
B1	1.38	4.83	8.23
B2	2.32	7.40	12.76
TOTAL:	3.70	12.23	20.98
C	2.45	7.76	13.23
TOTAL SITE:	12.99	39.89	68.37
		3.07 CFS/AC.	5.26 CFS/AC.



MATCHLINE
SEE TOP LEFT

SCALE: 1"=80'

EXTERNAL REFERENCES: C07-304_A1-FT Combined C07-304 PGMA01 C07-304 UTMA01 C07-304 MA01 C07304 bndy
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MARK	BY	DATE	REVISIONS	APPR.	DATE
ENGINEER				CITY	

DESIGNED BY: YH
DATE: 08-12-07
DRAWN BY: YH
DATE: 08-12-07
CHECKED BY: RWS
DATE: 08-12-07

PREPARED UNDER THE SUPERVISION OF:

RONALD W. SKLEPKO DATE
46216
R.C.E. NO. EXPIRATION DATE

SEAL-ENGINEER
RONALD W. SKLEPKO
No. 46216
Exp. 12-31-06
CIVIL

DRC
Development Resource Consultants, Inc.
Civil Engineering • Land Surveying • Land Planning
800 S. ROCHESTER, SUITE C
ONTARIO, CA 91761 (909) 230-5246

CITY OF LA QUINTA

PROPOSED HYDROLOGY MAP
FOR
JEFFERSON SQUARE
SWC JEFFERSON ST. & FRED WARING DRIVE
LA QUNITA, CA

SHEET NO.
1
OF 1 SHTS

Technical Appendix C

Percolation Rate Update Letter & Original Study

Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

September 21, 2022 KA Project No. 112-22117

Mr. Luis Gomez
goUrban Development
lagomez@gourbandev.com

RE: Update to Geotechnical Engineering Investigation Report
Proposed Jefferson Square Development
44125 Jefferson Street
La Quinta, California

Reference: Geotechnical Engineering Investigation, Proposed Jefferson Square, Jefferson Street & Fred Waring Drive, La Quinta, California, Project No. 112-07036, dated May 25, 2007.

Dear Mr. Gomez:

In accordance with your request, we are providing this letter to update our previous Geotechnical Engineering Investigation report, KA Project No. 112-07036, dated May 25, 2007 for the above-referenced project site.

Based on our review of the proposed site plan and our discussions with the project representative, we understand that the proposed development includes construction of three (3) new multi-story buildings on existing out-lot parcels located at the subject site. These out-lot parcels have been previously graded for the proposed development back then. It is understood that the new proposed structures will be of masonry, wood, or metal framed structure supported on a conventional shallow foundation system.

Based on our recent observation and field work of the subject site, review of the previous geotechnical investigation report, and review of the proposed development site plan, the site and proposed development are consistent with the conclusions and recommendations presented in the previous Geotechnical Engineering Investigation report. Additional information to conform to seismic design requirements of the 2019 California Building Code (2019 CBC) is provided below.

Also, grading recommendations associated with the proposed buildings to be located at the subject site are provided below. In order to prepare these recommendations, we have reviewed the preliminary site plans prepared by Aero Collective and the Geotechnical Engineering Investigation Report prepared by Krazan & Associates, Inc. These recommendations are intended to provide supplemental grading recommendations for preparation of the proposed building pad areas and surrounding paved areas. These recommendations have been requested based on the significant period of time since the initial preparation of the building pad areas.

In the event these structural or grading details are inconsistent with the final design criteria, we should be notified so that we can evaluate the potential impacts of the changes on the recommendations presented in this report and provide an updated report as necessary.

The Site Class per Section 1613 of the 2019 California Building Code (2019 CBC) and ASCE 7-16, Chapter 20 is based upon the site soil conditions. It is our opinion that a Site Class D is most consistent with the subject site soil conditions. For seismic design of the structures based on the seismic provisions of the 2019 CBC, we recommend the following parameters:

Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.2.2
Site Coefficient F_a	1.000	Table 1613.2.3 (1)
S_S	1.948	Section 1613.2.1
S_{MS}	1.948	Section 1613.2.3
S_{DS}	1.298	Section 1613.2.4
Site Coefficient F_v	1.700	Table 1613.2.3 (2)
S_1	0.760	Section 1613.2.1
S_{M1}	1.292	Section 1613.2.3
S_{D1}	0.861	Section 1613.2.4
T_S	0.664	Section 1613.2
PGA_M	0.887g	Figure 22.7

***** Based on Equivalent Lateral Force (ELF) Design Procedure being used.

Site Conditions

It is our understanding, based on a review of the referenced Compaction Reports for Building 1 and Building 3 per the proposed site plan, that remedial grading of the proposed building pad area was performed in 2008. Preliminary site plans indicate the buildings to be of similar size and orientation as the previously graded building pads. Based on our recent site visit and field work, the exposed subgrade associated with the subject building pads was noted to be weathered. The near surface soils were found to possess varying in-place densities and moisture contents.

Building 2 per the proposed site plan is currently been used as an asphalt paved parking lot for the existing shopping center. Site preparation for this area should be perform based on the recommendations presented on the Geotechnical Engineering Investigation referenced above.

Site Preparation

As previously discussed, rough grading of the subject building pads was performed in 2008. Based on visual observations made during a recent site visit, the near surface soils were found to possess varying in-place densities and moisture contents. The near surface soil conditions present at the site are not considered suitable to support the proposed structures. As such, remedial grading is recommended for the proposed development.

Overexcavation and Recompaction – Building and Foundation Areas

To reduce post-construction soil movement and provide uniform support for the buildings and other foundations, overexcavation and recompaction within the proposed building footprint areas should be performed to a minimum depth of at least twelve (12) inches below existing grades. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The exposed subgrade at the base of the overexcavation should then be scarified, moisture-conditioned as necessary, and compacted. The overexcavation and recompaction should also extend laterally five feet (5') beyond edges of the proposed footings or building limits. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill. This will apply to Building 1 and Building 3 (See Figure 1). For Building 2, recommendations presented on the Geotechnical Engineering Investigation referenced above should be follow.

Overexcavation and Recompaction – Proposed Parking Area

To reduce post-construction soil movement and provide uniform support for the proposed parking and drive areas, overexcavation and recompaction of the near surface soil in the proposed parking area should be performed to a minimum depth of at least twelve (12) inches below existing grades or proposed subgrade, whichever is deeper. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The overexcavation and recompaction should also extend laterally at least three (3) feet beyond edges of the proposed paving limits or to the property boundary. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

Any buried structures encountered during construction should be properly removed and the resulting excavations backfilled with Engineered Fill, compacted to a minimum of 95 percent of the maximum dry density based on ASTM Test Method D1557. Excavations, depressions, or soft and pliant areas extending below planned finished subgrade levels should be cleaned to firm, undisturbed soil and backfilled with Engineered Fill. In general, any septic tanks, debris pits, cesspools, or similar structures should be entirely removed. Concrete footings should be removed to an equivalent depth of at least 3 feet below proposed footing elevations or as recommended by the Soils Engineer. Any other buried structures encountered, should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with Engineered Fill.

The upper soils, during wet winter months become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Soils Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section and the Engineered Fill section.

The recommendations and limitations provided in the Geotechnical Engineering Investigation Report prepared by Krazan & Associates, Inc., Project No. 112-07036 apply to this letter and should be incorporated into the design and construction of the proposed development.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

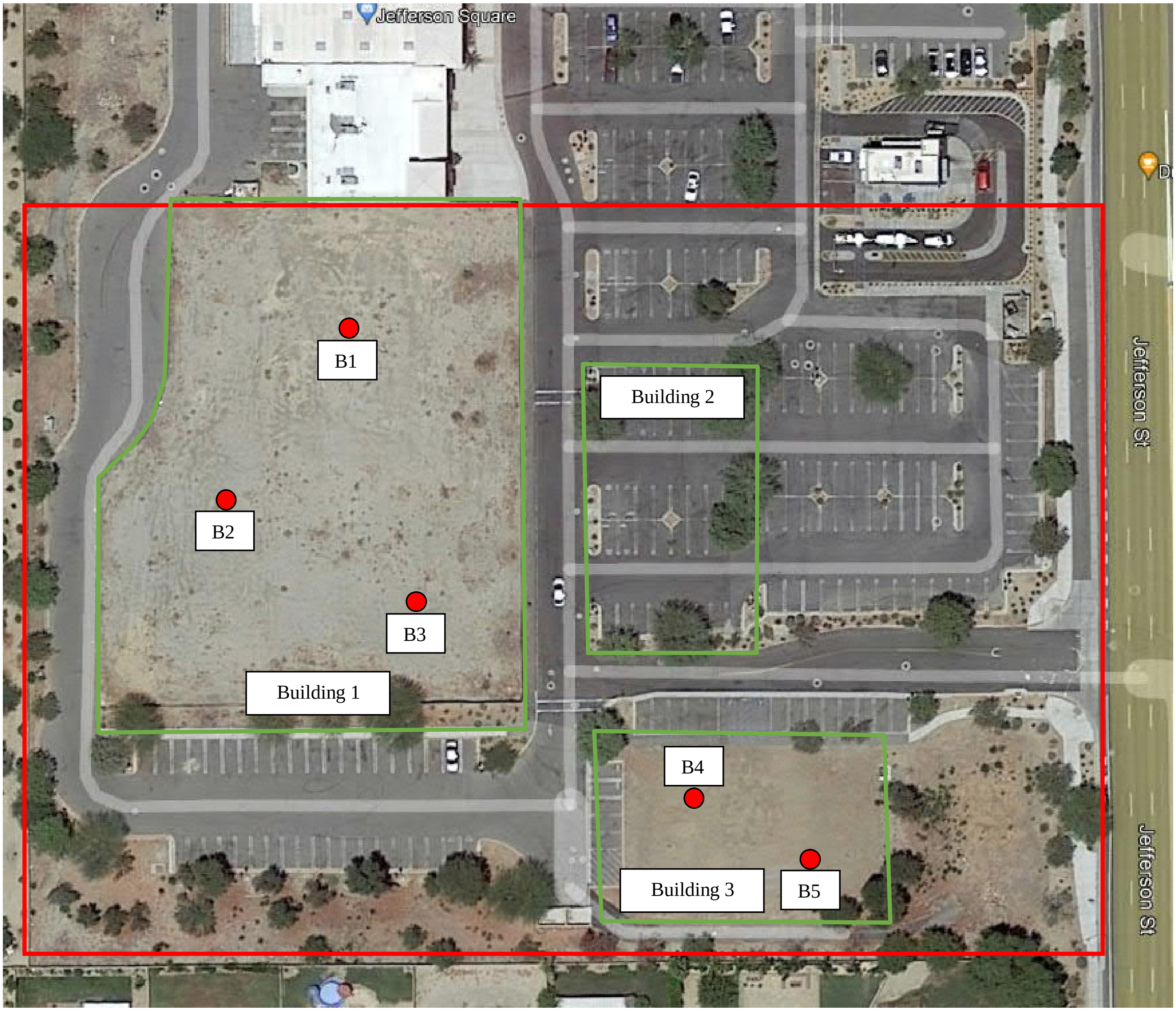
Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Jorge A Pelayo

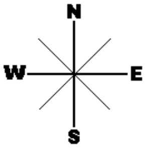
REGISTERED PROFESSIONAL ENGINEER
JORGE A. PELAYO
91269
CIVIL
STATE OF CALIFORNIA

Jorge A. Pelayo, MS, PE
Project Engineer
RCE No. 91269

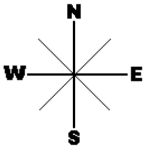
Figures



● APPROXIMATE BORING LOCATION



SITE MAP	**Scale:** NTS	**Date:** September, 2022	Krazan **GEOTECHNICAL ENGINEERING**
PROPOSED JEFFERSON SQUARE DEVELOPMENT 44125 JEFFERSON STREET LA QUINTA, CALIFORNIA	**Drawn by:** AM	**Approved by:** JAP	
	Project No. 112-22117	**Figure No.** 1	



VICINITY MAP	**Scale:** NTS	**Date:** September, 2022	Krazan GEOTECHNICAL ENGINEERING
PROPOSED JEFFERSON SQUARE DEVELOPMENT **44125 JEFFERSON STREET** **LA QUINTA, CALIFORNIA**	**Drawn by:** AM	**Approved by:** JAP	
	Project No. 112-22117	**Figure No.** 2	

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED JEFFERSON SQUARE
JEFFERSON STREET AND FRED WARING DRIVE
LA QUINTA, CALIFORNIA

PROJECT NO. 112-07036
MAY 25, 2007

PREPARED FOR:

REGENCY CENTERS, INC.
36 EXECUTIVE PARK, SUITE 100
IRVINE, CALIFORNIA 92614

ATTENTION: MR. THOMAS MIDDLETON

PREPARED BY:

KRAZAN & ASSOCIATES, INC.
4221 BRICKELL STREET
ONTARIO, CALIFORNIA 91761
(909) 974-4400

SEISMICITY, LIQUEFACTION POTENTIAL AND SEISMIC INDUCED SETTLEMENT

Seismicity is a general term relating to the abrupt release of accumulated strain energy in the rock materials of the earth's crust in a given geographical area. The recurrence of accumulation and subsequent release of strain have resulted in faults and fault systems. Fault patterns and density reflect relative degrees of regional stress through time, but do not necessarily indicate recent seismic activity; therefore, the degree of seismic risk must be determined or estimated by the seismic record in any given region. Soil liquefaction is a state of soil particle suspension caused by a complete loss of strength when the effective stress drops to zero. Liquefaction normally occurs under saturated conditions in soils such as sand in which the strength is purely frictional. However, liquefaction has occurred in soils other than clean sand. Liquefaction usually occurs under vibratory conditions such as those induced by seismic events. To evaluate the liquefaction potential of the site, the following items were evaluated:

1) Soil type
2) Groundwater depth
3) Relative density
4) Initial confining pressure
5) Intensity and duration of ground shaking

The soils beneath the site consist predominately of dense and stiff materials. Groundwater is expected to be a depth of greater than 50 feet. The potential for liquefaction is considered to be low based on the absence of shallow groundwater and the relatively dense and stiff materials underlying the site.

One of the most common phenomena during seismic shaking accompanying any earthquake is the induced settlement of loose unconsolidated soils. Based on site subsurface conditions and the moderate to high seismicity of the region, any loose granular materials at the site could be vulnerable to this potential hazard. Our analysis of dynamic densification of "dry" soil above the water table in the upper 50 feet of existing soil profile was performed. The seismic densification of dry to damp alluvial sandy soils due to onsite seismic activity is calculated to have total settlements of approximately 2 to 3 inches. To reduce the effects and magnitude of the seismic induced settlements, remedial grading is recommended, as discussed later in this report. Following completion of the recommended remedial grading and foundation design, we estimate that differential settlements of approximately ½ inch in 20 feet laterally may result from seismic densification.

SOIL CORROSIVITY

Corrosion tests were performed to evaluate the soil corrosivity to the buried structures. The results of the tests are included as follows:

Parameter	Results	Test Method
Resistivity	12,500 ohms-cm	Caltrans
Sulfate	Less than 5 mg/kg	EPA 9038
Chloride	23.4 mg/kg	EPA 9253
pH	9.02	EPA 9045C

Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

July 8, 2008 KA Project No. 112-07036

Mr. Thomas Middleton
Regency Centers Inc.
36 Executive Park, Suite 100
Irvine, CA 92614

RE: Percolation Rate Study
Proposed Shopping Center
Jefferson Street and Fred Waring Drive
La Quinta, California

Dear Mr. Middleton:

In accordance with your request, we have performed percolation testing at the subject site. This report documents the services and provides the results of our field and laboratory study.

PURPOSE AND SCOPE

This study was conducted to measure the approximate percolation rates within the near-surface strata of the site. It is our understanding that the data will be used by the project design team in their development of the on site storm water disposal system. The percolation testing conducted at the subject site was performed in general accordance with the City of La Quinta, Public Works Department, Engineering Bulletin #06-16, Hydrology and Hydraulic Report Criteria for Storm Drain Systems, USBR Percolation Test Standard. Our scope of services was outlined in our change order dated June 11, 2008 (KA Project No. 112-07036) and included the following:

- Conducting three (3) percolation tests within the area of the proposed detention basins at the subject site. Two of the percolation tests were performed at depths of approximately 10 to 13 feet below existing grade. The percolation test for the underground basin was performed at a depth of approximately 20 to 23 feet below the existing grade.

- A total of three exploratory borings were performed adjacent to the percolation tests. These exploratory borings were extended to a depth of at least 15 feet below the bottom of each test.

- Preparation of this report summarizing the results of our investigation.

SITE LOCATION AND SITE DESCRIPTION

The proposed site is located at the intersection of Jefferson Street and Fred Waring Drive in La Quinta, California. The site is roughly rectangular in shape and roughly sloping to the north and east. At the time of our field investigation and testing program, the site was undeveloped and covered with sparse bushes and exposed soil.

SOIL PROFILE AND SUBSURFACE CONDITIONS

The subsurface profile generally consisted of loose to dense fine sand and fine silty sands extending to the maximum depth explored. During the excavation of the borings, continuous visual and physical examination was conducted on the soil cuttings. Significant silt or clay layers/lenses were not identified as being encountered in any of the borings at the site.

Corrosion tests were performed to evaluate the soil corrosivity to the buried structures. The results of the tests are included as follows:

Parameter	Results	Test Method
Resistivity	2,460 ohms-cm	Caltrans
Sulfate	268 mg/kg	EPA 9038
Chloride	117 mg/kg	EPA 9253
pH	7.52	EPA 9045C

Excessive sulfate or chloride in either the soil or native water may result in an adverse reaction between the cement in concrete and the soil. California Building Code has developed criteria for evaluation of sulfate and chloride levels and how they relate to cement reactivity with soil and/or water. The soil samples from the subject site were tested to have a low sulfate and chloride concentrations. Therefore, no special design requirements are necessary to compensate for sulfate or chloride reactivity with the cement. Electrical resistivity testing of the soil indicates that the onsite soils may have a mild potential for metal loss from electrochemical corrosion process.

PERCOLATION TESTING

Two methods for percolation testing are given in the City of La Quinta, Public Works Department, Engineering Bulletin #06-16, Hydrology and Hydraulic Report Criteria for Storm Drain Systems, USBR Percolation Test Standard. Either ASTM Double Ring Infiltrometer Test or U.S. Bureau of Reclamation Test were recommended by the City of La Quinta as approved test methods. The U.S. Bureau of Reclamation method was determined to be the most prudent for the subject site.

The test locations are presented on the attached site plan, Figure 1. Detail results of the percolation tests are attached. The data is presented in tabular format. The soil percolation rates are based on tests conducted with clean water. The infiltration rates may vary with time as a result of soil clogging from water impurities. A factor of safety should be incorporated into the design of the basins to compensate for these factors. In addition, periodic maintenance consisting of clearing the bottom of the basins should be expected.

The highest percolation rate ranges from 4.25 inches to 6.5 inches per hour. A minimum factor of safety of 2.0 should be assigned to this value. The recommended design percolation rate should be a maximum of 2.0 inches per hour.

LIMITATIONS

Geotechnical Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although our services were conducted in accordance with current engineering practice, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Soils Engineering, physical changes in the site, either due to excavation or fill placement, new agency regulations, or possible changes in the proposed structure after the soils report is completed may require the soils report to be professionally reviewed. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that 1 year be considered a reasonable time for the usefulness of this report.

The scope of our services did not include a groundwater study and was limited to the performance of percolation testing and the submitted of the data only. Our services did not include those associated with an Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices. The work conducted through the course of this investigation, including the preparation of this report, have been performed in accordance with the generally accepted standards of geotechnical engineering practice, which existed in the geographic area at the time the report was written. No other warranty, express or implied, is made.

It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

If you have any questions regarding the services performed or the data reported herein, or if we may be of further assistance, please do not hesitate to contact our office at (909) 974-4400.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Christopher Robinson, PG
Project Geologist
PG No. 8420

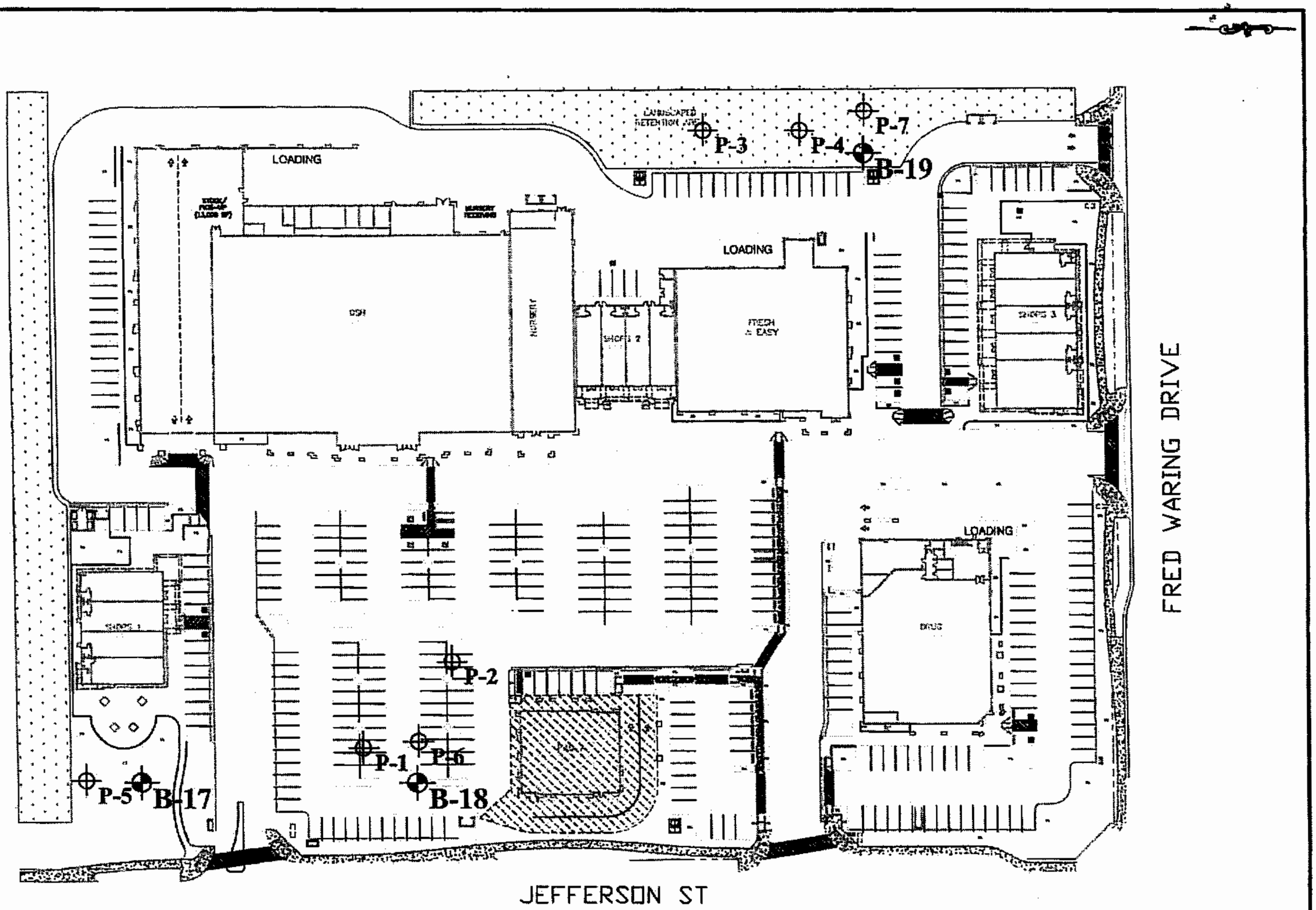
CHRISTOPHER ROBINSON
No. 8420
Exp 10/08

James M. Kellogg, PE
Project Engineer
RCE No. 65092

JAMES M. KELLOGG
No 65092
Expires Sep 30, 2009
CIVIL

CR/JMK:rm

Attachments: Figure 1, Site Plan
Results of Percolation Tests
Boring Logs



LEGEND

⌖ B-18 APPROXIMATE BORING LOCATION

⌖ P-7 APPROXIMATE PERCOLATION TEST LOCATION

PROPOSED JEFFERSON SQUARE
LA QUINTA, CA

SITE PLAN

Scale: NTS	Date: JULY 2008
Drawn by: RM	Approved by: JK
Project No. 112-07036	Figure No. 1

Krazan
SITE DEVELOPMENT ENGINEERS
Offices Serving the Western United States

Log of Drill Hole B-17

Project: Proposed Jefferson Square
Project No: 112-07036

Client: Regency Centers
Figure No.: A-17

Location: La Quinta, CA
Logged By: WP

Depth to Water>
Initial:
At Completion:

SUBSURFACE PROFILE			SAMPLE				
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.	Water Content (%) 10 20 30 40
		Ground Surface					
0		***SILTY SAND (SM),*** fine grained, light brown, slightly moist					
2 4		***SILTY SAND/SAND (SM/SP),*** fine to medium grained, light brown, slightly moist					
6 8		***SILTY SAND/SAND (SM/SP),*** fine grained, brown, slightly moist, medium dense					
10 12		***SAND (SP),*** very fine grained, yellow-tan, slightly moist, medium dense					
14		***SILTY SAND (SM),*** medium to coarse grained, tan, medium dense					
16 18		***SILTY SAND/SAND (SM/SP),*** fine to medium grained, light brown, slightly moist					
20		***SILTY SAND/SAND (SM/SP),*** fine grained, tan-brown					
22		***SAND (SP),*** medium to coarse grained, light brown, dense					
24		***SAND (SP),*** medium to coarse grained, light brown, dense					
26 28 30		End of Borehole Total Depth = 25' No groundwater was encountered during drilling Hole backfilled with soil cuttings and tamped 06/26/08					

Drill Method: Hollow Stem Auger
Drill Date: 06/26/08

Drill Rig: CME 55
Hole Size: 6"

Krazan and Associates

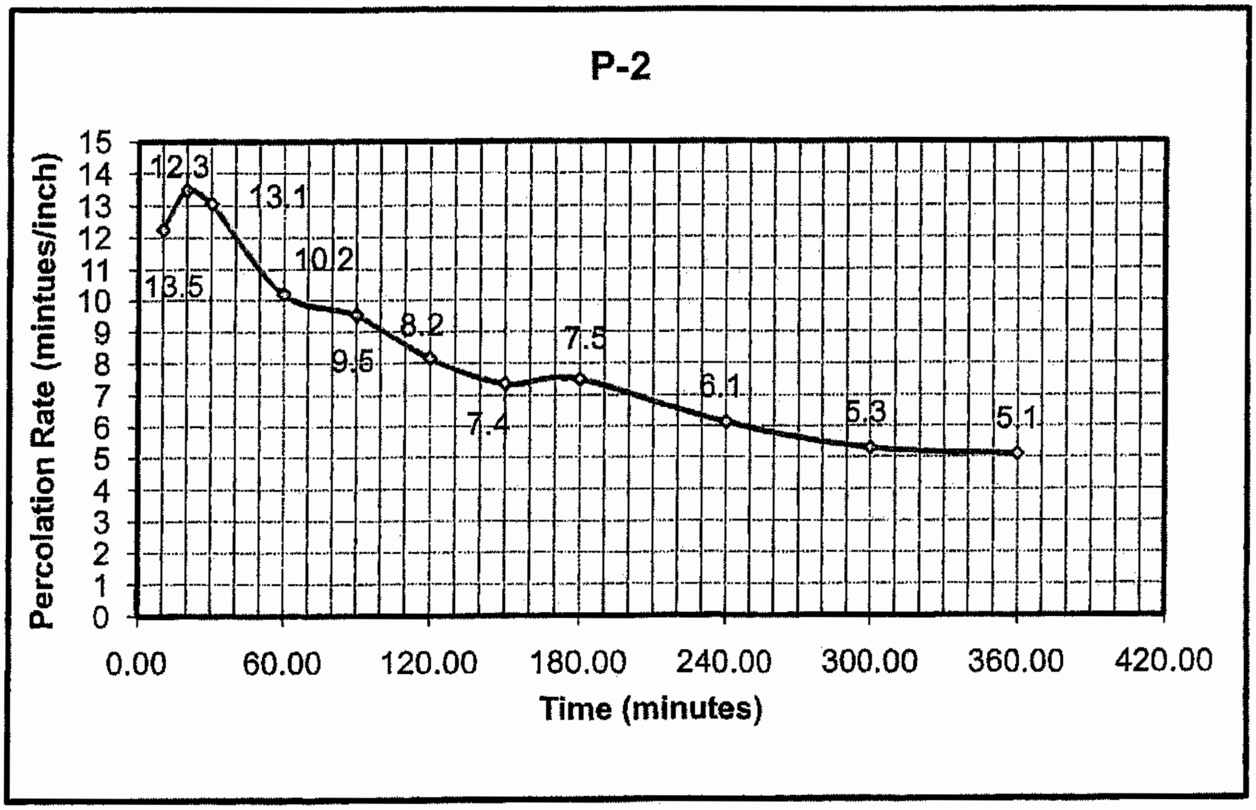
Driller: JG
Elevation: See Site Plan

Sheet: 1 of 1

RESULTS OF PERCOLATION TESTS

Project #	112-07036			**Date**	July 3, 2008
Project Name	Jefferson Square			**Recharges**	24 hr pre-saturated
Project Address	Jefferson Street and Fred Waring Drive				
Test No:	P-6	**Total Depth**	13 feet	**Test Size**	6 inches
Depth To Water	10 feet	**Soil Classification**	SM	**Gallons / hours**	3.75 Gals / 6 hrs

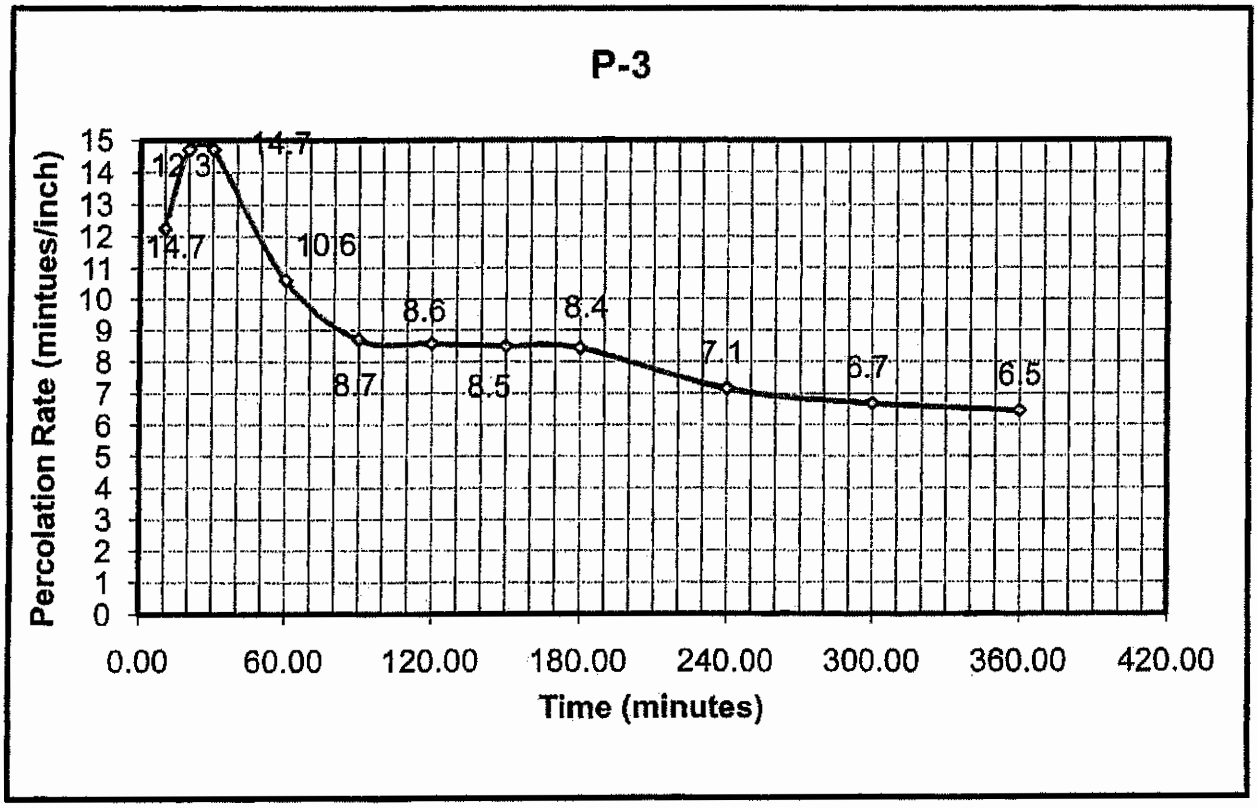
Reading	Elasped Time(min.)	Incremental Time (min.)	Gallons to keep Constant Head		Incremental Percolation Rate (in/hr)
Start	0	0.00	0.0		
2	10.00	10.00	0.3		12.3
3	20.00	10.00	0.6		13.5
4	30.00	10.00	0.8		13.1
5	60.00	30.00	1.3		10.2
6	90.00	30.00	1.8		9.5
7	120.00	30.00	2.0		8.2
8	150.00	30.00	2.3		7.4
9	180.00	30.00	2.8		7.5
10	240.00	60.00	3.0		6.1
11	300.00	60.00	3.3		5.3
12	360.00	60.00	3.8		5.1
13					
14					
15					
	Percolation Rate in Inches per Hour				5.1



RESULTS OF PERCOLATION TESTS

Project #	**112-07036**			**Date**	**July 3, 2008**
Project Name	Jefferson Square			**Recharges**	24 hr pre-saturated
Project Address	Jefferson Street and Fred Waring Drive				
Test No:	P-6	**Total Depth**	13 feet	**Test Size**	6 inches
Depth To Water	10 feet	**Soil Classification**	SM	**Gallons / hours**	4.75 Gals / 6 hrs

Reading	**Elasped Time(min.)**	**Incremental Time (min.)**	**Gallons to keep Constant Head**		**Incremental Percolation Rate (in/hr)**
Start	0	0.00	0.0		
2	10.00	10.00	0.3		12.3
3	20.00	10.00	0.6		14.7
4	30.00	10.00	0.9		14.7
5	60.00	30.00	1.3		10.6
6	90.00	30.00	1.6		8.7
7	120.00	30.00	2.1		8.6
8	150.00	30.00	2.6		8.5
9	180.00	30.00	3.1		8.4
10	240.00	60.00	3.5		7.1
11	300.00	60.00	4.1		6.7
12	360.00	60.00	4.7		6.5
13					
14					
15					
	Percolation Rate in Inches per Hour				**6.5**



Enviro - Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Krazan & Associates, Inc.**
4221 Brickell St.
Ontario, CA 91761
Tel(909)974-4400 Fax(909)974-4022

PROJECT: **La Quinta**

MATRIX: SOIL
SAMPLING DATE: 12/24/07
REPORT TO: MR. SCOTT KELLOGG
DATE RECEIVED: 01/02/08
DATE ANALYZED: 01/02-03/08
DATE REPORTED: 01/04/08

SAMPLE I.D.: **112-07036 / B-100-3'** LAB I.D.: 080102-1

PARAMETER	SAMPLE RESULT	UNIT	PQL	DF	EPA METHOD
RESISTIVITY	2460	OHMS-CM	100000*	--	CALTRANS
SULFATE	268	MG/KG	10	1	EPA 9038
CHLORIDE	117	MG/KG	10	1	EPA 9253
pH	7.52	pH/UNIT	--	--	EPA 9045C

COMMENTS
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = DF X PQL
MG/KG = MILLIGRAM PER KILOGRAM = PPM
OHMS-CM = OHMS-CENTIMETER
RESISTIVITY = 1/CONDUCTIVITY
* = HIGH LIMIT

DATA REVIEWED AND APPROVED BY:
CAL-DHS ELAP CERTIFICATE No.: 1555

Technical Appendix D

Rational Method Analysis Proposed Condition

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2015 Advanced Engineering Software (aes)
                      (Rational Tabling Version 22.0)
                   Release Date: 07/01/2015  License ID 1510

                           Analysis prepared by:

                           DRC Engineering, Inc.
                   160 South Old Springs Road, Suite 210
                          Anaheim Hills,  CA 92808
                                714-685-6860

 ************************** DESCRIPTION OF STUDY **************************
* 21-177 JEFFERSON SQUARE RESIDENTIAL                                      *
* PROPOSED CONDITION                                                       *
* 10-YEAR STORM EVENT                                                      *
 **************************************************************************

  FILE NAME: 8619P10.DAT
  TIME/DATE OF STUDY: 08:15 11/03/2022
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.630
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  2.100
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   1.247
  SLOPE OF INTENSITY DURATION CURVE = 0.6000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+--------------------------------------------------------------------------+
| BEGIN AREA A                                                             |
| PROPOSED SUBAREA A1                                                      |
|                                                                          |
+--------------------------------------------------------------------------+
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   907.00
  UPSTREAM ELEVATION(FEET) =     55.70
  DOWNSTREAM ELEVATION(FEET) =     39.50
  ELEVATION DIFFERENCE(FEET) =     16.20
  TC = 0.303*[(  907.00**3)/(    16.20)]**.2 =   10.333
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.583
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8603
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      4.87
  TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      4.87

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.87
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1112.00 FEET.

+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A2                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.430
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8593
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.57   SUBAREA RUNOFF(CFS) =    7.58
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      12.45
  TC(MIN.) =   11.11

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   445.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.45
  PIPE TRAVEL TIME(MIN.) =   1.35    Tc(MIN.) =   12.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1557.00 FEET.

+--------------------------------------------------------------------------+
| PROPOSED SUBEAREA A3                                                     |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.203
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8578
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =    7.39
  TOTAL AREA(ACRES) =        6.8   TOTAL RUNOFF(CFS) =      19.84
  TC(MIN.) =   12.46

+--------------------------------------------------------------------------+
| END AREA A                                                               |
| BEGIN AREA B                                                             |
| PROPOSED SUBAREA B1                                                      |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   342.00
  UPSTREAM ELEVATION(FEET) =     50.20
  DOWNSTREAM ELEVATION(FEET) =     46.30
  ELEVATION DIFFERENCE(FEET) =      3.90
  TC = 0.323*[(  342.00**3)/(     3.90)]**.2 =    8.147
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.132
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8268
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      5.23
  TOTAL AREA(ACRES) =      1.53   TOTAL RUNOFF(CFS) =      5.23

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   274.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.23
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     616.00 FEET.

+--------------------------------------------------------------------------+
| PROPOSED SUBAREA B2                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.849
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8618
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.13   SUBAREA RUNOFF(CFS) =    7.07
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =      12.29
  TC(MIN.) =    9.17

+--------------------------------------------------------------------------+
| END AREA B                                                               |
| BEGIN AREA C                                                             |
| PROPOSED AREA C1                                                         |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS CONDOMINIUM
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   533.00
  UPSTREAM ELEVATION(FEET) =     46.90
  DOWNSTREAM ELEVATION(FEET) =     39.00
  ELEVATION DIFFERENCE(FEET) =      7.90
  TC = 0.359*[(  533.00**3)/(     7.90)]**.2 =   10.277
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.595
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7612
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      6.81
  TOTAL AREA(ACRES) =      2.49   TOTAL RUNOFF(CFS) =      6.81

+--------------------------------------------------------------------------+
| END AREA C                                                               |
```

```
|                                                                            |
| END STUDY                                                                  |
+----------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.5  TC(MIN.) =     10.28
  PEAK FLOW RATE(CFS)   =       6.81
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2015 Advanced Engineering Software (aes)
                      (Rational Tabling Version 22.0)
                   Release Date: 07/01/2015  License ID 1510

                           Analysis prepared by:

                           DRC Engineering, Inc.
                   160 South Old Springs Road, Suite 210
                          Anaheim Hills,  CA 92808
                                714-685-6860

 ************************** DESCRIPTION OF STUDY **************************
* 21-177 JEFFERSON SQUARE RESIDENTIAL                                      *
* PROPOSED CONDITION                                                       *
* 100-YEAR STORM EVENT                                                     *
 **************************************************************************

  FILE NAME: 8619P100.DAT
  TIME/DATE OF STUDY: 08:29 11/03/2022
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.630
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  2.100
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   2.100
  SLOPE OF INTENSITY DURATION CURVE = 0.6000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)      (FT)   SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================= ======   ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+--------------------------------------------------------------------------+
| BEGIN AREA A                                                             |
| PROPOSED SUBAREA A1                                                      |
|                                                                          |
+--------------------------------------------------------------------------+
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   907.00
  UPSTREAM ELEVATION(FEET) =     55.70
  DOWNSTREAM ELEVATION(FEET) =     39.50
  ELEVATION DIFFERENCE(FEET) =     16.20
  TC = 0.303*[(  907.00**3)/(    16.20)]**.2 =   10.333
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.033
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8712
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      8.31
  TOTAL AREA(ACRES) =      1.58   TOTAL RUNOFF(CFS) =      8.31

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.00
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.31
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   11.02
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1112.00 FEET.

+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A2                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.806
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8705
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.57   SUBAREA RUNOFF(CFS) =   12.99
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      21.29
  TC(MIN.) =   11.02

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

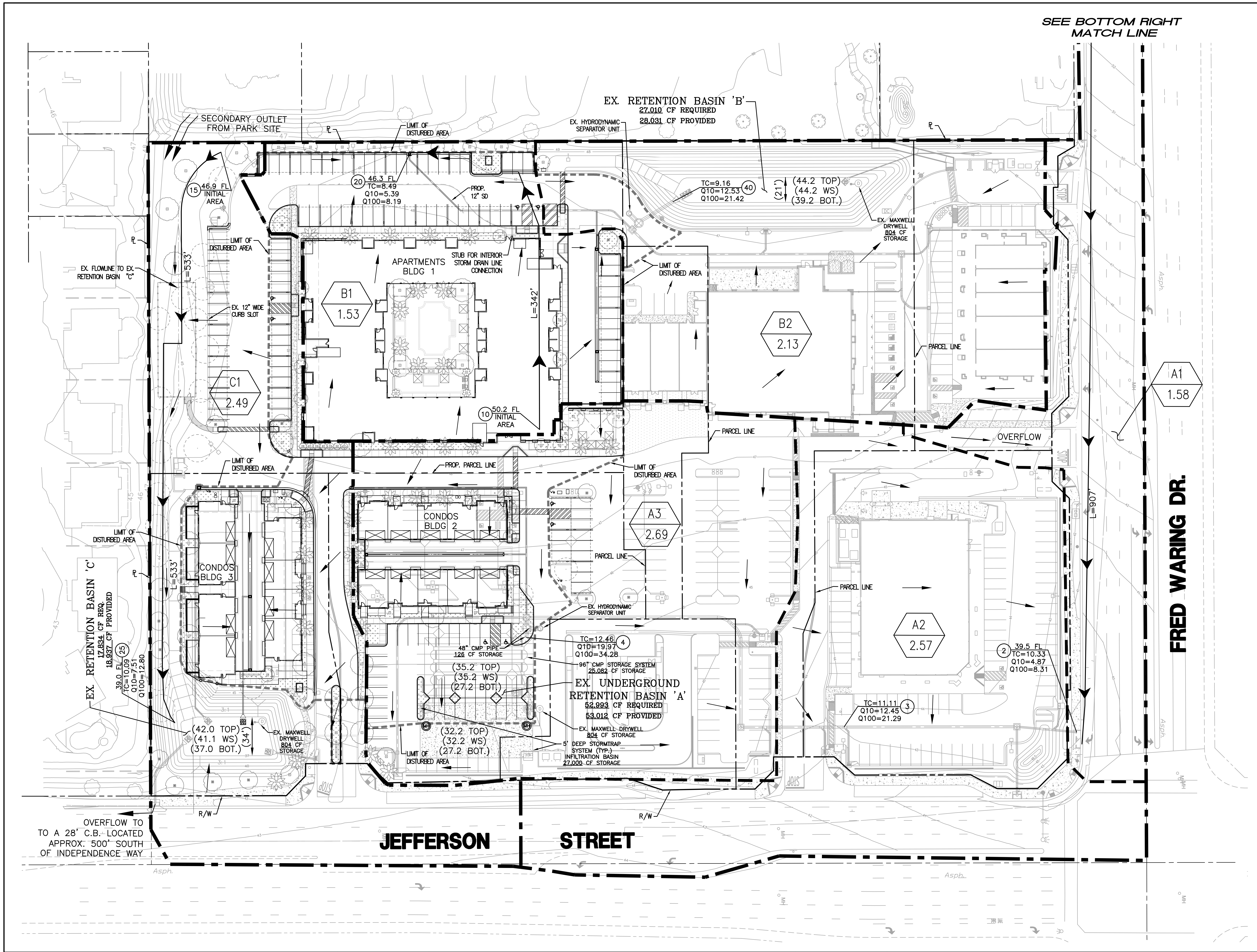
```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   445.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  22.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.29
  PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   12.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1557.00 FEET.

+--------------------------------------------------------------------------+
| PROPOSED SUBAREA A3                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.453
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8692
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =   12.75
  TOTAL AREA(ACRES) =        6.8   TOTAL RUNOFF(CFS) =      34.05
  TC(MIN.) =   12.23

+--------------------------------------------------------------------------+
| END AREA A                                                               |
| BEGIN AREA B                                                             |
| PROPOSED AREA B1                                                         |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   342.00
  UPSTREAM ELEVATION(FEET) =     50.20
  DOWNSTREAM ELEVATION(FEET) =     46.30
  ELEVATION DIFFERENCE(FEET) =      3.90
  TC = 0.323*[(  342.00**3)/(     3.90)]**.2 =    8.147
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.958
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8479
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      9.03
  TOTAL AREA(ACRES) =      1.53   TOTAL RUNOFF(CFS) =      9.03

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   274.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.03
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =    9.05
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     616.00 FEET.

+--------------------------------------------------------------------------+
| PROPOSED SUBAREA B2                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.534
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8728
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.13   SUBAREA RUNOFF(CFS) =   12.15
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =      21.17
  TC(MIN.) =    9.05

+--------------------------------------------------------------------------+
| END AREA B                                                               |
| BEGIN AREA C                                                             |
| PROPOSED SUBAREA C1                                                      |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS CONDOMINIUM
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   533.00
  UPSTREAM ELEVATION(FEET) =     46.90
  DOWNSTREAM ELEVATION(FEET) =     39.00
  ELEVATION DIFFERENCE(FEET) =      7.90
  TC = 0.359*[(  533.00**3)/(     7.90)]**.2 =   10.277
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.053
  CONDOMINIUM DEVELOPMENT RUNOFF COEFFICIENT = .7996
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =     12.05
  TOTAL AREA(ACRES) =      2.49   TOTAL RUNOFF(CFS) =     12.05

+--------------------------------------------------------------------------+
| END AREA C                                                               |
```

```
|                                                                            |
| END STUDY                                                                  |
+----------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        2.5  TC(MIN.) =     10.28
  PEAK FLOW RATE(CFS)    =      12.05
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Technical Appendix E

Hydrology Map
Proposed Condition

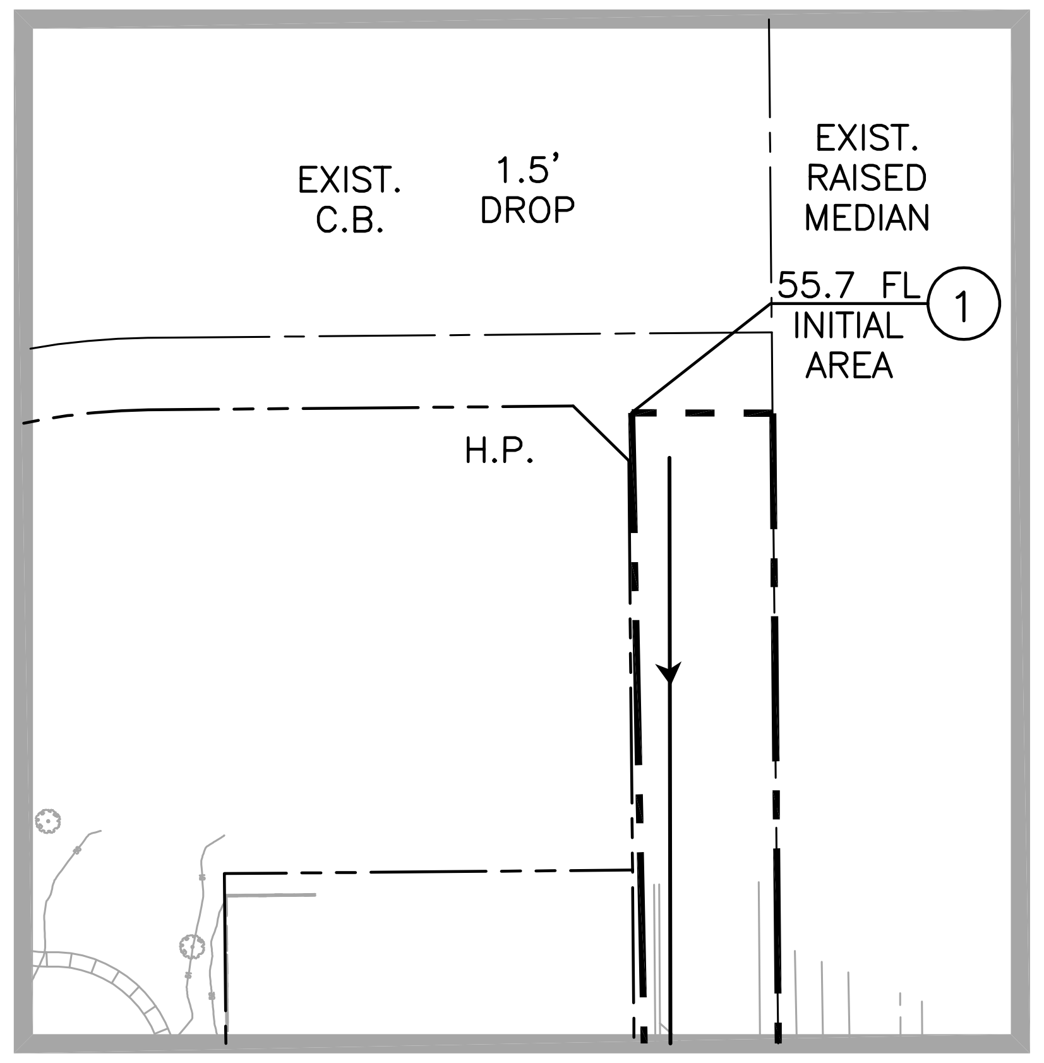


PROPOSED HYDROLOGY MAP
FOR
JEFFERSON SQUARE RESIDENTIAL
LA QUINTA, CALIFORNIA

LEGEND

A1 / X.XX	SUBAREA ACREAGE
①	NODE
① T_{10}=X.XX	TIME OF CONCENTRATION IN MINUTES
Q_{10}=XX.XX	RUNOFF FOR 10 YEAR STORM EVENT IN CFS
Q_{100}=XX.XX	RUNOFF FOR 100 YEAR STORM EVENT IN CFS
XXX.XFS	ELEVATION
---→---	FLOW PATH
━ ▬ ━	SUBAREA BOUNDARY
━━━	DRAINAGE AREA BOUNDARY
⊗	DRYWELL
(C1)	INLET #C1

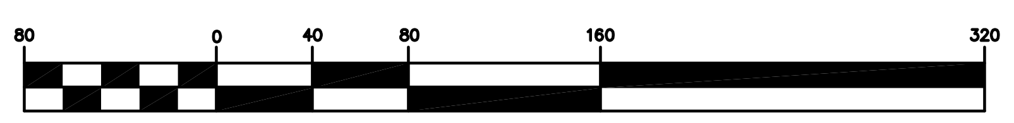
HYDROLOGY SUMMARY			
DRAINAGE AREA	AREA (AC.)	Q10 (CFS)	Q100 (CFS)
A1	1.58	4.87	8.31
A2	2.57	7.58	12.99
A3	2.69	7.39	12.75
TOTAL:	6.84	19.84	34.05
B1	1.53	5.23	9.03
B2	2.13	7.07	12.15
TOTAL:	3.66	12.29	21.17
C	2.49	6.81	12.05
TOTAL SITE:	12.99	38.94	67.27
		3.00 CFS/AC.	5.18 CFS/AC.



MATCHLINE
SEE TOP LEFT

SCALE: 1"=80'

GRAPHIC SCALE



(IN FEET)
1 inch = 40 ft.

MARK	BY	DATE	REVISIONS	APPR.	DATE
ENGINEER				CITY	

DESIGNED BY: DG
DATE: 12-01-22
DRAWN BY: DG
DATE: 12-01-22
CHECKED BY: CM
DATE: 12-01-22

SEAL—ENGINEER

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

CITY OF LA QUINTA

PROPOSED HYDROLOGY MAP
FOR
JEFFERSON SQUARE RESIDENTIAL
SWC JEFFERSON ST. & FRED WARING DRIVE
LA QUNITA, CA

SHEET NO.
1
OF 1 SHTS

EXTERNAL REFERENCES: 21177mac01 21177bn101 21177ct101 21177ct102 21177 CG101 21177 AR Site 21177 LA Trees 21177 CE Dutch Bros
FILENAME: M:\2021\21-177 Go Urban La Quinta Jackson Sq\HM\21177 PR HM.dwg, LAST SAVED ON: Dec 01 2022 6:29am PLOTTED BY: DREW, ON: Dec 01 2022 6:29am, CFG: