PRELIMINARY
HYDROLOGY CALCULATIONS

FOR

PROLOGIS PARK MORENO VALLEY-EUCALYPTUS
TPM 35679
CITY CASE NUMBER PA07-0084
S/O 60 FREEWAY BETWEEN PETTIT STREET AND QUINCY STREET
MORENO VALLEY, CALIFORNIA 92555

PREPARED FOR

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REVISED DECEMBER 13, 2007
REVISED MAY 13, 2008
REVISED NOVEMBER 4, 2008

THIENES ENG. JOB NO. 2818

PREPARED BY

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14349 FIRESTONE BOULEVARD
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PRELIMINARY
HYDROLOGY CALCULATIONS

FOR

PROLOGIS PARK MORENO VALLEY-
EUCALYPTUS
TPM 35679
CASE NO. PA07-0084

PREPARED BY BRIAN WEIL
UNDER THE SUPERVISION OF

HAIDOOK AGHAIAN DATE:
R.C.E. 43293
EXP. 12/31/10

List of Technical Appendices

Technical Appendix A	Hydrologic Analysis Existing Condition - Rational Method
Technical Appendix B	Hydrologic Analysis Existing Condition – Flood Hydrograph
Technical Appendix C	Street Capacity Calculations (Eucalyptus Avenue) Hydrologic Analysis Proposed Condition – Rational Method
Technical Appendix D	Hydrologic Analysis Proposed Condition – Flood Hydrograph
Technical Appendix E	Hydrology Maps

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Introduction

A preliminary hydrology report for the Prologis Park project has been completed. The project site is located south of State Route 60 and west of the Quincy Channel in the City of Moreno Valley, California. The site encompasses approximately 120 acres that generally drain to the Quincy Channel, which runs the entire length of the east boundary of the site. Please see Vicinity Map on page 3.

Discussion

The site currently is comprised of barren land and orchards. Quincy Channel runs along the eastern boundary of the site. An unnamed smaller wash, tributary to Quincy Channel, diagonals near the southwest boundary of the site.

The site is proposed to be developed as an industrial complex with six large buildings and associated streets, truck docks, and parking areas. Eucalyptus Avenue will be re-aligned through the project.

State Route 60 does not have any drainage improvements along the north boundary of the project. Therefore, it is assumed that flows generated south of the centerline of State Route 60, between the west and east property lines projected north, will flow onto the site and require drainage improvements to intercept the flow.

Preliminary rational method analyses were completed for the existing and proposed conditions of the project site. These analyses provide for an estimate of rational method peak flows generated on the site and the flow rates that the proposed onsite storm drains and catch basins will be required to convey.

The site incorporates six detention basins for both water quality and water quantity purposes. Once the runoff has been treated and mitigated to the existing level, the flows will be released through two outlets to the Quincy Channel. Preliminary existing and proposed condition flood hydrograph analyses have been completed to provide an order-of-magnitude estimate of the required storage volumes.

Hydrologic Analysis

The hydrologic analyses were completed in accordance with the Riverside County Flood Control & Water Conservation District (RCFC&WCD) Hydrology Manual. Both rational method and flood hydrograph analyses were completed for the 100-, 10-, 5-, and 2-year return events.

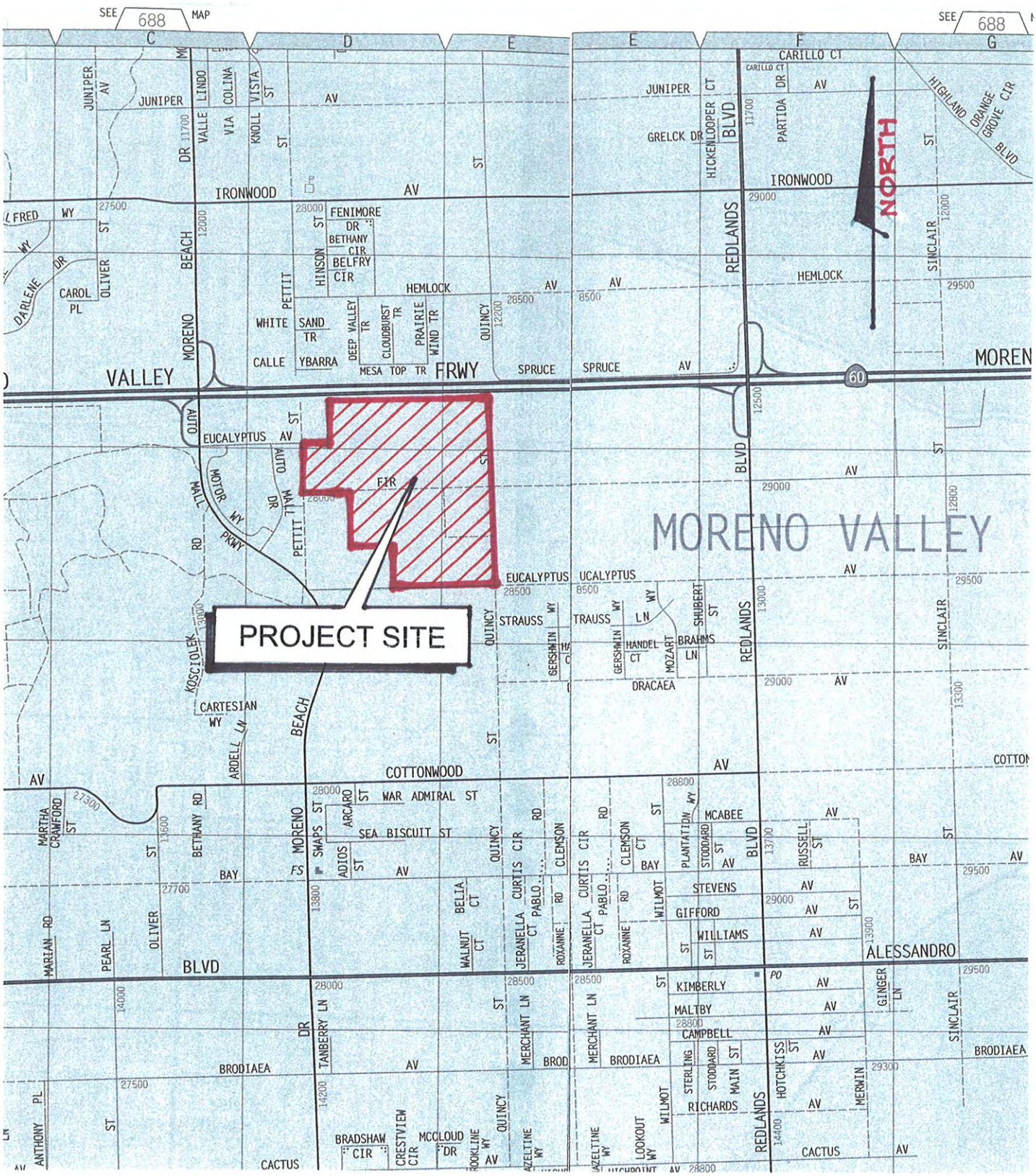
The site is situated within hydrologic soil type "B" as identified in the Hydrology Manual. A combination of "Barren" and "Orchard, Evergreen - Fair" cover land use types have been assumed for the existing site condition. A "Commercial" land use type has been assumed for the State Route 60 drainage area as well as the proposed site conditions. Rainfall intensity – duration data was taken from Plate D-4.1 (6 of 6) and rainfall durational depth data was taken from Plates D-4.3 – D-4.4 and E-5.1 – E-5.6 of the Hydrology Manual

The existing condition rational method hydrologic analysis is contained in Technical Appendix A. The existing condition flood hydrograph hydrologic analysis is contained in Technical Appendix B. The proposed condition rational method hydrologic analysis is contained in Technical Appendix C. The proposed condition flood hydrograph hydrologic analysis is contained in Technical Appendix D.

Preliminary Results

The existing condition analyses accounted for 124.1 acres. In the proposed condition, there are approximately 58.7 acres tributary to the north outlet to Quincy Channel and 62.4 acres tributary to the south outlet to Quincy Channel, for a total of 121.1 acres. The 3.0 acre deficit in the proposed condition is attributed to some street flow area in the proposed Eucalyptus Avenue that will drain west to the existing Eucalyptus Avenue and areas adjacent to Quincy Channel that will be directly tributary to the channel. In both cases, no drainage structures are proposed, and thus, the areas have not been modeled.

The preliminary hydrologic results indicate that a total of approximately 13.6 ac-ft of storage will be required for the project. This requirement reflects the difference in the 10-year – 24-hour total storm runoff volumes between the existing and proposed site conditions. The conceptual grading plan currently allocates approximately 7.1 ac-ft of storage for the large basin on the north system and 11.6 ac-ft of storage for the large basin on the south system. The final design and analysis of the site will determine how much storage is ultimately required.



VICINITY MAP

NOT TO SCALE

Prologis Park - Moreno Valley
Hydrologic Summary

Return Event (yr)	Storm Duration (hr)	Existing Total Flow (cfs)	Existing Total Volume (ac-ft)	Proposed North Outlet Flow (cfs)	Proposed North Outlet Volume (ac-ft)	Proposed South Outlet Flow (cfs)	Proposed South Outlet Volume (ac-ft)	Proposed Total (Summation) Flow (cfs)	Proposed Total (Summation) Volume (ac-ft)	Difference Flow (cfs)	Difference Volume (ac-ft)
100	Rational	135.1	-	137.4	-	150.5	-	287.9	-	152.8	-
100	24	56.9	22.1	30.9	15.5	33.0	16.4	63.9	31.9	7.0	9.8
100	6	147.8	18.0	76.3	10.5	83.3	11.1	159.6	21.6	11.8	3.6
100	3	167.3	15.1	88.7	8.2	95.6	8.7	184.3	16.9	17.0	1.8
100	1	257.7	11.1	150.6	5.6	164.5	5.9	315.1	11.5	57.4	0.4
10	Rational	79.5	-	93.0	-	100.3	-	193.3	-	113.8	-
10	24	17.1	4.3	16.7	8.7	17.7	9.2	34.4	17.9	17.3	13.6
10	6	76.8	5.7	47.4	5.4	51.8	5.6	99.2	11.0	22.4	5.3
10	3	89.0	5.2	55.4	4.6	59.6	4.8	115.0	9.4	26.0	4.2
10	1	144.6	5.3	93.7	3.3	102.2	3.5	195.9	6.8	51.3	1.5
5	Rational	65.0	-	80.6	-	86.5	-	167.1	-	102.1	-
5	24	3.8	2.4	10.9	6.2	11.2	6.4	22.1	12.6	18.3	10.2
5	6	40.4	2.5	36.9	4.1	40.0	4.7	76.9	8.8	36.5	6.3
5	3	49.9	2.4	43.4	3.1	46.5	3.1	89.9	6.2	40.0	3.8
5	1	94.7	2.6	74.6	2.5	81.2	2.6	155.8	5.1	61.1	2.5
2	Rational	43.1	-	60.8	-	64.5	-	125.3	-	82.2	-
2	24	2.8	1.8	7.2	5.1	7.7	5.2	14.9	10.3	12.1	8.5
2	6	20.8	1.5	26.4	3.4	28.6	3.5	55.0	6.9	34.2	5.4
2	3	27.4	1.4	31.2	2.2	33.3	2.3	64.5	4.5	37.1	3.1
2	1	59.4	1.6	53.0	1.6	57.6	1.7	110.6	3.3	51.2	1.7

Existing Condition = 124.1 Acres
Proposed Condition - North Outlet = 58.7 Acres
Proposed Condition - South Outlet = 62.4 Acres
Proposed Condition - Total (Summation) = 121.1 Acres
Existing Condition Rational Method Results are Summed

NORTH BASIN

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Total Vol. (ac-ft)
1743.40	0.00	0				
			12450	12450	0.29	0.45
1744.00	0.60	41500				
			42500	54950	1.26	1.37
1745.00	1.60	43500				
			44600	99550	2.29	2.35
1746.00	2.60	45700				
			46650	146200	3.36	3.54
1747.00	3.60	47600				
			48600	194800	4.47	5.05
1748.00	4.60	49600				
			50650	245450	5.63	6.64
1749.00	5.60	51700				
						7.11
1750.00						

WATER QUALITY BASIN

1746.00	0.00	0			
			8050	8050	0.18
1747.00	1.00	16100			
			16950	25000	0.57
1748.00	2.00	17800			
			18800	43800	1.01
1749.00	3.00	19800			
			20850	64650	1.48
1750.00	4.00	21900			

4

1" = 60'

PROPOSED DETENTION BASIN
FOR INITIAL RUNOFF

PROPOSED DETENTION BASIN

PROPOSED PUBLIC STREET
TO BE DEDICATED PER
PARCEL MAP 35679

CONSTRUCT 24FT HC RAMP
(4) RISERS 5 7/8"

(NOT IMPROVED)

E FLOOR
0.005

AutoCAD File: O:\2800-2899\2818\2818CGP02.dwg Plotted at: Mon Nov 03 06:16:27 2008

SOUTH BASIN

Elevation	Depth (feet)	Area (sq. ft.)	Volume (c.f.)	Σ Volume (c.f.)	Σ Volume (ac-ft)	Total Vol. (ac-ft)
1717.00	0.00	0				
			19450	19450	0.45	0.45
1718.00	1.00	38900				
			40200	59650	1.37	1.37
1719.00	2.00	41500				
			42850	102500	2.35	2.35
1720.00	3.00	44200				
			45800	148300	3.40	4.46
1721.00	4.00	47400				
			49050	197350	4.53	6.70
1722.00	5.00	50700				
			52400	249750	5.73	9.06
1723.00	6.00	54100				
			55850	305600	7.02	11.55
1724.00	7.00	57600				

WATER QUALITY BASIN

1720.00	0.00	44400			
			46000	46000	1.06
1721.00	1.00	47600			
			48550	94550	2.17
1722.00	2.00	49500			
			50500	145050	3.33
1723.00	3.00	51500			
			52550	197600	4.54
1724.00	4.00	53600			

4

1"=60'

(10) RISERS 5 7/16"

5 1/16" RISERS
1745.73 FF
1745.23 PAD

1745.66 FF
1745.16 PAD

1743.11 FF
1742.61 PAD

1742.84 FF
1742.34 PAD

LANDSCAPE

1742.12 TC
1741.62 FS

1739.13 TC
1738.63 FS

1741.15 TC
1740.65 FS

R=2.50%

R=1.58%

1735.17 TC
1734.50 FL

1738.38 TC
1737.88 FS

1736.54 FL

6" CURB

1741.62 TC
1741.12 FS

1742.01 TC
1741.51 FS

1740.58 FL/HP

1740.85 TC
1740.35 FS

1739.30 TC
1738.80 FS

1739.15 FG

1738.51 TC
1738.01 FS

1739.14 TC
1738.64 FS

1739.16 TC
1738.66 FS

1738.02 TC
1737.52 FS

1738.21 TC
1737.71 FL

HP

1736.35 TC
1735.85 FS

6"CURB

PROPOSED AC PAVEMENT

66' DRIVE

30' DRIVE

3' V-GUTTER

3' GUTTER

1731.06 TC
1730.56 FS

1729.85 TC
1729.35 FL

1737.49 TC
1736.99 FS

1740.88 TC
1740.38 FS

1741.53 TC
1741.03 FS

1740.10 TC
1739.60 FS

1737.58 TC
1737.08 FS

1737.10 TC
1736.60 FS

1737.98 TC
1737.48 FS

1735.60 TC
1735.10 FS

1730.20 TC
1729.70 FS

1.80%

1.50%

1.58%

2.70%

2.7%

1%

2:1

1717.93
FL
1717.53
FG

1717.63
FG

CONSTRUCT HEADWALL

CONSTRUCT GROUTED RIP-RAP

1717.38
FG

1725.00
FS

1717.65
FG

CONCRETE SLOPE

1720.10
FG

1720.24
FG

CONSTRUCT HEADWALL

CONSTRUCT GROUTED RIP-RAP

1719.70
FS/FG

1724.00
FS

1719.40
FL/LP

CONCRETE SPILLWAY
SECONDARY OUTLET

PROPOSED DETENTION BASIN

PROPOSED DETENTION BASIN
FOR INITIAL RUNOFF

1724.49
FS

1724.86
FS

1.5%

1717.31
FG

1717.15
FG

R=0.11%

1721.00 TG
1716.88 FL
RIP-RAP

1716.92
FG

R=0.17%

PROPOSED
STORM DRAIN

1719.70
FS/FG

1720.10
FG

3:1

1722.79
FG/FS

CONSTRUCT GROUTED
RIP-RAP

1728.67
FS/FG

LIMITS OF GRADING
JOIN EXISTING GROUND

EXISTING
R/W

CONSTRUCT CONCRETE
SLOPE

1725.01
FS/FG

1713.38
INV

40'

PROPOSED
STORM DRAIN

1724.60
FG

1729.00
FS/FG

C/L INCILIA STREET

EXITING ROADWAY
EASEMENT

EXISTING
R/W

8

Technical Appendix A

Hydrologic Analysis
Existing Condition – Rational Method

RAINFALL INTENSITY—INCHES PER HOUR

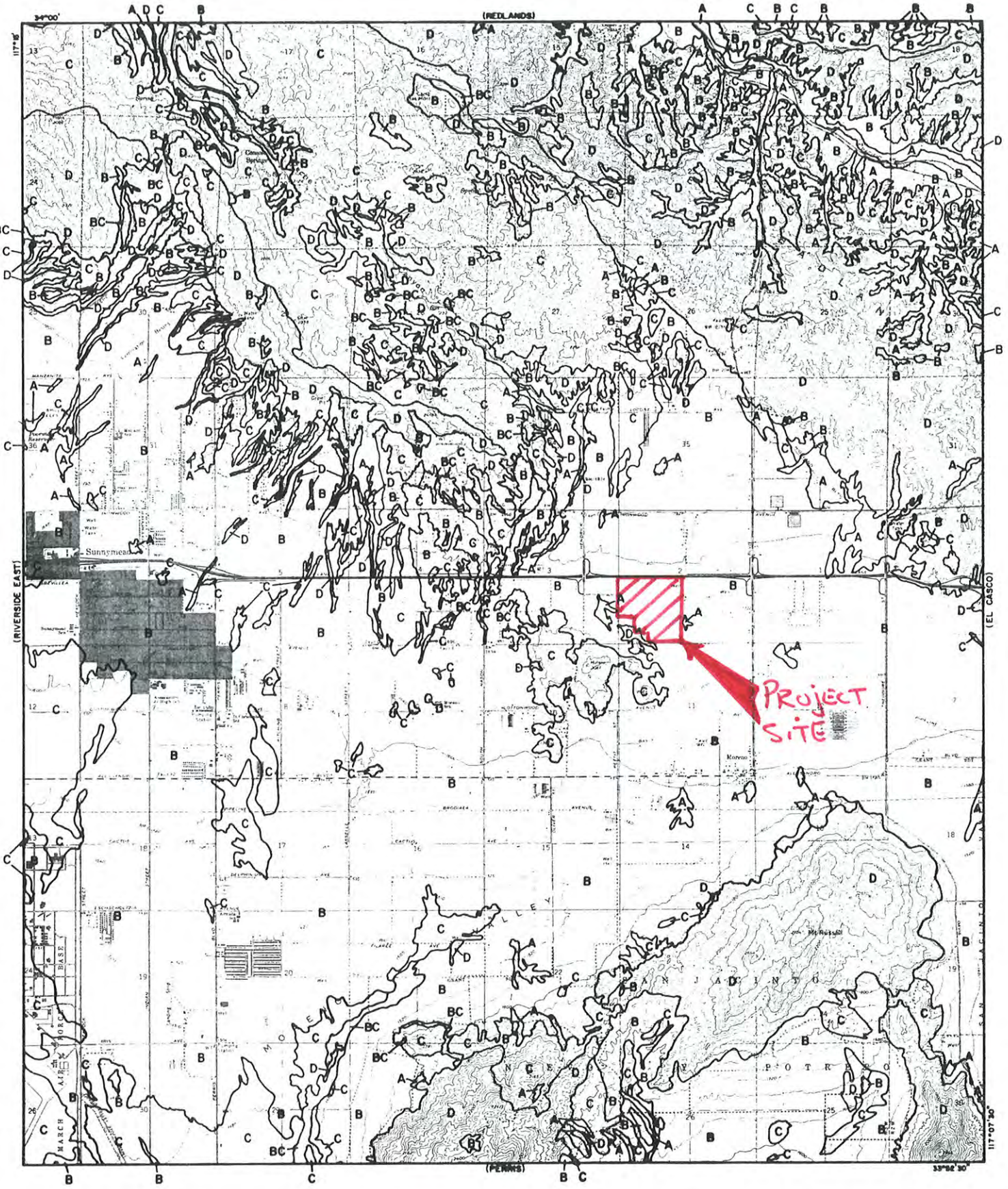
SUNNYMEAD – MORENO			WOODCREST		
DURATION MINUTES	FREQUENCY 10 YEAR	100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	100 YEAR
5	2.84	4.16	5	3.37	5.30
6	2.59	3.79	6	3.05	4.79
7	2.40	3.51	7	2.80	4.40
8	2.25	3.29	8	2.60	4.09
9	2.12	3.10	9	2.44	3.83
10	2.01	2.94	10	2.30	3.62
11	1.92	2.80	11	2.19	3.43
12	1.83	2.68	12	2.08	3.27
13	1.76	2.58	13	1.99	3.13
14	1.70	2.48	14	1.91	3.01
15	1.64	2.40	15	1.84	2.89
16	1.59	2.32	16	1.78	2.79
17	1.54	2.25	17	1.72	2.70
18	1.50	2.19	18	1.67	2.62
19	1.46	2.13	19	1.62	2.54
20	1.42	2.08	20	1.57	2.47
22	1.35	1.98	22	1.49	2.34
24	1.30	1.90	24	1.42	2.23
26	1.25	1.82	26	1.36	2.14
28	1.20	1.76	28	1.31	2.05
30	1.16	1.70	30	1.26	1.98
32	1.12	1.64	32	1.22	1.91
34	1.09	1.59	34	1.18	1.85
36	1.06	1.55	36	1.14	1.79
38	1.03	1.51	38	1.11	1.74
40	1.00	1.47	40	1.07	1.69
45	.95	1.39	45	1.01	1.58
50	.90	1.31	50	.95	1.49
55	.86	1.25	55	.90	1.42
60	.82	1.20	60	.86	1.35
65	.79	1.15	65	.82	1.29
70	.76	1.11	70	.79	1.24
75	.73	1.07	75	.76	1.19
80	.71	1.04	80	.73	1.15
85	.69	1.01	85	.71	1.11
SLOPE = .500			SLOPE = .550		

RCFC & WCD

HYDROLOGY MANUAL

STANDARD INTENSITY – DURATION CURVES DATA

PLATE D-4.1 (6 of 6)



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

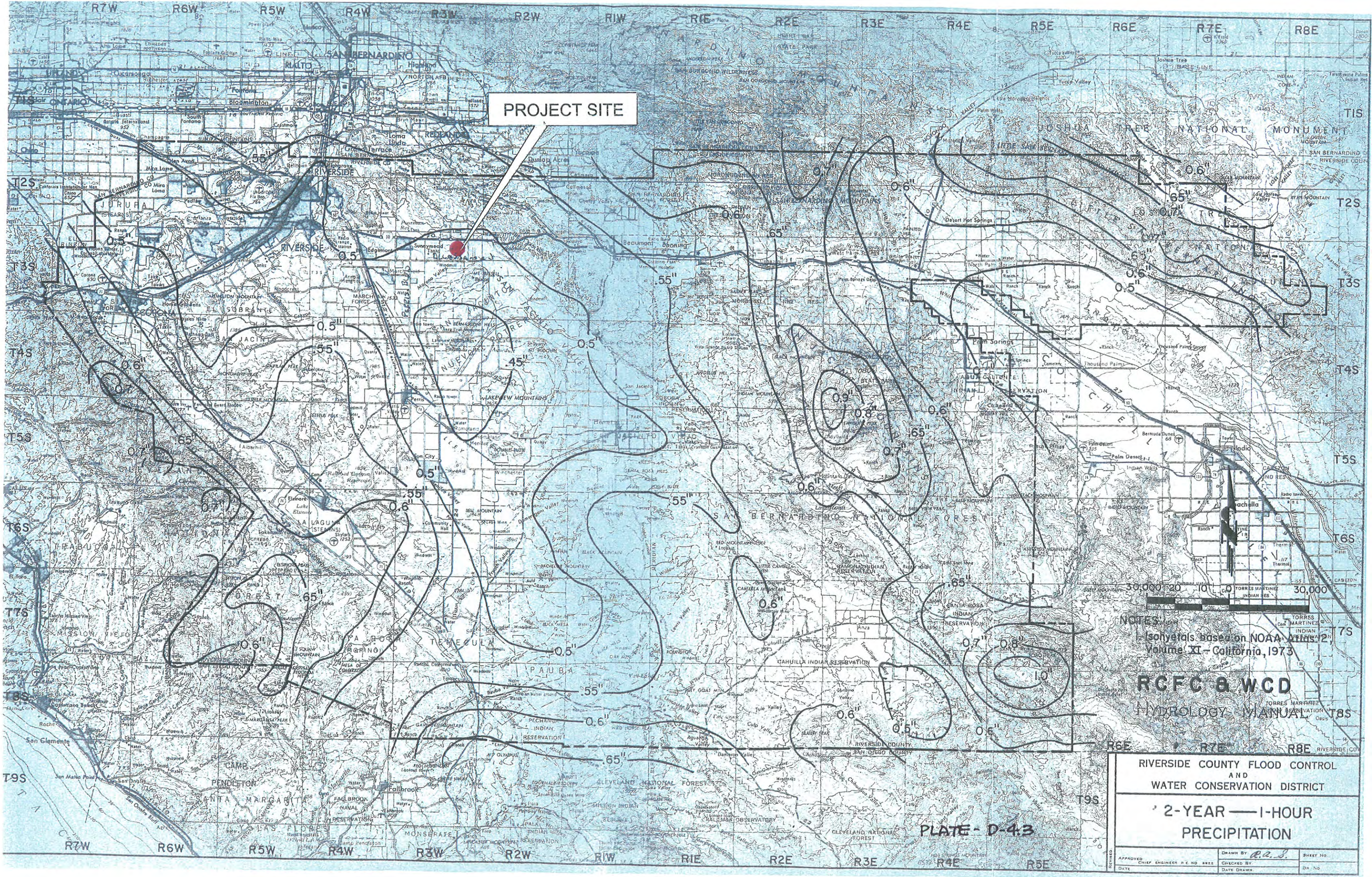
RCFC&WCD

HYDROLOGY MANUAL

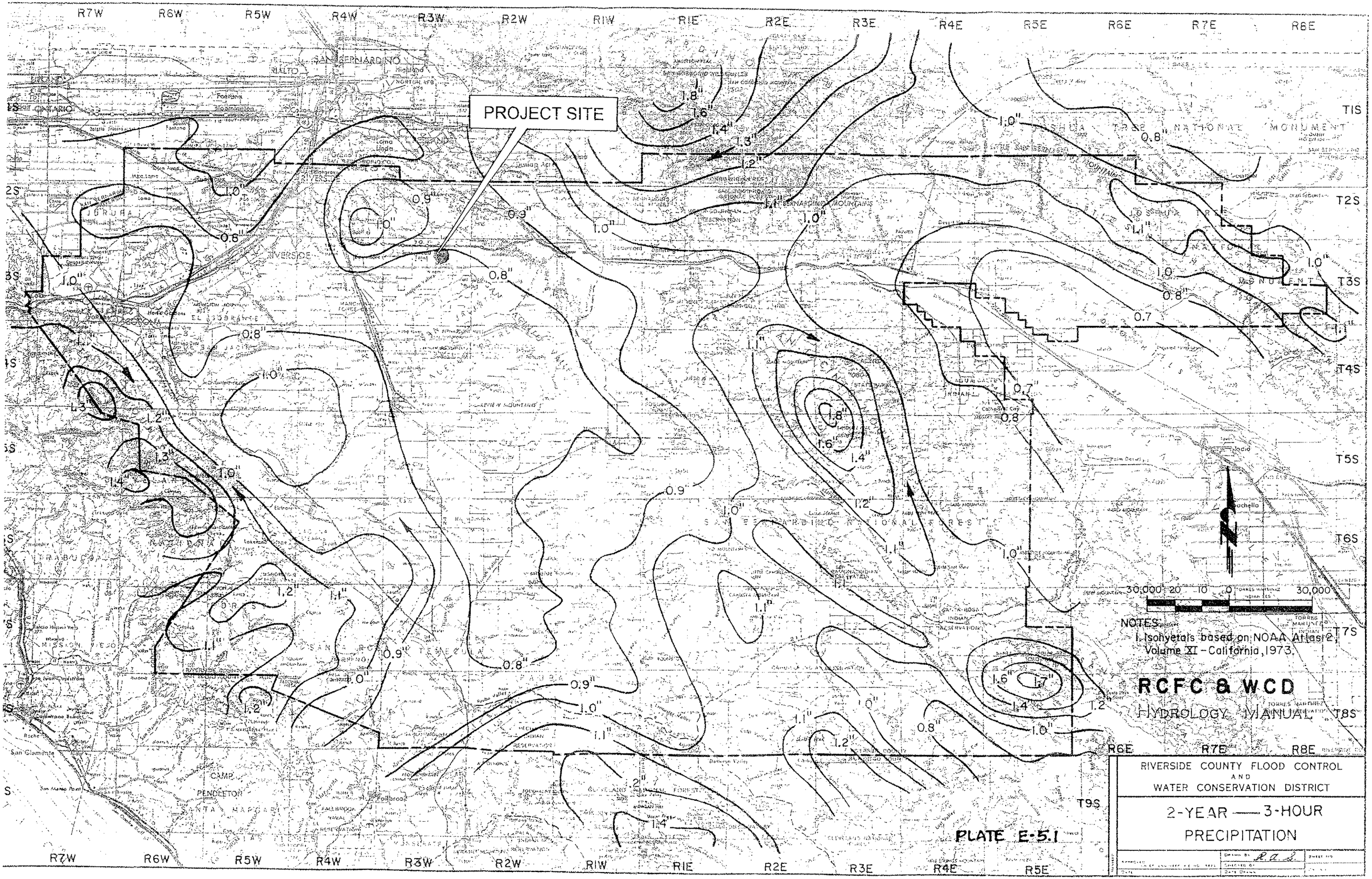
0 FEET 5000

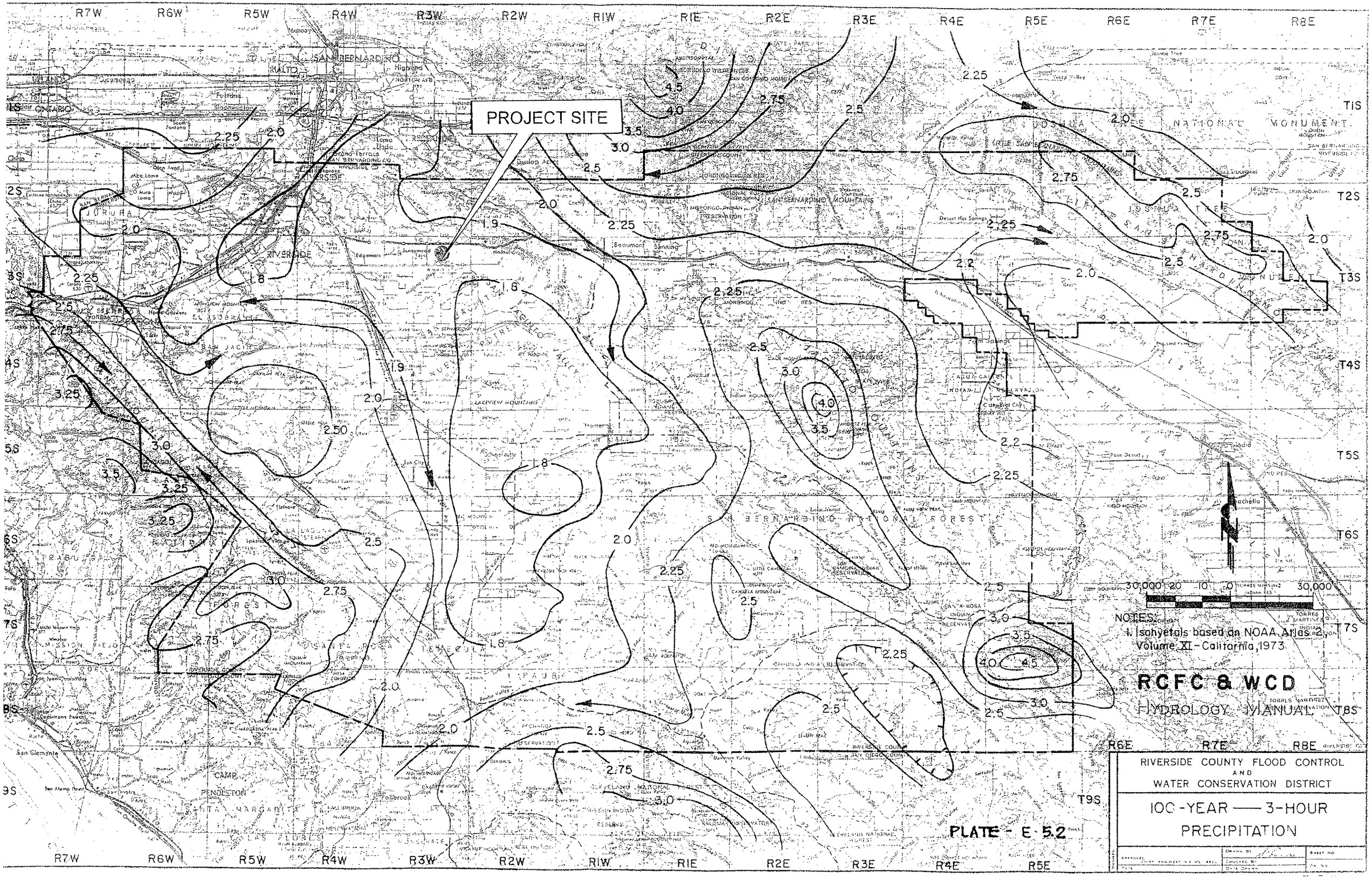
HYDROLOGIC SOILS GROUP MAP FOR SUNNYMEAD

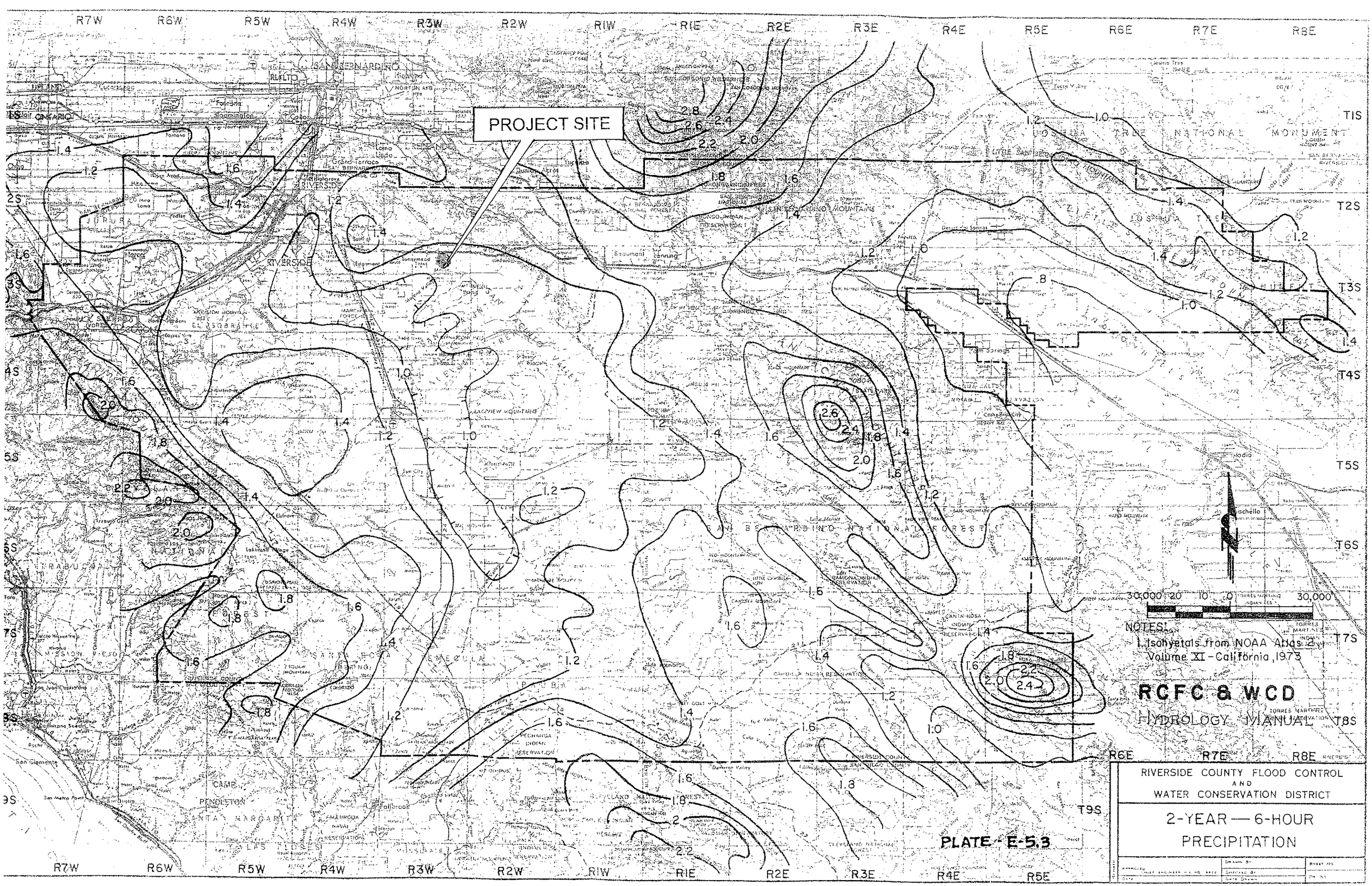
PLATE C-1.17


PROJECT SITE
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
PLATE - D-4.3

PROJECT SITE
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
30,000 20 10 0 30,000
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR —— 1-HOUR
PRECIPITATION
PLATE - D-4.4
APPROVED CHIEF ENGINEER
DRAWN BY R.A.S.
CHECKED BY
DATE DRAWN
SHEET NO
DR. NO
REVISED
DATE


PROJECT SITE
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
30,000 20 10 0 30,000
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 3-HOUR PRECIPITATION
PLATE E-5.1

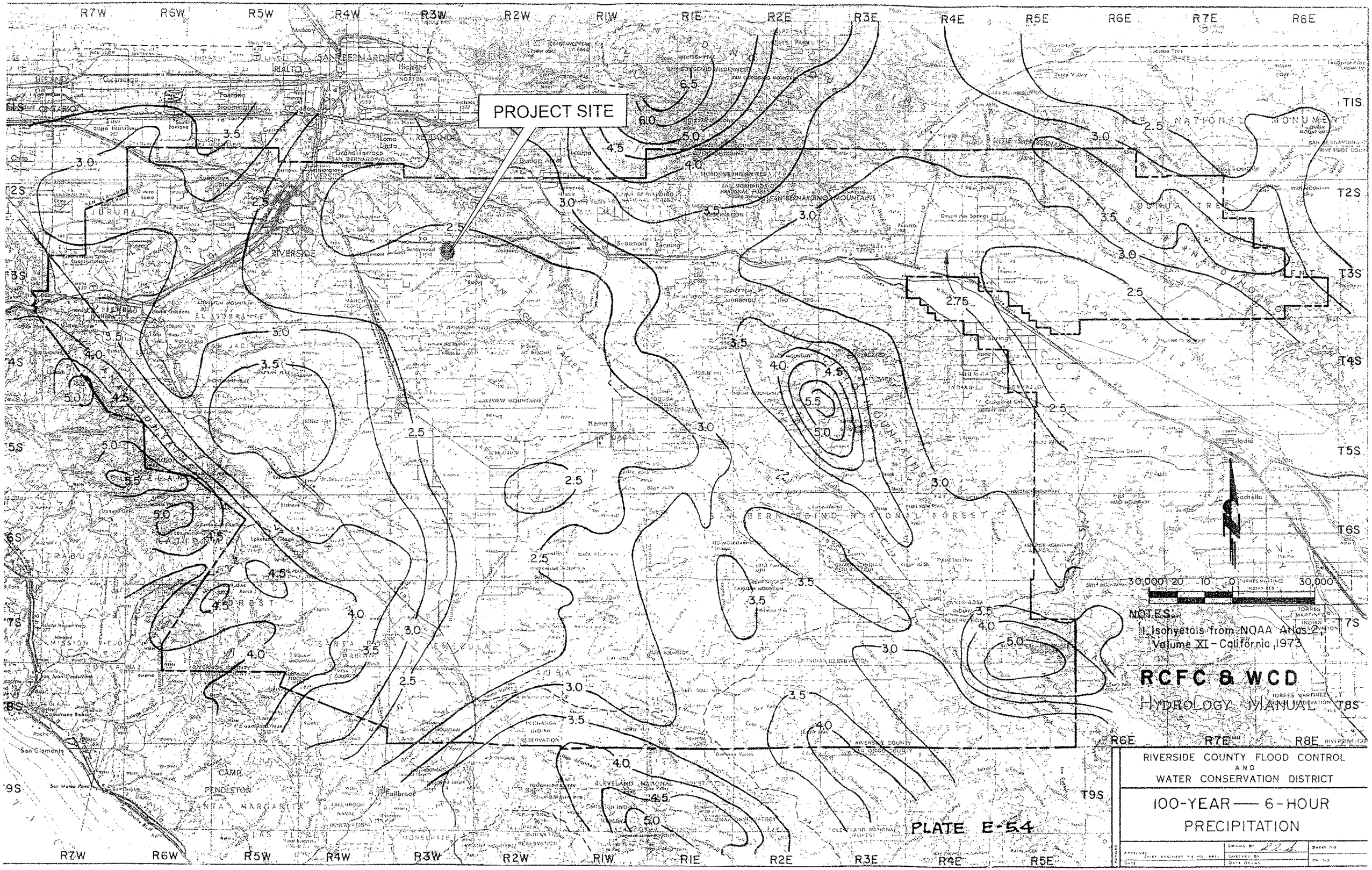

PROJECT SITE
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SAN BERNARDINO
RIVERSIDE
JURUPA
SAN JACINTO
SAN BERNARDINO NATIONAL FOREST
NATIONAL MONUMENT
30,000 20 10 0 30,000
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR
PRECIPITATION
PLATE - E 5.2



RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 6-HOUR PRECIPITATION

PLATE E-5.3



RCFC & WCD

HYDROLOGY MANUAL

PLATE E-54

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100-YEAR — 6-HOUR PRECIPITATION

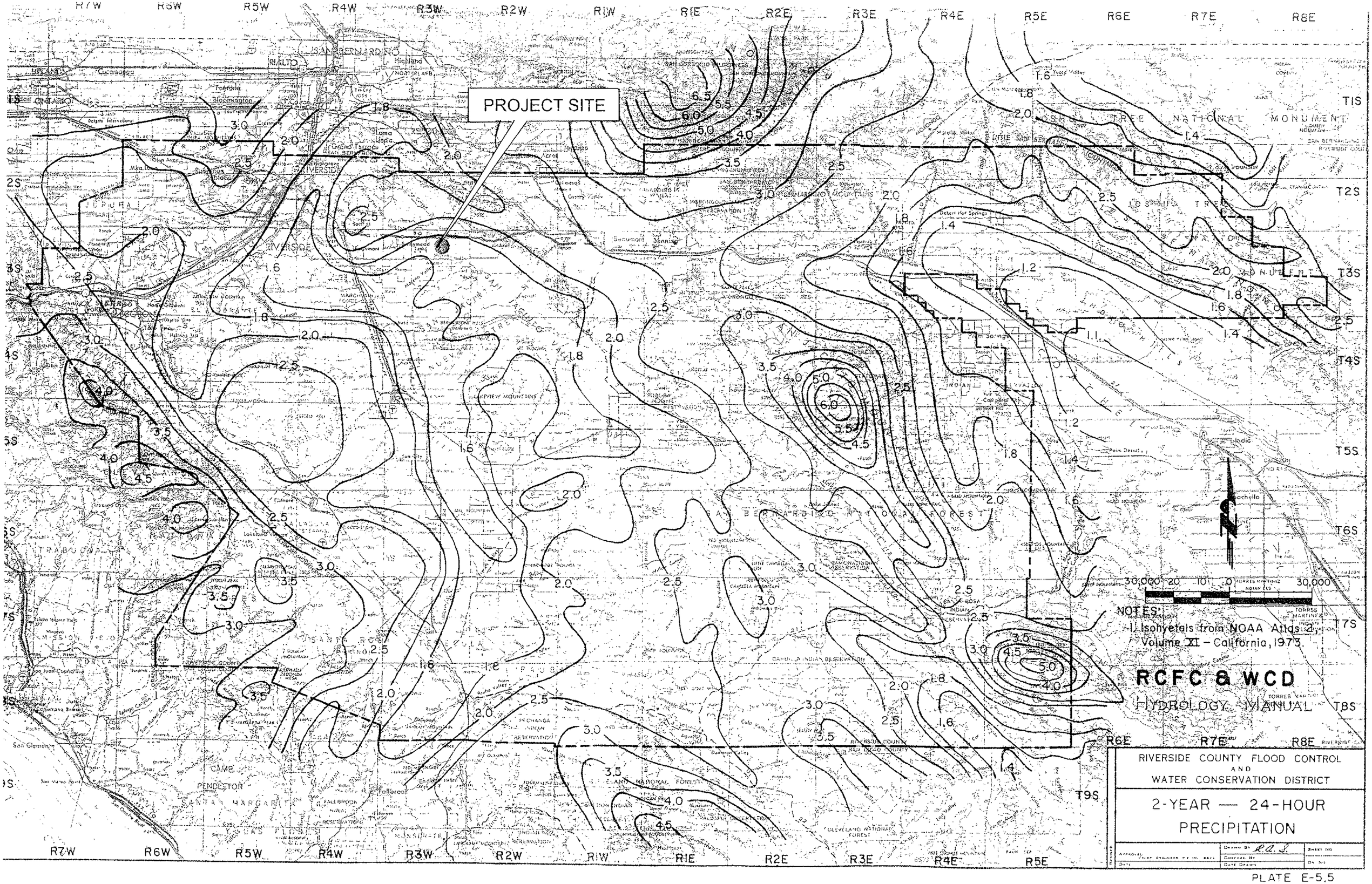
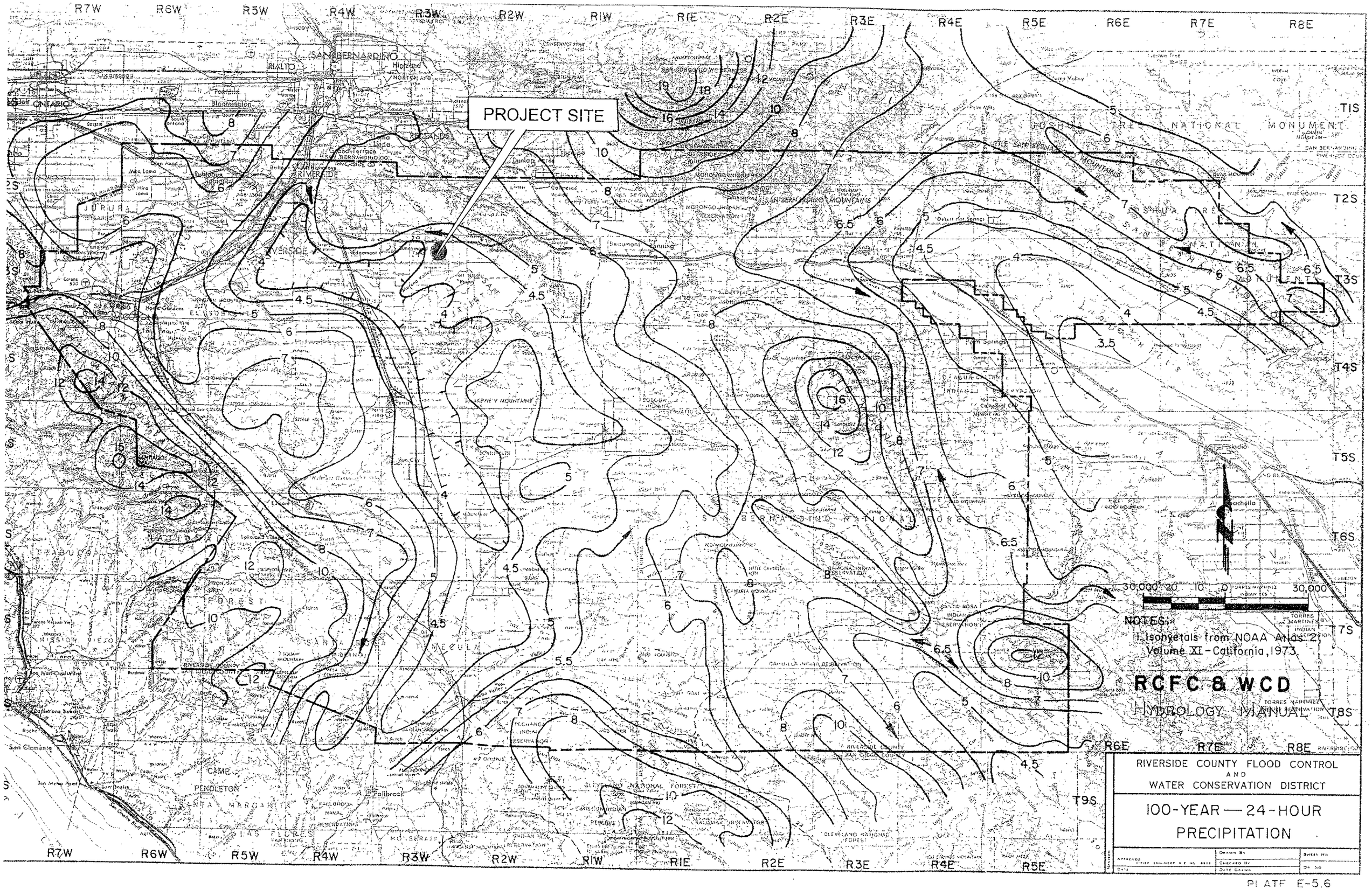

PROJECT SITE
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
JOSHUA TREE NATIONAL MONUMENT
SAN JACINTO MOUNTAINS
SAN GORGONIO MOUNTAINS
SAN JACINTO WILDERNESS
SAN GORGONIO WILDERNESS
SAN JACINTO PEAK
SAN GORGONIO MOUNTAIN
SAN JACINTO VALLEY
SAN TIMOTEO CANYON
SAN GABRIEL MOUNTAINS
SAN GABRIEL WILDERNESS
SAN GABRIEL RIVER
SAN ANTONIO CANYON
SAN ANTONIO PEAK
SAN ANTONIO RIVER
SAN BERNARDINO MOUNTAINS
SAN BERNARDINO PEAK
SAN BERNARDINO
RIVERSIDE
RIVERSIDE COUNTY
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
ORANGE COUNTY
RIALTO
COLTON
LOMA LINDA
GRAND TERRACE
HIGHGROVE
BLOOMINGTON
MORENO VALLEY
SUNNYMEAD
JURUPA
MARCH AIR FORCE BASE
NORTON AIR FORCE BASE
CAMP PENDLETON
PENDLETON
SAN CLEMENTE
TRABUCO
LAKE ELSINORE
LAKEVIEW MOUNTAINS
PERRIS
DESERT HOT SPRINGS
PALM SPRINGS
CABAZON
BANNING
BEAUMONT
CALIMESA
YUCAIPA
REDLANDS
HIGHLAND
CRAFTON
LOMA LINDA
GRAND TERRACE
COLTON
RIALTO
FONTANA
BLOOMINGTON
MORENO VALLEY
SUNNYMEAD
JURUPA
RIVERSIDE
MARCH AIR FORCE BASE
NORTON AIR FORCE BASE
CAMP PENDLETON
PENDLETON
SAN CLEMENTE
TRABUCO
LAKE ELSINORE
LAKEVIEW MOUNTAINS
PERRIS
DESERT HOT SPRINGS
PALM SPRINGS
CABAZON
BANNING
BEAUMONT
CALIMESA
YUCAIPA
REDLANDS
HIGHLAND
CRAFTON
SAN JACINTO MOUNTAINS
SAN GORGONIO MOUNTAINS
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
SAN JACINTO VALLEY
SAN TIMOTEO CANYON
SAN ANTONIO CANYON
SAN ANTONIO RIVER
SAN GABRIEL RIVER
SAN JACINTO PEAK
SAN GORGONIO MOUNTAIN
SAN BERNARDINO PEAK
SAN JACINTO WILDERNESS
SAN GORGONIO WILDERNESS
SAN GABRIEL WILDERNESS
CAHUILLA INDIAN RESERVATION
SANTA ROSA INDIAN RESERVATION
SANTA MARGARITA
TEMECULA
MURRIETA
FALLBROOK
ESCONDIDO
SAN MARCOS
VISTA
OCEANSIDE
CARLSBAD
ENCINITAS
SOLANA BEACH
DEL MAR
LA JOLLA
SAN DIEGO
CORONADO
IMPERIAL BEACH
CHULA VISTA
NATIONAL CITY
LA MESA
EL CAJON
LA MESA
SPRING VALLEY
LAKESIDE
SANTEE
POWAY
RAMONA
ESCONDIDO
SAN MARCOS
VISTA
OCEANSIDE
CARLSBAD
ENCINITAS
SOLANA BEACH
DEL MAR
LA JOLLA
SAN DIEGO
CORONADO
IMPERIAL BEACH
CHULA VISTA
NATIONAL CITY
LA MESA
EL CAJON
LA MESA
SPRING VALLEY
LAKESIDE
SANTEE
POWAY
RAMONA
1.1
1.2
1.4
1.6
1.8
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
30,000 20 10 0 30,000
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI – California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
Drawn By R.A.S.
Checked By
Date Drawn
Sheet No.
Dr. No.

PLATE E-5.5


PROJECT SITE
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R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SAN BERNARDINO
RIVERSIDE
ONTARIO
JURUPA
SAN BERNARDINO MOUNTAINS
SAN BERNARDINO NATIONAL FOREST
JOSHUA TREE NATIONAL MONUMENT
CAMP PENDLETON
Fallbrook
30,000 20 10 0 30,000
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION

PLATE E-5.6

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION HYDROLOGY                                            *
* 100-YEAR                                                                *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXA.DAT
  TIME/DATE OF STUDY: 05:17 05/12/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =  1000.00
 UPSTREAM ELEVATION =   1787.40
 DOWNSTREAM ELEVATION =   1760.00
 ELEVATION DIFFERENCE =     27.40
 TC = 0.709*[( 1000.00**3)/(    27.40)]**.2 =   23.086
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.935
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      7.23
 TOTAL AREA(ACRES) =      6.40   TOTAL RUNOFF(CFS) =      7.23

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.935
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8684
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    1.34
 TOTAL AREA(ACRES) =     7.20   TOTAL RUNOFF(CFS) =    8.57
 TC(MIN) =  23.09

****************************************************************************
 FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1760.00  DOWNSTREAM(FEET) =   1750.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   593.00   CHANNEL SLOPE =  0.0160
 CHANNEL FLOW THRU SUBAREA(CFS) =      8.57
 FLOW VELOCITY(FEET/SEC) =   3.04 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.25   Tc(MIN.) =  26.33
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =  1593.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.812
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5702
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =   11.10   SUBAREA RUNOFF(CFS) =   11.47
 TOTAL AREA(ACRES) =    18.30   TOTAL RUNOFF(CFS) =   20.04
 TC(MIN) =  26.33
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      18.30  TC(MIN.) =      26.33
 PEAK FLOW RATE(CFS)    =      20.04
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

1

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-99 Advanced Engineering Software (aes)
             Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

                             THIENES ENGINEERING
                           16800 VALLEY VIEW AVENUE
                              LA MIRADA CA 90638
                       PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION HYDROLOGY                                            *
* 100-YEAR                                                                *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXB.DAT
  TIME/DATE OF STUDY: 05:22 05/12/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   975.00
  UPSTREAM ELEVATION =   1792.20
  DOWNSTREAM ELEVATION =   1766.00
  ELEVATION DIFFERENCE =     26.20
  TC = 0.709*[(  975.00**3)/(    26.20)]**.2 =   22.942
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.941
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      6.13
  TOTAL AREA(ACRES) =      5.40   TOTAL RUNOFF(CFS) =      6.13

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.941
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8684
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.18
  TOTAL AREA(ACRES) =     6.10   TOTAL RUNOFF(CFS) =    7.31
  TC(MIN) =  22.94

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1766.00  DOWNSTREAM(FEET) =   1749.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   979.00   CHANNEL SLOPE =  0.0174
  CHANNEL FLOW THRU SUBAREA(CFS) =      7.31
  FLOW VELOCITY(FEET/SEC) =   3.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.36   Tc(MIN.) =  28.30
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =  1954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.747
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5627
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    9.10   SUBAREA RUNOFF(CFS) =    8.95
  TOTAL AREA(ACRES) =    15.20   TOTAL RUNOFF(CFS) =   16.25
  TC(MIN) =  28.30

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.747
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8663
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.50   SUBAREA RUNOFF(CFS) =     0.76
  TOTAL AREA(ACRES) =     15.70   TOTAL RUNOFF(CFS) =    17.01
  TC(MIN) =  28.30

****************************************************************************
  FLOW PROCESS FROM NODE     202.00 TO NODE     203.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1749.00  DOWNSTREAM(FEET) =   1730.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   524.00   CHANNEL SLOPE =  0.0363
  CHANNEL FLOW THRU SUBAREA(CFS) =     17.01
  FLOW VELOCITY(FEET/SEC) =   5.46 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =  29.90
  LONGEST FLOWPATH FROM NODE     200.00 TO NODE     203.00 =  2478.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     203.00 TO NODE     203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.700
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5569
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =   18.40   SUBAREA RUNOFF(CFS) =   17.42
  TOTAL AREA(ACRES) =    34.10   TOTAL RUNOFF(CFS) =   34.43
  TC(MIN) =  29.90

****************************************************************************
  FLOW PROCESS FROM NODE     203.00 TO NODE     203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.700
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8657
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.60   SUBAREA RUNOFF(CFS) =     0.88
  TOTAL AREA(ACRES) =    34.70   TOTAL RUNOFF(CFS) =   35.31
  TC(MIN) =  29.90
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      34.70  TC(MIN.) =      29.90
  PEAK FLOW RATE(CFS)    =      35.31
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION HYDROLOGY                                            *
* 100-YEAR                                                                *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXC.DAT
  TIME/DATE OF STUDY: 05:30 05/12/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =    986.00
  UPSTREAM ELEVATION =    1750.00
  DOWNSTREAM ELEVATION =    1714.00
  ELEVATION DIFFERENCE =      36.00
  TC = 0.533*[(  986.00**3)/(    36.00)]**.2 =    16.273
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.305
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6187
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       2.42
  TOTAL AREA(ACRES) =       1.70   TOTAL RUNOFF(CFS) =       2.42
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       1.70  TC(MIN.) =      16.27
  PEAK FLOW RATE(CFS)    =       2.42
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION HYDROLOGY                                            *
* 100-YEAR                                                                *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXD.DAT
  TIME/DATE OF STUDY: 05:30 05/12/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE     400.00 TO NODE     401.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =    997.00
  UPSTREAM ELEVATION =    1791.90
  DOWNSTREAM ELEVATION =    1767.00
  ELEVATION DIFFERENCE =      24.90
  TC = 0.533*[(  997.00**3)/(    24.90)]**.2 =   17.635
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.214
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6109
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       6.90
  TOTAL AREA(ACRES) =       5.10   TOTAL RUNOFF(CFS) =       6.90

****************************************************************************
  FLOW PROCESS FROM NODE     401.00 TO NODE     401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.214
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6109
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.27
  TOTAL AREA(ACRES) =      5.30   TOTAL RUNOFF(CFS) =     7.17
  TC(MIN) =  17.64

****************************************************************************
  FLOW PROCESS FROM NODE     401.00 TO NODE     401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.214
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8711
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.70   SUBAREA RUNOFF(CFS) =     1.35
  TOTAL AREA(ACRES) =      6.00   TOTAL RUNOFF(CFS) =     8.52
  TC(MIN) =  17.64

****************************************************************************
  FLOW PROCESS FROM NODE     401.00 TO NODE     402.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    1767.00  DOWNSTREAM(FEET) =    1744.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    973.00   CHANNEL SLOPE =  0.0236
  CHANNEL FLOW THRU SUBAREA(CFS) =       8.52
  FLOW VELOCITY(FEET/SEC) =    3.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    4.39   Tc(MIN.) =  22.03
  LONGEST FLOWPATH FROM NODE     400.00 TO NODE     402.00 =  1970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     402.00 TO NODE     402.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.981
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5886
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     2.30   SUBAREA RUNOFF(CFS) =     2.68
  TOTAL AREA(ACRES) =      8.30   TOTAL RUNOFF(CFS) =    11.20
  TC(MIN) =  22.03

****************************************************************************
  FLOW PROCESS FROM NODE     402.00 TO NODE     403.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1744.00  DOWNSTREAM(FEET) =   1723.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   838.00   CHANNEL SLOPE =  0.0251
  CHANNEL FLOW THRU SUBAREA(CFS) =     11.20
  FLOW VELOCITY(FEET/SEC) =   4.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.43   Tc(MIN.) =  25.46
  LONGEST FLOWPATH FROM NODE     400.00 TO NODE     403.00 =  2808.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     403.00 TO NODE     403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.842
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5738
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    46.70   SUBAREA RUNOFF(CFS) =    49.37
  TOTAL AREA(ACRES) =     55.00   TOTAL RUNOFF(CFS) =    60.56
  TC(MIN) =  25.46

****************************************************************************
  FLOW PROCESS FROM NODE     403.00 TO NODE     403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.842
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8674
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.48
  TOTAL AREA(ACRES) =     55.30   TOTAL RUNOFF(CFS) =    61.04
  TC(MIN) =  25.46
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      55.30  TC(MIN.) =      25.46
  PEAK FLOW RATE(CFS)    =      61.04
================================================================================
================================================================================
  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 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION HYDROLOGY                                            *
* 100-YEAR                                                                *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXE.DAT
  TIME/DATE OF STUDY: 05:37 05/12/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =    971.00
  UPSTREAM ELEVATION =    1791.90
  DOWNSTREAM ELEVATION =    1765.00
  ELEVATION DIFFERENCE =      26.90
  TC = 0.533*[(  971.00**3)/(    26.90)]**.2 =   17.092
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.249
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6140
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       3.04
  TOTAL AREA(ACRES) =       2.20   TOTAL RUNOFF(CFS) =       3.04

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    501.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.249
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8714
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.20
  TOTAL AREA(ACRES) =      2.30   TOTAL RUNOFF(CFS) =     3.23
  TC(MIN) =  17.09

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    1765.00  DOWNSTREAM(FEET) =    1741.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    978.00   CHANNEL SLOPE =  0.0245
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.23
  FLOW VELOCITY(FEET/SEC) =    2.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    5.45   Tc(MIN.) =  22.54
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =  1949.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    502.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.958
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5863
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     4.70   SUBAREA RUNOFF(CFS) =     5.40
  TOTAL AREA(ACRES) =      7.00   TOTAL RUNOFF(CFS) =     8.63
  TC(MIN) =  22.54

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  52
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1741.00  DOWNSTREAM(FEET) =   1713.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   774.00   CHANNEL SLOPE =  0.0362
  CHANNEL FLOW THRU SUBAREA(CFS) =      8.63
  FLOW VELOCITY(FEET/SEC) =   4.58 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.82   Tc(MIN.) =  25.36
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =  2723.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.846
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5742
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    6.80   SUBAREA RUNOFF(CFS) =    7.21
  TOTAL AREA(ACRES) =    13.80   TOTAL RUNOFF(CFS) =   15.84
  TC(MIN) =  25.36

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.846
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8674
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.48
  TOTAL AREA(ACRES) =    14.10   TOTAL RUNOFF(CFS) =   16.32
  TC(MIN) =  25.36
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     14.10  TC(MIN.) =     25.36
  PEAK FLOW RATE(CFS)    =     16.32
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 10-YEAR HYDROLOGY                                                       *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXA10.DAT
  TIME/DATE OF STUDY: 05:01 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =  1000.00
  UPSTREAM ELEVATION =   1787.40
  DOWNSTREAM ELEVATION =   1760.00
  ELEVATION DIFFERENCE =     27.40
  TC = 0.709*[( 1000.00**3)/(    27.40)]**.2 =   23.086
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.336
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.31
  TOTAL AREA(ACRES) =      6.40   TOTAL RUNOFF(CFS) =      4.31

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.336
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8604
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =     7.20   TOTAL RUNOFF(CFS) =    5.23
  TC(MIN) =  23.09

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1760.00  DOWNSTREAM(FEET) =   1750.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   593.00   CHANNEL SLOPE =  0.0160
  CHANNEL FLOW THRU SUBAREA(CFS) =      5.23
  FLOW VELOCITY(FEET/SEC) =   2.70 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.66   Tc(MIN.) =  26.75
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =  1593.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.241
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4880
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =   11.10   SUBAREA RUNOFF(CFS) =    6.72
  TOTAL AREA(ACRES) =    18.30   TOTAL RUNOFF(CFS) =   11.95
  TC(MIN) =  26.75
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      18.30  TC(MIN.) =      26.75
  PEAK FLOW RATE(CFS)    =      11.95
============================================================================
```

==========

END OF RATIONAL METHOD ANALYSIS

1

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 10-YEAR HYDROLOGY                                                       *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXB10.DAT
  TIME/DATE OF STUDY: 05:05 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =   975.00
 UPSTREAM ELEVATION =   1792.20
 DOWNSTREAM ELEVATION =   1766.00
 ELEVATION DIFFERENCE =     26.20
 TC = 0.709*[(  975.00**3)/(    26.20)]**.2 =   22.942
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.340
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      3.65
 TOTAL AREA(ACRES) =      5.40   TOTAL RUNOFF(CFS) =      3.65

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.340
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8605
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    0.81
 TOTAL AREA(ACRES) =     6.10   TOTAL RUNOFF(CFS) =    4.46
 TC(MIN) =  22.94

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1766.00  DOWNSTREAM(FEET) =   1749.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   979.00   CHANNEL SLOPE =  0.0174
 CHANNEL FLOW THRU SUBAREA(CFS) =      4.46
 FLOW VELOCITY(FEET/SEC) =   2.71 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   6.03   Tc(MIN.) =  28.97
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =  1954.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.192
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4791
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    9.10   SUBAREA RUNOFF(CFS) =    5.20
 TOTAL AREA(ACRES) =    15.20   TOTAL RUNOFF(CFS) =    9.66
 TC(MIN) =  28.97

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.192
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8579
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.50   SUBAREA RUNOFF(CFS) =     0.51
  TOTAL AREA(ACRES) =     15.70   TOTAL RUNOFF(CFS) =    10.17
  TC(MIN) =  28.97

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1749.00  DOWNSTREAM(FEET) =   1730.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   524.00   CHANNEL SLOPE =  0.0363
  CHANNEL FLOW THRU SUBAREA(CFS) =     10.17
  FLOW VELOCITY(FEET/SEC) =   4.78 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =  30.80
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =  2478.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.156
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4722
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =   18.40   SUBAREA RUNOFF(CFS) =   10.05
  TOTAL AREA(ACRES) =    34.10   TOTAL RUNOFF(CFS) =   20.22
  TC(MIN) =  30.80

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.156
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8572
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.60   SUBAREA RUNOFF(CFS) =     0.59
  TOTAL AREA(ACRES) =    34.70   TOTAL RUNOFF(CFS) =   20.81
  TC(MIN) =  30.80
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     34.70  TC(MIN.) =     30.80
  PEAK FLOW RATE(CFS)    =     20.81
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS

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**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 10-YEAR HYDROLOGY                                                       *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXC10.DAT
  TIME/DATE OF STUDY: 05:10 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   986.00
  UPSTREAM ELEVATION =   1750.00
  DOWNSTREAM ELEVATION =   1714.00
  ELEVATION DIFFERENCE =     36.00
  TC = 0.533*[(  986.00**3)/(    36.00)]**.2 =   16.273
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.591
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5427
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      1.47
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      1.47
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      1.70  TC(MIN.) =     16.27
  PEAK FLOW RATE(CFS)    =      1.47
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

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**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                           PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 10-YEAR HYDROLGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXD10.DAT
  TIME/DATE OF STUDY: 05:16 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   997.00
  UPSTREAM ELEVATION =   1791.90
  DOWNSTREAM ELEVATION =   1767.00
  ELEVATION DIFFERENCE =     24.90
  TC = 0.533*[(  997.00**3)/(    24.90)]**.2 =   17.635
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.528
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5340
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.16
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      4.16

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.528
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5340
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.16
  TOTAL AREA(ACRES) =     5.30   TOTAL RUNOFF(CFS) =    4.33
  TC(MIN) =  17.64

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.528
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8634
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =     6.00   TOTAL RUNOFF(CFS) =    5.25
  TC(MIN) =  17.64

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1767.00  DOWNSTREAM(FEET) =   1744.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   973.00   CHANNEL SLOPE =  0.0236
  CHANNEL FLOW THRU SUBAREA(CFS) =      5.25
  FLOW VELOCITY(FEET/SEC) =   3.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.94   Tc(MIN.) =  22.58
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =  1970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.351
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5069
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     2.30   SUBAREA RUNOFF(CFS) =     1.57
  TOTAL AREA(ACRES) =      8.30   TOTAL RUNOFF(CFS) =     6.82
  TC(MIN) =  22.58

****************************************************************************
  FLOW PROCESS FROM NODE     402.00 TO NODE     403.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1744.00  DOWNSTREAM(FEET) =   1723.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   838.00   CHANNEL SLOPE =  0.0251
  CHANNEL FLOW THRU SUBAREA(CFS) =      6.82
  FLOW VELOCITY(FEET/SEC) =   3.60 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.88   Tc(MIN.) =  26.46
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE     403.00 =  2808.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     403.00 TO NODE     403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.248
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4892
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    46.70   SUBAREA RUNOFF(CFS) =    28.50
  TOTAL AREA(ACRES) =     55.00   TOTAL RUNOFF(CFS) =    35.32
  TC(MIN) =  26.46

****************************************************************************
  FLOW PROCESS FROM NODE     403.00 TO NODE     403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.248
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8589
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.32
  TOTAL AREA(ACRES) =     55.30   TOTAL RUNOFF(CFS) =    35.65
  TC(MIN) =  26.46
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      55.30  TC(MIN.) =      26.46
  PEAK FLOW RATE(CFS)    =      35.65
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS

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**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 10-YEAR HYDROLOGY                                                       *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXE10.DAT
  TIME/DATE OF STUDY: 05:19 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   971.00
  UPSTREAM ELEVATION =   1791.90
  DOWNSTREAM ELEVATION =   1765.00
  ELEVATION DIFFERENCE =     26.90
  TC = 0.533*[(  971.00**3)/(    26.90)]**.2 =   17.092
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.553
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5374
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      1.84
  TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =      1.84

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    501.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.553
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8637
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.13
  TOTAL AREA(ACRES) =     2.30   TOTAL RUNOFF(CFS) =    1.97
  TC(MIN) =  17.09

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1765.00  DOWNSTREAM(FEET) =   1741.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   978.00   CHANNEL SLOPE =  0.0245
  CHANNEL FLOW THRU SUBAREA(CFS) =      1.97
  FLOW VELOCITY(FEET/SEC) =   2.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.07   Tc(MIN.) =  23.16
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =  1949.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    502.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.334
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5040
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    4.70   SUBAREA RUNOFF(CFS) =    3.16
  TOTAL AREA(ACRES) =     7.00   TOTAL RUNOFF(CFS) =    5.13
  TC(MIN) =  23.16

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  52
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1741.00  DOWNSTREAM(FEET) =   1713.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   774.00   CHANNEL SLOPE =  0.0362
  CHANNEL FLOW THRU SUBAREA(CFS) =      5.13
  FLOW VELOCITY(FEET/SEC) =   4.04 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.20   Tc(MIN.) =  26.35
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =  2723.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.250
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4897
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     6.80   SUBAREA RUNOFF(CFS) =     4.16
  TOTAL AREA(ACRES) =     13.80   TOTAL RUNOFF(CFS) =     9.29
  TC(MIN) =  26.35

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.250
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8590
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.32
  TOTAL AREA(ACRES) =     14.10   TOTAL RUNOFF(CFS) =     9.61
  TC(MIN) =  26.35
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      14.10  TC(MIN.) =      26.35
  PEAK FLOW RATE(CFS)    =       9.61
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS

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```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 5-YEAR HYDROLOGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXA5.DAT
  TIME/DATE OF STUDY: 05:00 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    5.00   1-HOUR INTENSITY(INCH/HOUR) =   0.724
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH =  1000.00
 UPSTREAM ELEVATION =   1787.40
 DOWNSTREAM ELEVATION =   1760.00
 ELEVATION DIFFERENCE =     27.40
 TC = 0.709*[( 1000.00**3)/(    27.40)]**.2 =   23.086
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.167
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      3.54
 TOTAL AREA(ACRES) =      6.40   TOTAL RUNOFF(CFS) =      3.54

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.167
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8574
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    0.80
 TOTAL AREA(ACRES) =     7.20   TOTAL RUNOFF(CFS) =    4.34
 TC(MIN) =  23.09

****************************************************************************
 FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1760.00  DOWNSTREAM(FEET) =   1750.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   593.00   CHANNEL SLOPE =  0.0160
 CHANNEL FLOW THRU SUBAREA(CFS) =      4.34
 FLOW VELOCITY(FEET/SEC) =   2.58 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.83   Tc(MIN.) =  26.91
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =  1593.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.081
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4570
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =   11.10   SUBAREA RUNOFF(CFS) =    5.48
 TOTAL AREA(ACRES) =    18.30   TOTAL RUNOFF(CFS) =    9.82
 TC(MIN) =  26.91
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      18.30  TC(MIN.) =     26.91
 PEAK FLOW RATE(CFS)    =       9.82
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

1

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
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              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 5-YEAR HYDROLOGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXB5.DAT
  TIME/DATE OF STUDY: 05:04 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    5.00   1-HOUR INTENSITY(INCH/HOUR) =   0.724
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =    975.00
  UPSTREAM ELEVATION =    1792.20
  DOWNSTREAM ELEVATION =    1766.00
  ELEVATION DIFFERENCE =      26.20
  TC = 0.709*[(  975.00**3)/(    26.20)]**.2 =    22.942
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.171
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       3.00
  TOTAL AREA(ACRES) =       5.40   TOTAL RUNOFF(CFS) =       3.00

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.171
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8575
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.70   SUBAREA RUNOFF(CFS) =     0.70
  TOTAL AREA(ACRES) =     6.10   TOTAL RUNOFF(CFS) =     3.70
  TC(MIN) =  22.94

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1766.00  DOWNSTREAM(FEET) =   1749.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    979.00   CHANNEL SLOPE =  0.0174
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.70
  FLOW VELOCITY(FEET/SEC) =    2.59 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    6.29   Tc(MIN.) =  29.23
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =  1954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.037
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4477
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     9.10   SUBAREA RUNOFF(CFS) =     4.22
  TOTAL AREA(ACRES) =    15.20   TOTAL RUNOFF(CFS) =     7.93
  TC(MIN) =  29.23

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.037
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8548
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.50   SUBAREA RUNOFF(CFS) =     0.44
  TOTAL AREA(ACRES) =     15.70   TOTAL RUNOFF(CFS) =     8.37
  TC(MIN) =  29.23

****************************************************************************
  FLOW PROCESS FROM NODE     202.00 TO NODE     203.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1749.00  DOWNSTREAM(FEET) =   1730.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   524.00   CHANNEL SLOPE =  0.0363
  CHANNEL FLOW THRU SUBAREA(CFS) =      8.37
  FLOW VELOCITY(FEET/SEC) =   4.55 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =  31.15
  LONGEST FLOWPATH FROM NODE     200.00 TO NODE     203.00 =  2478.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     203.00 TO NODE     203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.004
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4405
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    18.40   SUBAREA RUNOFF(CFS) =     8.14
  TOTAL AREA(ACRES) =     34.10   TOTAL RUNOFF(CFS) =    16.51
  TC(MIN) =  31.15

****************************************************************************
  FLOW PROCESS FROM NODE     203.00 TO NODE     203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.004
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8541
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.60   SUBAREA RUNOFF(CFS) =     0.51
  TOTAL AREA(ACRES) =     34.70   TOTAL RUNOFF(CFS) =    17.03
  TC(MIN) =  31.15
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      34.70  TC(MIN.) =      31.15
  PEAK FLOW RATE(CFS)    =      17.03
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
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                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 5-YEAR HYDROLOGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXC5.DAT
  TIME/DATE OF STUDY: 05:09 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    5.00   1-HOUR INTENSITY(INCH/HOUR) =   0.724
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   986.00
  UPSTREAM ELEVATION =   1750.00
  DOWNSTREAM ELEVATION =   1714.00
  ELEVATION DIFFERENCE =     36.00
  TC = 0.533*[(  986.00**3)/(    36.00)]**.2 =   16.273
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.390
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5132
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      1.21
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      1.70  TC(MIN.) =     16.27
  PEAK FLOW RATE(CFS)    =      1.21
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
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                          Analysis prepared by:

                            THIENES ENGINEERING
                          16800 VALLEY VIEW AVENUE
                             LA MIRADA CA 90638
                      PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 5-YEAR HYDROLOGY                                                        *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXD5.DAT
  TIME/DATE OF STUDY: 05:13 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    5.00   1-HOUR INTENSITY(INCH/HOUR) =   0.724
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =    997.00
  UPSTREAM ELEVATION =    1791.90
  DOWNSTREAM ELEVATION =    1767.00
  ELEVATION DIFFERENCE =      24.90
  TC = 0.533*[(  997.00**3)/(    24.90)]**.2 =    17.635
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.335
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5043
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       3.43
  TOTAL AREA(ACRES) =       5.10   TOTAL RUNOFF(CFS) =       3.43

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.335
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5043
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.13
  TOTAL AREA(ACRES) =     5.30   TOTAL RUNOFF(CFS) =     3.57
  TC(MIN) =  17.64

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.335
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8604
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.70   SUBAREA RUNOFF(CFS) =     0.80
  TOTAL AREA(ACRES) =     6.00   TOTAL RUNOFF(CFS) =     4.37
  TC(MIN) =  17.64

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    1767.00  DOWNSTREAM(FEET) =    1744.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    973.00   CHANNEL SLOPE =  0.0236
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.37
  FLOW VELOCITY(FEET/SEC) =    3.14 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    5.16   Tc(MIN.) =  22.79
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =  1970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.174
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4757
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     2.30   SUBAREA RUNOFF(CFS) =     1.28
  TOTAL AREA(ACRES) =      8.30   TOTAL RUNOFF(CFS) =     5.66
  TC(MIN) =  22.79

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1744.00  DOWNSTREAM(FEET) =   1723.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   838.00   CHANNEL SLOPE =  0.0251
  CHANNEL FLOW THRU SUBAREA(CFS) =      5.66
  FLOW VELOCITY(FEET/SEC) =   3.44 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.06   Tc(MIN.) =  26.85
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =  2808.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.082
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4572
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    46.70   SUBAREA RUNOFF(CFS) =    23.10
  TOTAL AREA(ACRES) =     55.00   TOTAL RUNOFF(CFS) =    28.76
  TC(MIN) =  26.85

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.082
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8557
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.28
  TOTAL AREA(ACRES) =     55.30   TOTAL RUNOFF(CFS) =    29.04
  TC(MIN) =  26.85
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      55.30  TC(MIN.) =      26.85
  PEAK FLOW RATE(CFS)    =      29.04
================================================================================
================================================================================
  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 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 5-YEAR HYDROLOGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXE5.DAT
  TIME/DATE OF STUDY: 05:18 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    5.00   1-HOUR INTENSITY(INCH/HOUR) =   0.724
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   971.00
  UPSTREAM ELEVATION =   1791.90
  DOWNSTREAM ELEVATION =   1765.00
  ELEVATION DIFFERENCE =     26.90
  TC = 0.533*[(  971.00**3)/(    26.90)]**.2 =   17.092
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.356
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5078
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =      1.52

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    501.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.356
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8608
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.12
  TOTAL AREA(ACRES) =     2.30   TOTAL RUNOFF(CFS) =    1.63
  TC(MIN) =  17.09

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1765.00  DOWNSTREAM(FEET) =   1741.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   978.00   CHANNEL SLOPE =  0.0245
  CHANNEL FLOW THRU SUBAREA(CFS) =      1.63
  FLOW VELOCITY(FEET/SEC) =   2.59 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.30   Tc(MIN.) =  23.40
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =  1949.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    502.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.159
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4727
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    4.70   SUBAREA RUNOFF(CFS) =    2.58
  TOTAL AREA(ACRES) =     7.00   TOTAL RUNOFF(CFS) =    4.21
  TC(MIN) =  23.40

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  52
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1741.00  DOWNSTREAM(FEET) =   1713.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   774.00   CHANNEL SLOPE =  0.0362
  CHANNEL FLOW THRU SUBAREA(CFS) =      4.21
  FLOW VELOCITY(FEET/SEC) =   3.85 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.35   Tc(MIN.) =  26.74
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =  2723.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.084
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4577
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    6.80   SUBAREA RUNOFF(CFS) =    3.37
  TOTAL AREA(ACRES) =    13.80   TOTAL RUNOFF(CFS) =    7.58
  TC(MIN) =  26.74

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.084
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8558
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =    14.10   TOTAL RUNOFF(CFS) =    7.86
  TC(MIN) =  26.74
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     14.10  TC(MIN.) =     26.74
  PEAK FLOW RATE(CFS)    =      7.86
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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            Ver. 1.5A Release Date: 01/01/99  License ID 1435

                         Analysis prepared by:

                          THIENES ENGINEERING
                        16800 VALLEY VIEW AVENUE
                           LA MIRADA CA 90638
                  PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                              *
* EXISTING CONDITION                                                       *
* 2-YEAR HYDROLOGY                                                         *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXA2.DAT
  TIME/DATE OF STUDY: 04:59 05/13/2008
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.554
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =  1000.00
  UPSTREAM ELEVATION =    1787.40
  DOWNSTREAM ELEVATION =    1760.00
  ELEVATION DIFFERENCE =      27.40
  TC = 0.709*[( 1000.00**3)/(    27.40)]**.2 =   23.086
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.894
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       2.37
  TOTAL AREA(ACRES) =       6.40   TOTAL RUNOFF(CFS) =       2.37

****************************************************************************
  FLOW PROCESS FROM NODE     100.00 TO NODE     101.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.894
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8514
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.80   SUBAREA RUNOFF(CFS) =     0.61
  TOTAL AREA(ACRES) =      7.20   TOTAL RUNOFF(CFS) =     2.98
  TC(MIN) =  23.09

****************************************************************************
  FLOW PROCESS FROM NODE     101.00 TO NODE     102.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    1760.00  DOWNSTREAM(FEET) =    1750.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    593.00   CHANNEL SLOPE =  0.0160
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.98
  FLOW VELOCITY(FEET/SEC) =    2.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    4.16   Tc(MIN.) =  27.25
  LONGEST FLOWPATH FROM NODE     100.00 TO NODE     102.00 =  1593.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     102.00 TO NODE     102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.823
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3959
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    11.10   SUBAREA RUNOFF(CFS) =     3.62
  TOTAL AREA(ACRES) =     18.30   TOTAL RUNOFF(CFS) =     6.60
  TC(MIN) =  27.25
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      18.30  TC(MIN.) =      27.25
  PEAK FLOW RATE(CFS)    =       6.60
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

1

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

                                THIENES ENGINEERING
                              16800 VALLEY VIEW AVENUE
                                 LA MIRADA CA 90638
                          PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 2-YEAR HYDROLOGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXB2.DAT
  TIME/DATE OF STUDY: 05:03 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.554
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   975.00
  UPSTREAM ELEVATION =   1792.20
  DOWNSTREAM ELEVATION =   1766.00
  ELEVATION DIFFERENCE =     26.20
  TC = 0.709*[(  975.00**3)/(    26.20)]**.2 =   22.942
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.897
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.01
  TOTAL AREA(ACRES) =      5.40   TOTAL RUNOFF(CFS) =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.897
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8515
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    0.53
  TOTAL AREA(ACRES) =     6.10   TOTAL RUNOFF(CFS) =    2.55
  TC(MIN) =  22.94

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1766.00  DOWNSTREAM(FEET) =   1749.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   979.00   CHANNEL SLOPE =  0.0174
  CHANNEL FLOW THRU SUBAREA(CFS) =      2.55
  FLOW VELOCITY(FEET/SEC) =   2.39 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.84   Tc(MIN.) =  29.78
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =  1954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.787
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3861
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    9.10   SUBAREA RUNOFF(CFS) =    2.77
  TOTAL AREA(ACRES) =    15.20   TOTAL RUNOFF(CFS) =    5.31
  TC(MIN) =  29.78

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8486
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.50   SUBAREA RUNOFF(CFS) =     0.33
  TOTAL AREA(ACRES) =     15.70   TOTAL RUNOFF(CFS) =     5.64
  TC(MIN) =  29.78

****************************************************************************
  FLOW PROCESS FROM NODE     202.00 TO NODE     203.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    1749.00  DOWNSTREAM(FEET) =    1730.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    524.00   CHANNEL SLOPE =  0.0363
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.64
  FLOW VELOCITY(FEET/SEC) =    4.13 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    2.11   Tc(MIN.) =  31.89
  LONGEST FLOWPATH FROM NODE     200.00 TO NODE     203.00 =  2478.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     203.00 TO NODE     203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.761
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3786
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    18.40   SUBAREA RUNOFF(CFS) =     5.30
  TOTAL AREA(ACRES) =     34.10   TOTAL RUNOFF(CFS) =    10.94
  TC(MIN) =  31.89

****************************************************************************
  FLOW PROCESS FROM NODE     203.00 TO NODE     203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.761
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8479
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.60   SUBAREA RUNOFF(CFS) =     0.39
  TOTAL AREA(ACRES) =     34.70   TOTAL RUNOFF(CFS) =    11.33
  TC(MIN) =  31.89
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      34.70  TC(MIN.) =      31.89
  PEAK FLOW RATE(CFS)    =      11.33
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-99 Advanced Engineering Software (aes)
             Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

                            THIENES ENGINEERING
                          16800 VALLEY VIEW AVENUE
                             LA MIRADA CA 90638
                      PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 2-YEAR HYDROLOGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXC2.DAT
  TIME/DATE OF STUDY: 05:08 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.554
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   986.00
  UPSTREAM ELEVATION =   1750.00
  DOWNSTREAM ELEVATION =   1714.00
  ELEVATION DIFFERENCE =     36.00
  TC = 0.533*[(  986.00**3)/(    36.00)]**.2 =   16.273
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.065
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4537
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      1.70   TOTAL RUNOFF(CFS) =      0.82
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      1.70  TC(MIN.) =     16.27
  PEAK FLOW RATE(CFS)    =      0.82
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

                            THIENES ENGINEERING
                          16800 VALLEY VIEW AVENUE
                            LA MIRADA CA 90638
                       PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 2-YEAR HYDROLOGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXD2.DAT
  TIME/DATE OF STUDY: 05:11 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.554
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   997.00
  UPSTREAM ELEVATION =   1791.90
  DOWNSTREAM ELEVATION =   1767.00
  ELEVATION DIFFERENCE =     24.90
  TC = 0.533*[(  997.00**3)/(    24.90)]**.2 =   17.635
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.023
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4447
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.023
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4447
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.09
  TOTAL AREA(ACRES) =     5.30   TOTAL RUNOFF(CFS) =    2.41
  TC(MIN) =  17.64

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    401.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.023
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8545
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    0.61
  TOTAL AREA(ACRES) =     6.00   TOTAL RUNOFF(CFS) =    3.02
  TC(MIN) =  17.64

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1767.00  DOWNSTREAM(FEET) =   1744.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   973.00   CHANNEL SLOPE =  0.0236
  CHANNEL FLOW THRU SUBAREA(CFS) =      3.02
  FLOW VELOCITY(FEET/SEC) =   2.89 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.61   Tc(MIN.) =  23.24
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =  1970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.891
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4137
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     2.30   SUBAREA RUNOFF(CFS) =     0.85
  TOTAL AREA(ACRES) =      8.30   TOTAL RUNOFF(CFS) =     3.87
  TC(MIN) =  23.24

****************************************************************************
  FLOW PROCESS FROM NODE     402.00 TO NODE     403.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1744.00  DOWNSTREAM(FEET) =   1723.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   838.00   CHANNEL SLOPE =  0.0251
  CHANNEL FLOW THRU SUBAREA(CFS) =      3.87
  FLOW VELOCITY(FEET/SEC) =   3.15 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.44   Tc(MIN.) =  27.68
  LONGEST FLOWPATH FROM NODE     400.00 TO NODE     403.00 =  2808.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     403.00 TO NODE     403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.816
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3942
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    46.70   SUBAREA RUNOFF(CFS) =    15.03
  TOTAL AREA(ACRES) =     55.00   TOTAL RUNOFF(CFS) =    18.90
  TC(MIN) =  27.68

****************************************************************************
  FLOW PROCESS FROM NODE     403.00 TO NODE     403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.816
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8494
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.21
  TOTAL AREA(ACRES) =     55.30   TOTAL RUNOFF(CFS) =    19.11
  TC(MIN) =  27.68
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      55.30  TC(MIN.) =      27.68
  PEAK FLOW RATE(CFS)    =      19.11
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
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             Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

                            THIENES ENGINEERING
                          16800 VALLEY VIEW AVENUE
                              LA MIRADA CA 90638
                     PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK MORENO VALLEY                                             *
* EXISTING CONDITION                                                      *
* 2-YEAR HYDROLOGY                                                        *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\EXE2.DAT
  TIME/DATE OF STUDY: 05:17 05/13/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.554
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH =   971.00
  UPSTREAM ELEVATION =   1791.90
  DOWNSTREAM ELEVATION =   1765.00
  ELEVATION DIFFERENCE =     26.90
  TC = 0.533*[(  971.00**3)/(    26.90)]**.2 =   17.092
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.039
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4482
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    501.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.039
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8548
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.09
  TOTAL AREA(ACRES) =     2.30   TOTAL RUNOFF(CFS) =    1.11
  TC(MIN) =  17.09

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1765.00  DOWNSTREAM(FEET) =   1741.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   978.00   CHANNEL SLOPE =  0.0245
  CHANNEL FLOW THRU SUBAREA(CFS) =      1.11
  FLOW VELOCITY(FEET/SEC) =   2.40 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.80   Tc(MIN.) =  23.89
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =  1949.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    502.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.879
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4106
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    4.70   SUBAREA RUNOFF(CFS) =    1.70
  TOTAL AREA(ACRES) =     7.00   TOTAL RUNOFF(CFS) =    2.81
  TC(MIN) =  23.89

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  52
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1741.00  DOWNSTREAM(FEET) =   1713.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   774.00   CHANNEL SLOPE =  0.0362
 CHANNEL FLOW THRU SUBAREA(CFS) =      2.81
 FLOW VELOCITY(FEET/SEC) =   3.52 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.66   Tc(MIN.) =  27.55
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =  2723.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.818
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .3947
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    6.80   SUBAREA RUNOFF(CFS) =    2.20
 TOTAL AREA(ACRES) =    13.80   TOTAL RUNOFF(CFS) =    5.01
 TC(MIN) =  27.55

****************************************************************************
 FLOW PROCESS FROM NODE    503.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.818
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8495
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.21
 TOTAL AREA(ACRES) =    14.10   TOTAL RUNOFF(CFS) =    5.21
 TC(MIN) =  27.55
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =     14.10  TC(MIN.) =     27.55
 PEAK FLOW RATE(CFS)    =      5.21
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS

1
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Technical Appendix B

Hydrologic Analysis
Existing Condition – Flood Hydrograph

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
Study date 05/11/08 File: 0727E10024100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 100-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.70	210.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	4.25	527.42

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 4.250(In)

Point rain (area averaged) = 4.250(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 4.249(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	94.4	0.073	0.000	0.073	0.587	0.043
65.0	82.0	0.221	0.000	0.221	0.380	0.084
56.0	74.8	0.305	0.900	0.058	0.032	0.002
					Sum (F) =	0.129

Area averaged mean soil loss (F) (In/Hr) = 0.129
Minimum soil loss rate ((In/Hr)) = 0.064
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900
~~~~~~

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.034	0.228	0.031	0.00
2	0.17	0.07	0.034	0.227	0.031	0.00
3	0.25	0.07	0.034	0.227	0.031	0.00
4	0.33	0.10	0.051	0.226	0.046	0.01
5	0.42	0.10	0.051	0.225	0.046	0.01
6	0.50	0.10	0.051	0.224	0.046	0.01
7	0.58	0.10	0.051	0.223	0.046	0.01
8	0.67	0.10	0.051	0.222	0.046	0.01
9	0.75	0.10	0.051	0.221	0.046	0.01
10	0.83	0.13	0.068	0.220	0.061	0.01
11	0.92	0.13	0.068	0.220	0.061	0.01
12	1.00	0.13	0.068	0.219	0.061	0.01
13	1.08	0.10	0.051	0.218	0.046	0.01
14	1.17	0.10	0.051	0.217	0.046	0.01
15	1.25	0.10	0.051	0.216	0.046	0.01
16	1.33	0.10	0.051	0.215	0.046	0.01
17	1.42	0.10	0.051	0.214	0.046	0.01
18	1.50	0.10	0.051	0.213	0.046	0.01
19	1.58	0.10	0.051	0.213	0.046	0.01
20	1.67	0.10	0.051	0.212	0.046	0.01
21	1.75	0.10	0.051	0.211	0.046	0.01
22	1.83	0.13	0.068	0.210	0.061	0.01
23	1.92	0.13	0.068	0.209	0.061	0.01
24	2.00	0.13	0.068	0.208	0.061	0.01
25	2.08	0.13	0.068	0.208	0.061	0.01
26	2.17	0.13	0.068	0.207	0.061	0.01
27	2.25	0.13	0.068	0.206	0.061	0.01
28	2.33	0.13	0.068	0.205	0.061	0.01
29	2.42	0.13	0.068	0.204	0.061	0.01
30	2.50	0.13	0.068	0.203	0.061	0.01
31	2.58	0.17	0.085	0.203	0.076	0.01
32	2.67	0.17	0.085	0.202	0.076	0.01
33	2.75	0.17	0.085	0.201	0.076	0.01
34	2.83	0.17	0.085	0.200	0.076	0.01
35	2.92	0.17	0.085	0.199	0.076	0.01
36	3.00	0.17	0.085	0.198	0.076	0.01
37	3.08	0.17	0.085	0.198	0.076	0.01
38	3.17	0.17	0.085	0.197	0.076	0.01
39	3.25	0.17	0.085	0.196	0.076	0.01
40	3.33	0.17	0.085	0.195	0.076	0.01
41	3.42	0.17	0.085	0.194	0.076	0.01
42	3.50	0.17	0.085	0.193	0.076	0.01
43	3.58	0.17	0.085	0.193	0.076	0.01
44	3.67	0.17	0.085	0.192	0.076	0.01
45	3.75	0.17	0.085	0.191	0.076	0.01
46	3.83	0.20	0.102	0.190	0.092	0.01
47	3.92	0.20	0.102	0.189	0.092	0.01
48	4.00	0.20	0.102	0.189	0.092	0.01
49	4.08	0.20	0.102	0.188	0.092	0.01
50	4.17	0.20	0.102	0.187	0.092	0.01
51	4.25	0.20	0.102	0.186	0.092	0.01
52	4.33	0.23	0.119	0.185	0.107	0.01
53	4.42	0.23	0.119	0.185	0.107	0.01
54	4.50	0.23	0.119	0.184	0.107	0.01

55	4.58	0.23	0.119	0.183	0.107	0.01
56	4.67	0.23	0.119	0.182	0.107	0.01
57	4.75	0.23	0.119	0.182	0.107	0.01
58	4.83	0.27	0.136	0.181	0.122	0.01
59	4.92	0.27	0.136	0.180	0.122	0.01
60	5.00	0.27	0.136	0.179	0.122	0.01
61	5.08	0.20	0.102	0.178	0.092	0.01
62	5.17	0.20	0.102	0.178	0.092	0.01
63	5.25	0.20	0.102	0.177	0.092	0.01
64	5.33	0.23	0.119	0.176	0.107	0.01
65	5.42	0.23	0.119	0.175	0.107	0.01
66	5.50	0.23	0.119	0.175	0.107	0.01
67	5.58	0.27	0.136	0.174	0.122	0.01
68	5.67	0.27	0.136	0.173	0.122	0.01
69	5.75	0.27	0.136	0.172	0.122	0.01
70	5.83	0.27	0.136	0.171	0.122	0.01
71	5.92	0.27	0.136	0.171	0.122	0.01
72	6.00	0.27	0.136	0.170	0.122	0.01
73	6.08	0.30	0.153	0.169	0.138	0.02
74	6.17	0.30	0.153	0.168	0.138	0.02
75	6.25	0.30	0.153	0.168	0.138	0.02
76	6.33	0.30	0.153	0.167	0.138	0.02
77	6.42	0.30	0.153	0.166	0.138	0.02
78	6.50	0.30	0.153	0.165	0.138	0.02
79	6.58	0.33	0.170	0.165	---	0.01
80	6.67	0.33	0.170	0.164	---	0.01
81	6.75	0.33	0.170	0.163	---	0.01
82	6.83	0.33	0.170	0.163	---	0.01
83	6.92	0.33	0.170	0.162	---	0.01
84	7.00	0.33	0.170	0.161	---	0.01
85	7.08	0.33	0.170	0.160	---	0.01
86	7.17	0.33	0.170	0.160	---	0.01
87	7.25	0.33	0.170	0.159	---	0.01
88	7.33	0.37	0.187	0.158	---	0.03
89	7.42	0.37	0.187	0.157	---	0.03
90	7.50	0.37	0.187	0.157	---	0.03
91	7.58	0.40	0.204	0.156	---	0.05
92	7.67	0.40	0.204	0.155	---	0.05
93	7.75	0.40	0.204	0.155	---	0.05
94	7.83	0.43	0.221	0.154	---	0.07
95	7.92	0.43	0.221	0.153	---	0.07
96	8.00	0.43	0.221	0.152	---	0.07
97	8.08	0.50	0.255	0.152	---	0.10
98	8.17	0.50	0.255	0.151	---	0.10
99	8.25	0.50	0.255	0.150	---	0.10
100	8.33	0.50	0.255	0.150	---	0.11
101	8.42	0.50	0.255	0.149	---	0.11
102	8.50	0.50	0.255	0.148	---	0.11
103	8.58	0.53	0.272	0.147	---	0.12
104	8.67	0.53	0.272	0.147	---	0.13
105	8.75	0.53	0.272	0.146	---	0.13
106	8.83	0.57	0.289	0.145	---	0.14
107	8.92	0.57	0.289	0.145	---	0.14
108	9.00	0.57	0.289	0.144	---	0.14
109	9.08	0.63	0.323	0.143	---	0.18
110	9.17	0.63	0.323	0.143	---	0.18
111	9.25	0.63	0.323	0.142	---	0.18
112	9.33	0.67	0.340	0.141	---	0.20
113	9.42	0.67	0.340	0.141	---	0.20
114	9.50	0.67	0.340	0.140	---	0.20
115	9.58	0.70	0.357	0.139	---	0.22
116	9.67	0.70	0.357	0.139	---	0.22
117	9.75	0.70	0.357	0.138	---	0.22
118	9.83	0.73	0.374	0.137	---	0.24
119	9.92	0.73	0.374	0.137	---	0.24
120	10.00	0.73	0.374	0.136	---	0.24
121	10.08	0.50	0.255	0.135	---	0.12
122	10.17	0.50	0.255	0.135	---	0.12
123	10.25	0.50	0.255	0.134	---	0.12
124	10.33	0.50	0.255	0.133	---	0.12
125	10.42	0.50	0.255	0.133	---	0.12
126	10.50	0.50	0.255	0.132	---	0.12
127	10.58	0.67	0.340	0.131	---	0.21
128	10.67	0.67	0.340	0.131	---	0.21
129	10.75	0.67	0.340	0.130	---	0.21
130	10.83	0.67	0.340	0.129	---	0.21
131	10.92	0.67	0.340	0.129	---	0.21
132	11.00	0.67	0.340	0.128	---	0.21
133	11.08	0.63	0.323	0.128	---	0.20
134	11.17	0.63	0.323	0.127	---	0.20
135	11.25	0.63	0.323	0.126	---	0.20
136	11.33	0.63	0.323	0.126	---	0.20
137	11.42	0.63	0.323	0.125	---	0.20
138	11.50	0.63	0.323	0.124	---	0.20
139	11.58	0.57	0.289	0.124	---	0.17

140	11.67	0.57	0.289	0.123	---	0.17
141	11.75	0.57	0.289	0.123	---	0.17
142	11.83	0.60	0.306	0.122	---	0.18
143	11.92	0.60	0.306	0.121	---	0.18
144	12.00	0.60	0.306	0.121	---	0.19
145	12.08	0.83	0.425	0.120	---	0.30
146	12.17	0.83	0.425	0.120	---	0.31
147	12.25	0.83	0.425	0.119	---	0.31
148	12.33	0.87	0.442	0.118	---	0.32
149	12.42	0.87	0.442	0.118	---	0.32
150	12.50	0.87	0.442	0.117	---	0.32
151	12.58	0.93	0.476	0.117	---	0.36
152	12.67	0.93	0.476	0.116	---	0.36
153	12.75	0.93	0.476	0.115	---	0.36
154	12.83	0.97	0.493	0.115	---	0.38
155	12.92	0.97	0.493	0.114	---	0.38
156	13.00	0.97	0.493	0.114	---	0.38
157	13.08	1.13	0.578	0.113	---	0.46
158	13.17	1.13	0.578	0.113	---	0.47
159	13.25	1.13	0.578	0.112	---	0.47
160	13.33	1.13	0.578	0.111	---	0.47
161	13.42	1.13	0.578	0.111	---	0.47
162	13.50	1.13	0.578	0.110	---	0.47
163	13.58	0.77	0.391	0.110	---	0.28
164	13.67	0.77	0.391	0.109	---	0.28
165	13.75	0.77	0.391	0.109	---	0.28
166	13.83	0.77	0.391	0.108	---	0.28
167	13.92	0.77	0.391	0.108	---	0.28
168	14.00	0.77	0.391	0.107	---	0.28
169	14.08	0.90	0.459	0.106	---	0.35
170	14.17	0.90	0.459	0.106	---	0.35
171	14.25	0.90	0.459	0.105	---	0.35
172	14.33	0.87	0.442	0.105	---	0.34
173	14.42	0.87	0.442	0.104	---	0.34
174	14.50	0.87	0.442	0.104	---	0.34
175	14.58	0.87	0.442	0.103	---	0.34
176	14.67	0.87	0.442	0.103	---	0.34
177	14.75	0.87	0.442	0.102	---	0.34
178	14.83	0.83	0.425	0.102	---	0.32
179	14.92	0.83	0.425	0.101	---	0.32
180	15.00	0.83	0.425	0.101	---	0.32
181	15.08	0.80	0.408	0.100	---	0.31
182	15.17	0.80	0.408	0.100	---	0.31
183	15.25	0.80	0.408	0.099	---	0.31
184	15.33	0.77	0.391	0.099	---	0.29
185	15.42	0.77	0.391	0.098	---	0.29
186	15.50	0.77	0.391	0.098	---	0.29
187	15.58	0.63	0.323	0.097	---	0.23
188	15.67	0.63	0.323	0.097	---	0.23
189	15.75	0.63	0.323	0.096	---	0.23
190	15.83	0.63	0.323	0.096	---	0.23
191	15.92	0.63	0.323	0.095	---	0.23
192	16.00	0.63	0.323	0.095	---	0.23
193	16.08	0.13	0.068	0.094	0.061	0.01
194	16.17	0.13	0.068	0.094	0.061	0.01
195	16.25	0.13	0.068	0.093	0.061	0.01
196	16.33	0.13	0.068	0.093	0.061	0.01
197	16.42	0.13	0.068	0.092	0.061	0.01
198	16.50	0.13	0.068	0.092	0.061	0.01
199	16.58	0.10	0.051	0.091	0.046	0.01
200	16.67	0.10	0.051	0.091	0.046	0.01
201	16.75	0.10	0.051	0.090	0.046	0.01
202	16.83	0.10	0.051	0.090	0.046	0.01
203	16.92	0.10	0.051	0.089	0.046	0.01
204	17.00	0.10	0.051	0.089	0.046	0.01
205	17.08	0.17	0.085	0.088	0.076	0.01
206	17.17	0.17	0.085	0.088	0.076	0.01
207	17.25	0.17	0.085	0.088	0.076	0.01
208	17.33	0.17	0.085	0.087	0.076	0.01
209	17.42	0.17	0.085	0.087	0.076	0.01
210	17.50	0.17	0.085	0.086	0.076	0.01
211	17.58	0.17	0.085	0.086	0.076	0.01
212	17.67	0.17	0.085	0.085	0.076	0.01
213	17.75	0.17	0.085	0.085	0.076	0.01
214	17.83	0.13	0.068	0.085	0.061	0.01
215	17.92	0.13	0.068	0.084	0.061	0.01
216	18.00	0.13	0.068	0.084	0.061	0.01
217	18.08	0.13	0.068	0.083	0.061	0.01
218	18.17	0.13	0.068	0.083	0.061	0.01
219	18.25	0.13	0.068	0.083	0.061	0.01
220	18.33	0.13	0.068	0.082	0.061	0.01
221	18.42	0.13	0.068	0.082	0.061	0.01
222	18.50	0.13	0.068	0.081	0.061	0.01
223	18.58	0.10	0.051	0.081	0.046	0.01
224	18.67	0.10	0.051	0.081	0.046	0.01

225	18.75	0.10	0.051	0.080	0.046	0.01
226	18.83	0.07	0.034	0.080	0.031	0.00
227	18.92	0.07	0.034	0.079	0.031	0.00
228	19.00	0.07	0.034	0.079	0.031	0.00
229	19.08	0.10	0.051	0.079	0.046	0.01
230	19.17	0.10	0.051	0.078	0.046	0.01
231	19.25	0.10	0.051	0.078	0.046	0.01
232	19.33	0.13	0.068	0.078	0.061	0.01
233	19.42	0.13	0.068	0.077	0.061	0.01
234	19.50	0.13	0.068	0.077	0.061	0.01
235	19.58	0.10	0.051	0.076	0.046	0.01
236	19.67	0.10	0.051	0.076	0.046	0.01
237	19.75	0.10	0.051	0.076	0.046	0.01
238	19.83	0.07	0.034	0.075	0.031	0.00
239	19.92	0.07	0.034	0.075	0.031	0.00
240	20.00	0.07	0.034	0.075	0.031	0.00
241	20.08	0.10	0.051	0.074	0.046	0.01
242	20.17	0.10	0.051	0.074	0.046	0.01
243	20.25	0.10	0.051	0.074	0.046	0.01
244	20.33	0.10	0.051	0.073	0.046	0.01
245	20.42	0.10	0.051	0.073	0.046	0.01
246	20.50	0.10	0.051	0.073	0.046	0.01
247	20.58	0.10	0.051	0.073	0.046	0.01
248	20.67	0.10	0.051	0.072	0.046	0.01
249	20.75	0.10	0.051	0.072	0.046	0.01
250	20.83	0.07	0.034	0.072	0.031	0.00
251	20.92	0.07	0.034	0.071	0.031	0.00
252	21.00	0.07	0.034	0.071	0.031	0.00
253	21.08	0.10	0.051	0.071	0.046	0.01
254	21.17	0.10	0.051	0.071	0.046	0.01
255	21.25	0.10	0.051	0.070	0.046	0.01
256	21.33	0.07	0.034	0.070	0.031	0.00
257	21.42	0.07	0.034	0.070	0.031	0.00
258	21.50	0.07	0.034	0.069	0.031	0.00
259	21.58	0.10	0.051	0.069	0.046	0.01
260	21.67	0.10	0.051	0.069	0.046	0.01
261	21.75	0.10	0.051	0.069	0.046	0.01
262	21.83	0.07	0.034	0.068	0.031	0.00
263	21.92	0.07	0.034	0.068	0.031	0.00
264	22.00	0.07	0.034	0.068	0.031	0.00
265	22.08	0.10	0.051	0.068	0.046	0.01
266	22.17	0.10	0.051	0.068	0.046	0.01
267	22.25	0.10	0.051	0.067	0.046	0.01
268	22.33	0.07	0.034	0.067	0.031	0.00
269	22.42	0.07	0.034	0.067	0.031	0.00
270	22.50	0.07	0.034	0.067	0.031	0.00
271	22.58	0.07	0.034	0.067	0.031	0.00
272	22.67	0.07	0.034	0.066	0.031	0.00
273	22.75	0.07	0.034	0.066	0.031	0.00
274	22.83	0.07	0.034	0.066	0.031	0.00
275	22.92	0.07	0.034	0.066	0.031	0.00
276	23.00	0.07	0.034	0.066	0.031	0.00
277	23.08	0.07	0.034	0.065	0.031	0.00
278	23.17	0.07	0.034	0.065	0.031	0.00
279	23.25	0.07	0.034	0.065	0.031	0.00
280	23.33	0.07	0.034	0.065	0.031	0.00
281	23.42	0.07	0.034	0.065	0.031	0.00
282	23.50	0.07	0.034	0.065	0.031	0.00
283	23.58	0.07	0.034	0.065	0.031	0.00
284	23.67	0.07	0.034	0.065	0.031	0.00
285	23.75	0.07	0.034	0.065	0.031	0.00
286	23.83	0.07	0.034	0.064	0.031	0.00
287	23.92	0.07	0.034	0.064	0.031	0.00
288	24.00	0.07	0.034	0.064	0.031	0.00
Sum =		100.0			Sum =	25.7

Flood volume = Effective rainfall 2.14(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 22.1(Ac.Ft)
Total soil loss = 2.11(In)
Total soil loss = 21.796(Ac.Ft)
Total rainfall = 4.25(In)
Flood volume = 964672.9 Cubic Feet
Total soil loss = 949415.8 Cubic Feet

Peak flow rate of this hydrograph = 56.880(CFS)

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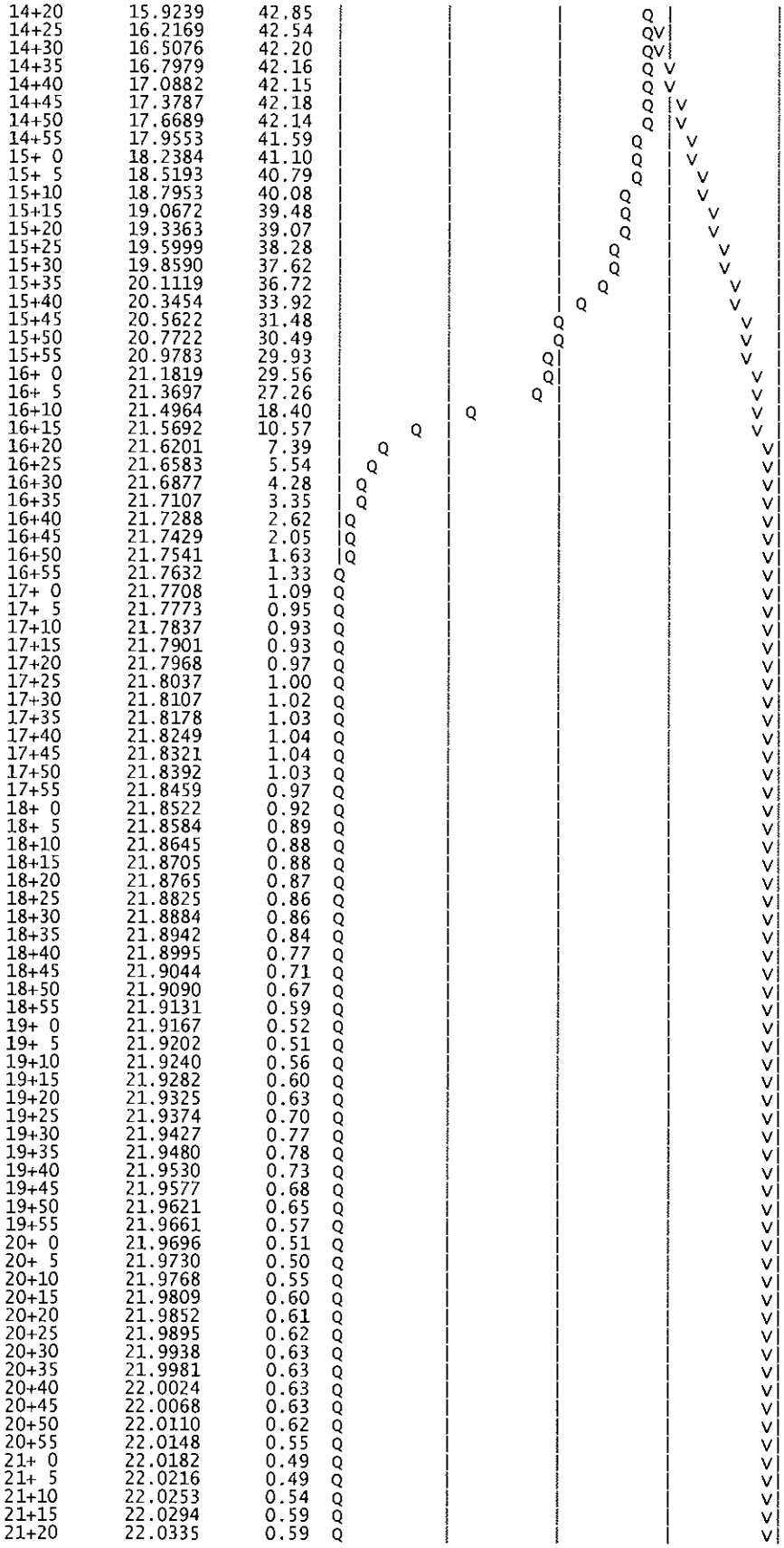
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0002	0.03	Q	|	|	|	|

0+10	0.0014	0.16	Q				
0+15	0.0033	0.28	Q				
0+20	0.0057	0.35	Q				
0+25	0.0087	0.44	Q				
0+30	0.0122	0.52	Q				
0+35	0.0160	0.55	Q				
0+40	0.0200	0.58	Q				
0+45	0.0241	0.59	Q				
0+50	0.0284	0.62	Q				
0+55	0.0332	0.70	Q				
1+ 0	0.0384	0.76	Q				
1+ 5	0.0437	0.78	Q				
1+10	0.0488	0.73	Q				
1+15	0.0534	0.68	Q				
1+20	0.0580	0.67	Q				
1+25	0.0626	0.66	Q				
1+30	0.0671	0.65	Q				
1+35	0.0715	0.65	Q				
1+40	0.0760	0.65	Q				
1+45	0.0804	0.65	Q				
1+50	0.0850	0.66	Q				
1+55	0.0900	0.72	Q				
2+ 0	0.0953	0.78	Q				
2+ 5	0.1009	0.80	Q				
2+10	0.1065	0.82	Q				
2+15	0.1122	0.83	Q				
2+20	0.1179	0.83	Q				
2+25	0.1237	0.84	Q				
2+30	0.1295	0.84	Q				
2+35	0.1354	0.86	Q				
2+40	0.1418	0.93	Q				
2+45	0.1486	0.99	Q				
2+50	0.1556	1.01	Q				
2+55	0.1627	1.03	Q				
3+ 0	0.1698	1.04	Q				
3+ 5	0.1770	1.04	Q				
3+10	0.1842	1.05	Q				
3+15	0.1915	1.05	Q				
3+20	0.1987	1.06	Q				
3+25	0.2060	1.06	Q				
3+30	0.2133	1.06	Q				
3+35	0.2206	1.06	Q				
3+40	0.2280	1.06	Q				
3+45	0.2353	1.06	Q				
3+50	0.2427	1.08	Q				
3+55	0.2506	1.15	Q				
4+ 0	0.2589	1.20	Q				
4+ 5	0.2674	1.23	Q				
4+10	0.2759	1.24	Q				
4+15	0.2845	1.25	Q				
4+20	0.2933	1.27	Q				
4+25	0.3026	1.34	Q				
4+30	0.3122	1.41	Q				
4+35	0.3221	1.43	Q				
4+40	0.3321	1.45	Q				
4+45	0.3421	1.46	Q				
4+50	0.3524	1.48	Q				
4+55	0.3631	1.56	VQ				
5+ 0	0.3742	1.62	VQ				
5+ 5	0.3854	1.61	VQ				
5+10	0.3957	1.50	Q				
5+15	0.4052	1.39	Q				
5+20	0.4147	1.37	Q				
5+25	0.4244	1.41	Q				
5+30	0.4344	1.46	Q				
5+35	0.4447	1.49	Q				
5+40	0.4554	1.56	VQ				
5+45	0.4666	1.62	VQ				
5+50	0.4779	1.65	VQ				
5+55	0.4894	1.66	VQ				
6+ 0	0.5009	1.67	VQ				
6+ 5	0.5126	1.70	VQ				
6+10	0.5247	1.77	VQ				
6+15	0.5373	1.83	VQ				
6+20	0.5501	1.86	VQ				
6+25	0.5630	1.87	|Q				
6+30	0.5760	1.89	|Q				
6+35	0.5884	1.80	|Q				
6+40	0.5982	1.42	QV				
6+45	0.6058	1.11	QV				
6+50	0.6130	1.04	QV				
6+55	0.6201	1.03	QV				
7+ 0	0.6273	1.06	QV				
7+ 5	0.6349	1.10	QV				
7+10	0.6428	1.15	QV				

7+15	0.6512	1.22	QV
7+20	0.6612	1.45	QV
7+25	0.6762	2.19	Q
7+30	0.6959	2.85	Q
7+35	0.7188	3.33	VQ
7+40	0.7478	4.21	VQ
7+45	0.7821	4.97	V Q
7+50	0.8201	5.52	V Q
7+55	0.8646	6.46	V Q
8+ 0	0.9147	7.27	V Q
8+ 5	0.9698	8.00	V Q
8+10	1.0361	9.63	V Q
8+15	1.1121	11.04	V Q
8+20	1.1927	11.71	V Q
8+25	1.2764	12.15	V Q
8+30	1.3624	12.48	V Q
8+35	1.4512	12.90	V Q
8+40	1.5462	13.78	V Q
8+45	1.6464	14.56	V Q
8+50	1.7505	15.11	V Q
8+55	1.8611	16.06	V Q
9+ 0	1.9772	16.87	V Q
9+ 5	2.0984	17.59	V Q
9+10	2.2308	19.22	V Q
9+15	2.3728	20.62	V Q
9+20	2.5204	21.43	V Q
9+25	2.6755	22.52	V Q
9+30	2.8369	23.44	V Q
9+35	3.0028	24.09	V Q
9+40	3.1757	25.10	V Q
9+45	3.3545	25.97	V Q
9+50	3.5376	26.58	V Q
9+55	3.7275	27.57	V Q
10+ 0	3.9232	28.41	V Q
10+ 5	4.1143	27.75	V Q
10+10	4.2755	23.41	V Q
10+15	4.4100	19.53	V Q
10+20	4.5345	18.08	V Q
10+25	4.6536	17.30	V Q
10+30	4.7693	16.80	V Q
10+35	4.8881	17.24	V Q
10+40	5.0283	20.35	V Q
10+45	5.1877	23.15	V Q
10+50	5.3544	24.20	V Q
10+55	5.5252	24.81	V Q
11+ 0	5.6990	25.24	V Q
11+ 5	5.8740	25.40	V Q
11+10	6.0460	24.97	V Q
11+15	6.2153	24.59	V Q
11+20	6.3846	24.58	V Q
11+25	6.5543	24.64	V Q
11+30	6.7245	24.71	V Q
11+35	6.8931	24.47	V Q
11+40	7.0531	23.23	V Q
11+45	7.2055	22.14	VQ
11+50	7.3561	21.87	VQ
11+55	7.5099	22.32	VQ
12+ 0	7.6668	22.79	V Q
12+ 5	7.8325	24.05	V Q
12+10	8.0309	28.81	V Q
12+15	8.2583	33.02	V Q
12+20	8.4987	34.91	V Q
12+25	8.7507	36.59	V Q
12+30	9.0117	37.90	V Q
12+35	9.2803	38.99	V Q
12+40	9.5617	40.86	V Q
12+45	9.8542	42.47	V Q
12+50	10.1535	43.46	V Q
12+55	10.4612	44.68	V Q
13+ 0	10.7759	45.69	V Q
13+ 5	11.0999	47.04	V Q
13+10	11.4496	50.78	V Q
13+15	11.8217	54.03	V Q
13+20	12.2034	55.42	V Q
13+25	12.5910	56.27	V Q
13+30	12.9827	56.88	V Q
13+35	13.3657	55.61	V Q
13+40	13.7007	48.64	V Q
13+45	13.9931	42.46	V Q
13+50	14.2693	40.10	VQ
13+55	14.5367	38.82	QV
14+ 0	14.7982	37.97	QV
14+ 5	15.0599	38.00	Q V
14+10	15.3373	40.27	QV
14+15	15.6288	42.33	Q



14+20	15.9239	42.85	
14+25	16.2169	42.54	
14+30	16.5076	42.20	
14+35	16.7979	42.16	
14+40	17.0882	42.15	
14+45	17.3787	42.18	
14+50	17.6689	42.14	
14+55	17.9553	41.59	
15+ 0	18.2384	41.10	
15+ 5	18.5193	40.79	
15+10	18.7953	40.08	
15+15	19.0672	39.48	
15+20	19.3363	39.07	
15+25	19.5999	38.28	
15+30	19.8590	37.62	
15+35	20.1119	36.72	
15+40	20.3454	33.92	
15+45	20.5622	31.48	
15+50	20.7722	30.49	
15+55	20.9783	29.93	
16+ 0	21.1819	29.56	
16+ 5	21.3697	27.26	
16+10	21.4964	18.40	
16+15	21.5692	10.57	
16+20	21.6201	7.39	
16+25	21.6583	5.54	
16+30	21.6877	4.28	
16+35	21.7107	3.35	
16+40	21.7288	2.62	
16+45	21.7429	2.05	
16+50	21.7541	1.63	
16+55	21.7632	1.33	
17+ 0	21.7708	1.09	
17+ 5	21.7773	0.95	
17+10	21.7837	0.93	
17+15	21.7901	0.93	
17+20	21.7968	0.97	
17+25	21.8037	1.00	
17+30	21.8107	1.02	
17+35	21.8178	1.03	
17+40	21.8249	1.04	
17+45	21.8321	1.04	
17+50	21.8392	1.03	
17+55	21.8459	0.97	
18+ 0	21.8522	0.92	
18+ 5	21.8584	0.89	
18+10	21.8645	0.88	
18+15	21.8705	0.88	
18+20	21.8765	0.87	
18+25	21.8825	0.86	
18+30	21.8884	0.86	
18+35	21.8942	0.84	
18+40	21.8995	0.77	
18+45	21.9044	0.71	
18+50	21.9090	0.67	
18+55	21.9131	0.59	
19+ 0	21.9167	0.52	
19+ 5	21.9202	0.51	
19+10	21.9240	0.56	
19+15	21.9282	0.60	
19+20	21.9325	0.63	
19+25	21.9374	0.70	
19+30	21.9427	0.77	
19+35	21.9480	0.78	
19+40	21.9530	0.73	
19+45	21.9577	0.68	
19+50	21.9621	0.65	
19+55	21.9661	0.57	
20+ 0	21.9696	0.51	
20+ 5	21.9730	0.50	
20+10	21.9768	0.55	
20+15	21.9809	0.60	
20+20	21.9852	0.61	
20+25	21.9895	0.62	
20+30	21.9938	0.63	
20+35	21.9981	0.63	
20+40	22.0024	0.63	
20+45	22.0068	0.63	
20+50	22.0110	0.62	
20+55	22.0148	0.55	
21+ 0	22.0182	0.49	
21+ 5	22.0216	0.49	
21+10	22.0253	0.54	
21+15	22.0294	0.59	
21+20	22.0335	0.59	

21+25	22.0372	0.54	Q	|	|	|	V|
21+30	22.0405	0.48	Q	|	|	|	V|
21+35	22.0438	0.48	Q	|	|	|	V|
21+40	22.0474	0.53	Q	|	|	|	V|
21+45	22.0515	0.58	Q	|	|	|	V|
21+50	22.0555	0.59	Q	|	|	|	V|
21+55	22.0592	0.53	Q	|	|	|	V|
22+ 0	22.0625	0.48	Q	|	|	|	V|
22+ 5	22.0657	0.48	Q	|	|	|	V|
22+10	22.0694	0.53	Q	|	|	|	V|
22+15	22.0734	0.58	Q	|	|	|	V|
22+20	22.0775	0.59	Q	|	|	|	V|
22+25	22.0811	0.53	Q	|	|	|	V|
22+30	22.0844	0.48	Q	|	|	|	V|
22+35	22.0876	0.46	Q	|	|	|	V|
22+40	22.0907	0.45	Q	|	|	|	V|
22+45	22.0938	0.44	Q	|	|	|	V|
22+50	22.0968	0.44	Q	|	|	|	V|
22+55	22.0998	0.44	Q	|	|	|	V|
23+ 0	22.1028	0.43	Q	|	|	|	V|
23+ 5	22.1057	0.43	Q	|	|	|	V|
23+10	22.1087	0.43	Q	|	|	|	V|
23+15	22.1116	0.43	Q	|	|	|	V|
23+20	22.1146	0.43	Q	|	|	|	V|
23+25	22.1175	0.43	Q	|	|	|	V|
23+30	22.1204	0.43	Q	|	|	|	V|
23+35	22.1234	0.43	Q	|	|	|	V|
23+40	22.1263	0.43	Q	|	|	|	V|
23+45	22.1292	0.43	Q	|	|	|	V|
23+50	22.1322	0.43	Q	|	|	|	V|
23+55	22.1351	0.43	Q	|	|	|	V|
24+ 0	22.1380	0.43	Q	|	|	|	V|
24+ 5	22.1407	0.39	Q	|	|	|	V|
24+10	22.1425	0.26	Q	|	|	|	V|
24+15	22.1435	0.14	Q	|	|	|	V|
24+20	22.1442	0.10	Q	|	|	|	V|
24+25	22.1446	0.07	Q	|	|	|	V|
24+30	22.1450	0.05	Q	|	|	|	V|
24+35	22.1453	0.04	Q	|	|	|	V|
24+40	22.1454	0.03	Q	|	|	|	V|
24+45	22.1456	0.02	Q	|	|	|	V|
24+50	22.1457	0.01	Q	|	|	|	V|
24+55	22.1458	0.01	Q	|	|	|	V|
25+ 0	22.1458	0.01	Q	|	|	|	V|
25+ 5	22.1458	0.00	Q	|	|	|	V|
25+10	22.1458	0.00	Q	|	|	|	V

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
                Study date  05/11/08 File: 0727E1006100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 100-YEAR

-----------------------------------------------------------------------
Drainage Area =     124.10(Ac.)  =      0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =     124.10(Ac.)  =      0.194 Sq. Mi.
Length along longest watercourse =    2808.00(Ft.)
Length along longest watercourse measured to centroid =    1755.00(Ft.)
Length along longest watercourse =      0.532 Mi.
Length along longest watercourse measured to centroid =      0.332 Mi.
Difference in elevation =      68.90(Ft.)
Slope along watercourse =    129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.148 Hr.
Lag time =     8.87 Min.
25% of lag time =     2.22 Min.
40% of lag time =     3.55 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      124.10            1.10                 136.51

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      124.10            2.50                 310.25

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    1.100(In)
Area Averaged 100-Year Rainfall =    2.500(In)

Point rain (area averaged) =    2.500(In)
Areal adjustment factor =   99.96 %
Adjusted average point rain =    2.499(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    72.900            86.00          0.000
    47.200            65.00          0.000
     4.000            56.00          0.900
 Total Area Entered =    124.10(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
86.0  94.4      0.073     0.000        0.073        0.587      0.043
65.0  82.0      0.221     0.000        0.221        0.380      0.084
56.0  74.8      0.305     0.900        0.058        0.032      0.002
                                                   Sum (F) =    0.129
Area averaged mean soil loss (F) (In/Hr) =  0.129
Minimum soil loss rate ((In/Hr)) =  0.064
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	0.129	---	0.02
2	0.17	0.60	0.180	0.129	---	0.05
3	0.25	0.60	0.180	0.129	---	0.05
4	0.33	0.60	0.180	0.129	---	0.05
5	0.42	0.60	0.180	0.129	---	0.05
6	0.50	0.70	0.210	0.129	---	0.08
7	0.58	0.70	0.210	0.129	---	0.08
8	0.67	0.70	0.210	0.129	---	0.08
9	0.75	0.70	0.210	0.129	---	0.08
10	0.83	0.70	0.210	0.129	---	0.08
11	0.92	0.70	0.210	0.129	---	0.08
12	1.00	0.80	0.240	0.129	---	0.11
13	1.08	0.80	0.240	0.129	---	0.11
14	1.17	0.80	0.240	0.129	---	0.11
15	1.25	0.80	0.240	0.129	---	0.11
16	1.33	0.80	0.240	0.129	---	0.11
17	1.42	0.80	0.240	0.129	---	0.11
18	1.50	0.80	0.240	0.129	---	0.11
19	1.58	0.80	0.240	0.129	---	0.11
20	1.67	0.80	0.240	0.129	---	0.11
21	1.75	0.80	0.240	0.129	---	0.11
22	1.83	0.80	0.240	0.129	---	0.11
23	1.92	0.80	0.240	0.129	---	0.11
24	2.00	0.90	0.270	0.129	---	0.14
25	2.08	0.80	0.240	0.129	---	0.11
26	2.17	0.90	0.270	0.129	---	0.14
27	2.25	0.90	0.270	0.129	---	0.14
28	2.33	0.90	0.270	0.129	---	0.14
29	2.42	0.90	0.270	0.129	---	0.14
30	2.50	0.90	0.270	0.129	---	0.14
31	2.58	0.90	0.270	0.129	---	0.14
32	2.67	0.90	0.270	0.129	---	0.14
33	2.75	1.00	0.300	0.129	---	0.17
34	2.83	1.00	0.300	0.129	---	0.17
35	2.92	1.00	0.300	0.129	---	0.17
36	3.00	1.00	0.300	0.129	---	0.17
37	3.08	1.00	0.300	0.129	---	0.17
38	3.17	1.10	0.330	0.129	---	0.20
39	3.25	1.10	0.330	0.129	---	0.20
40	3.33	1.10	0.330	0.129	---	0.20
41	3.42	1.20	0.360	0.129	---	0.23
42	3.50	1.30	0.390	0.129	---	0.26
43	3.58	1.40	0.420	0.129	---	0.29
44	3.67	1.40	0.420	0.129	---	0.29
45	3.75	1.50	0.450	0.129	---	0.32
46	3.83	1.50	0.450	0.129	---	0.32
47	3.92	1.60	0.480	0.129	---	0.35
48	4.00	1.60	0.480	0.129	---	0.35
49	4.08	1.70	0.510	0.129	---	0.38
50	4.17	1.80	0.540	0.129	---	0.41
51	4.25	1.90	0.570	0.129	---	0.44
52	4.33	2.00	0.600	0.129	---	0.47
53	4.42	2.10	0.630	0.129	---	0.50
54	4.50	2.10	0.630	0.129	---	0.50

55	4.58	2.20	0.660	0.129	---	0.53
56	4.67	2.30	0.690	0.129	---	0.56
57	4.75	2.40	0.720	0.129	---	0.59
58	4.83	2.40	0.720	0.129	---	0.59
59	4.92	2.50	0.750	0.129	---	0.62
60	5.00	2.60	0.780	0.129	---	0.65
61	5.08	3.10	0.930	0.129	---	0.80
62	5.17	3.60	1.080	0.129	---	0.95
63	5.25	3.90	1.170	0.129	---	1.04
64	5.33	4.20	1.259	0.129	---	1.13
65	5.42	4.70	1.409	0.129	---	1.28
66	5.50	5.60	1.679	0.129	---	1.55
67	5.58	1.90	0.570	0.129	---	0.44
68	5.67	0.90	0.270	0.129	---	0.14
69	5.75	0.60	0.180	0.129	---	0.05
70	5.83	0.50	0.150	0.129	---	0.02
71	5.92	0.30	0.090	0.129	0.081	0.01
72	6.00	0.20	0.060	0.129	0.054	0.01
Sum =		100.0			Sum =	20.8

Flood volume = Effective rainfall 1.74(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 18.0(Ac.Ft)
Total soil loss = 0.76(In)
Total soil loss = 7.884(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 782288.3 Cubic Feet
Total soil loss = 343438.7 Cubic Feet

Peak flow rate of this hydrograph = 147.843(CFS)

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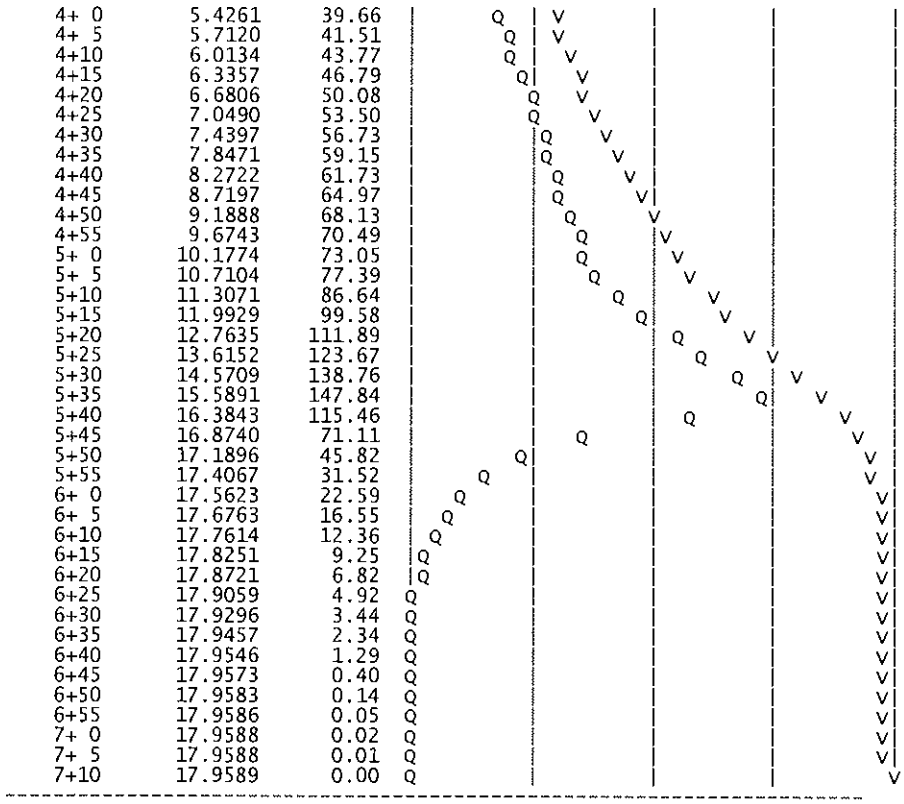
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 50.0 100.0 150.0 200.0
0+ 5	0.0014	0.20	Q
0+10	0.0103	1.30	Q
0+15	0.0324	3.21	Q
0+20	0.0637	4.54	Q
0+25	0.0990	5.12	VQ
0+30	0.1386	5.75	VQ
0+35	0.1880	7.17	VQ
0+40	0.2458	8.39	VQ
0+45	0.3073	8.93	VQ
0+50	0.3711	9.27	VQ
0+55	0.4367	9.51	VQ
1+ 0	0.5053	9.97	|Q
1+ 5	0.5830	11.27	|VQ
1+10	0.6685	12.42	|VQ
1+15	0.7574	12.92	|VQ
1+20	0.8484	13.21	|VQ
1+25	0.9407	13.40	| Q
1+30	1.0339	13.54	| Q
1+35	1.1279	13.64	| Q
1+40	1.2224	13.72	| Q
1+45	1.3173	13.78	| Q
1+50	1.4125	13.82	| QV
1+55	1.5079	13.85	| QV
2+ 0	1.6053	14.15	| QV
2+ 5	1.7091	15.07	| Q
2+10	1.8139	15.22	| QV
2+15	1.9225	15.77	| QV
2+20	2.0371	16.63	| QV
2+25	2.1540	16.97	| QV
2+30	2.2722	17.17	| Q V
2+35	2.3913	17.29	| Q V
2+40	2.5111	17.39	| Q V
2+45	2.6333	17.74	| Q V
2+50	2.7639	18.97	| Q V
2+55	2.9020	20.05	| Q V
3+ 0	3.0432	20.50	| Q V
3+ 5	3.1862	20.76	| Q V
3+10	3.3323	21.22	| Q V
3+15	3.4874	22.52	| Q V
3+20	3.6503	23.65	| Q V
3+25	3.8185	24.41	| Q V
3+30	3.9986	26.15	| Q V
3+35	4.1973	28.85	| Q V
3+40	4.4150	31.62	| Q V
3+45	4.6471	33.70	| Q V
3+50	4.8935	35.77	| Q V
3+55	5.1529	37.67	| Q |V



4+ 0	5.4261	39.66	
4+ 5	5.7120	41.51	
4+10	6.0134	43.77	
4+15	6.3357	46.79	
4+20	6.6806	50.08	
4+25	7.0490	53.50	
4+30	7.4397	56.73	
4+35	7.8471	59.15	
4+40	8.2722	61.73	
4+45	8.7197	64.97	
4+50	9.1888	68.13	
4+55	9.6743	70.49	
5+ 0	10.1774	73.05	
5+ 5	10.7104	77.39	
5+10	11.3071	86.64	
5+15	11.9929	99.58	
5+20	12.7635	111.89	
5+25	13.6152	123.67	
5+30	14.5709	138.76	
5+35	15.5891	147.84	
5+40	16.3843	115.46	
5+45	16.8740	71.11	
5+50	17.1896	45.82	
5+55	17.4067	31.52	
6+ 0	17.5623	22.59	
6+ 5	17.6763	16.55	
6+10	17.7614	12.36	
6+15	17.8251	9.25	
6+20	17.8721	6.82	
6+25	17.9059	4.92	
6+30	17.9296	3.44	
6+35	17.9457	2.34	
6+40	17.9546	1.29	
6+45	17.9573	0.40	
6+50	17.9583	0.14	
6+55	17.9586	0.05	
7+ 0	17.9588	0.02	
7+ 5	17.9588	0.01	
7+10	17.9589	0.00	

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

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PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 100-YEAR

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Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	0.80	99.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.85	229.59

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 1.850(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 1.849(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	94.4	0.073	0.000	0.073	0.587	0.043
65.0	82.0	0.221	0.000	0.221	0.380	0.084
56.0	74.8	0.305	0.900	0.058	0.032	0.002
					Sum (F) =	0.129

Area averaged mean soil loss (F) (In/Hr) = 0.129
Minimum soil loss rate ((In/Hr)) = 0.064
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900
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U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.288	0.129	---	0.16
2	0.17	1.30	0.288	0.129	---	0.16
3	0.25	1.10	0.244	0.129	---	0.12
4	0.33	1.50	0.333	0.129	---	0.20
5	0.42	1.50	0.333	0.129	---	0.20
6	0.50	1.80	0.399	0.129	---	0.27
7	0.58	1.50	0.333	0.129	---	0.20
8	0.67	1.80	0.399	0.129	---	0.27
9	0.75	1.80	0.399	0.129	---	0.27
10	0.83	1.50	0.333	0.129	---	0.20
11	0.92	1.60	0.355	0.129	---	0.23
12	1.00	1.80	0.399	0.129	---	0.27
13	1.08	2.20	0.488	0.129	---	0.36
14	1.17	2.20	0.488	0.129	---	0.36
15	1.25	2.20	0.488	0.129	---	0.36
16	1.33	2.00	0.444	0.129	---	0.31
17	1.42	2.60	0.577	0.129	---	0.45
18	1.50	2.70	0.599	0.129	---	0.47
19	1.58	2.40	0.533	0.129	---	0.40
20	1.67	2.70	0.599	0.129	---	0.47
21	1.75	3.30	0.732	0.129	---	0.60
22	1.83	3.10	0.688	0.129	---	0.56
23	1.92	2.90	0.643	0.129	---	0.51
24	2.00	3.00	0.666	0.129	---	0.54
25	2.08	3.10	0.688	0.129	---	0.56
26	2.17	4.20	0.932	0.129	---	0.80
27	2.25	5.00	1.109	0.129	---	0.98
28	2.33	3.50	0.777	0.129	---	0.65
29	2.42	6.80	1.509	0.129	---	1.38
30	2.50	7.30	1.620	0.129	---	1.49
31	2.58	8.20	1.819	0.129	---	1.69
32	2.67	5.90	1.309	0.129	---	1.18
33	2.75	2.00	0.444	0.129	---	0.31
34	2.83	1.80	0.399	0.129	---	0.27
35	2.92	1.80	0.399	0.129	---	0.27
36	3.00	0.60	0.133	0.129	---	0.00
Sum =		100.0			Sum =	17.6

Flood volume = Effective rainfall 1.46(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 15.1(Ac.Ft)
Total soil loss = 0.39(In)
Total soil loss = 3.995(Ac.Ft)
Total rainfall = 1.85(In)
Flood volume = 658920.7 Cubic Feet
Total soil loss = 174020.4 Cubic Feet

Peak flow rate of this hydrograph = 167.274(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0102	1.48	Q				
0+10	0.0634	7.73	VQ				
0+15	0.1519	12.85	V Q				
0+20	0.2493	14.14	V Q				
0+25	0.3688	17.34	V Q				
0+30	0.5153	21.28	V Q				
0+35	0.6860	24.77	V Q				
0+40	0.8650	26.00	V Q				
0+45	1.0570	27.87	V Q				
0+50	1.2613	29.67	V Q				
0+55	1.4569	28.39	V Q				
1+ 0	1.6502	28.07	VQ				
1+ 5	1.8636	30.98	V Q				
1+10	2.1127	36.18	V Q				
1+15	2.3880	39.97	VQ				
1+20	2.6714	41.15	VQ				
1+25	2.9581	41.63	VQ				
1+30	3.2762	46.19	VQ				
1+35	3.6268	50.91	VQ				
1+40	3.9816	51.51	Q				
1+45	4.3563	54.41	QV				
1+50	4.7801	61.54	Q				
1+55	5.2281	65.05	Q				
2+ 0	5.6720	64.45	Q V				
2+ 5	6.1190	64.91	Q V				
2+10	6.5938	68.95	Q V				
2+15	7.1545	81.41	Q V				
2+20	7.8041	94.32	Q V				
2+25	8.4791	98.02	Q V				
2+30	9.3117	120.88	Q				
2+35	10.3503	150.81	V Q				
2+40	11.5024	167.27	V Q				
2+45	12.5575	153.20	Q V				
2+50	13.3060	108.68	Q V				
2+55	13.8219	74.91	Q V				
3+ 0	14.2237	58.34	Q V				
3+ 5	14.5010	40.27	Q V				
3+10	14.6792	25.88	Q V				
3+15	14.8071	18.57	Q V				
3+20	14.9032	13.95	Q V				
3+25	14.9744	10.34	Q V				
3+30	15.0268	7.61	Q V				
3+35	15.0660	5.69	Q V				
3+40	15.0933	3.97	Q V				
3+45	15.1109	2.54	Q V				
3+50	15.1197	1.29	Q V				
3+55	15.1235	0.55	Q V				
4+ 0	15.1258	0.33	Q V				
4+ 5	15.1267	0.14	Q V				
4+10	15.1267	0.00	Q V				

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 100-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Oepth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	0.48	59.57

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.20	148.92

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.89 %
Adjusted average point rain = 1.199(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	94.4	0.073	0.000	0.073	0.587	0.043
65.0	82.0	0.221	0.000	0.221	0.380	0.084
56.0	74.8	0.305	0.900	0.058	0.032	0.002
					Sum (F) =	0.129

Area averaged mean soil loss (F) (In/Hr) = 0.129
Minimum soil loss rate ((In/Hr)) = 0.064
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900
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Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.604	0.129	---	0.48
2	0.17	4.30	0.619	0.129	---	0.49
3	0.25	5.00	0.719	0.129	---	0.59
4	0.33	5.00	0.719	0.129	---	0.59
5	0.42	5.80	0.834	0.129	---	0.71
6	0.50	6.50	0.935	0.129	---	0.81
7	0.58	7.40	1.064	0.129	---	0.94
8	0.67	8.60	1.237	0.129	---	1.11
9	0.75	12.30	1.769	0.129	---	1.64
10	0.83	29.10	4.186	0.129	---	4.06
11	0.92	6.80	0.978	0.129	---	0.85
12	1.00	5.00	0.719	0.129	---	0.59
Sum =		100.0			Sum =	12.8

Flood volume = Effective rainfall 1.07(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 11.1(Ac.Ft)
Total soil loss = 0.13(In)
Total soil loss = 1.332(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 481964.8 Cubic Feet
Total soil loss = 58006.8 Cubic Feet

Peak flow rate of this hydrograph = 257.749(CFS)

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1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	75.0	150.0	225.0	300.0
0+ 5	0.0303	4.41	Q				
0+10	0.1897	23.14	V Q				
0+15	0.4728	41.11	V Q				
0+20	0.8318	52.12	V Q				
0+25	1.2493	60.63	V Q				
0+30	1.7324	70.14	V Q				
0+35	2.2972	82.01	V Q				
0+40	2.9562	95.68	V Q				
0+45	3.7525	115.63	V Q				
0+50	4.9177	169.19	V	Q			
0+55	6.6928	257.75	V		Q		
1+ 0	8.2380	224.36	V		Q		
1+ 5	9.1866	137.74	V	Q			
1+10	9.7734	85.20	V				
1+15	10.1339	52.35	Q	V			
1+20	10.3867	36.70	Q	V			
1+25	10.5703	26.65	Q	V			
1+30	10.7097	20.24	Q	V			
1+35	10.8168	15.56	Q	V			
1+40	10.8977	11.74	Q	V			

1+45	10.9580	8.76	|Q	|	|	|	V|
1+50	11.0020	6.38	Q	|	|	|	V|
1+55	11.0357	4.90	Q	|	|	|	V|
2+ 0	11.0566	3.04	Q	|	|	|	V|
2+ 5	11.0624	0.83	Q	|	|	|	V|
2+10	11.0644	0.29	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E0102410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.70	210.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	4.25	527.42

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 4.250(In)

Point rain (area averaged) = 2.749(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 2.748(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	0.587	0.103
65.0	65.0	0.416	0.000	0.416	0.380	0.158
56.0	56.0	0.511	0.900	0.097	0.032	0.003
					Sum (F) =	0.265

Area averaged mean soil loss (F) (In/Hr) = 0.265
Minimum soil loss rate ((In/Hr)) = 0.132
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.022	0.469	0.020	0.00
2	0.17	0.07	0.022	0.467	0.020	0.00
3	0.25	0.07	0.022	0.465	0.020	0.00
4	0.33	0.10	0.033	0.463	0.030	0.00
5	0.42	0.10	0.033	0.462	0.030	0.00
6	0.50	0.10	0.033	0.460	0.030	0.00
7	0.58	0.10	0.033	0.458	0.030	0.00
8	0.67	0.10	0.033	0.456	0.030	0.00
9	0.75	0.10	0.033	0.454	0.030	0.00
10	0.83	0.13	0.044	0.453	0.040	0.00
11	0.92	0.13	0.044	0.451	0.040	0.00
12	1.00	0.13	0.044	0.449	0.040	0.00
13	1.08	0.10	0.033	0.447	0.030	0.00
14	1.17	0.10	0.033	0.446	0.030	0.00
15	1.25	0.10	0.033	0.444	0.030	0.00
16	1.33	0.10	0.033	0.442	0.030	0.00
17	1.42	0.10	0.033	0.440	0.030	0.00
18	1.50	0.10	0.033	0.439	0.030	0.00
19	1.58	0.10	0.033	0.437	0.030	0.00
20	1.67	0.10	0.033	0.435	0.030	0.00
21	1.75	0.10	0.033	0.433	0.030	0.00
22	1.83	0.13	0.044	0.432	0.040	0.00
23	1.92	0.13	0.044	0.430	0.040	0.00
24	2.00	0.13	0.044	0.428	0.040	0.00
25	2.08	0.13	0.044	0.426	0.040	0.00
26	2.17	0.13	0.044	0.425	0.040	0.00
27	2.25	0.13	0.044	0.423	0.040	0.00
28	2.33	0.13	0.044	0.421	0.040	0.00
29	2.42	0.13	0.044	0.419	0.040	0.00
30	2.50	0.13	0.044	0.418	0.040	0.00
31	2.58	0.17	0.055	0.416	0.049	0.01
32	2.67	0.17	0.055	0.414	0.049	0.01
33	2.75	0.17	0.055	0.413	0.049	0.01
34	2.83	0.17	0.055	0.411	0.049	0.01
35	2.92	0.17	0.055	0.409	0.049	0.01
36	3.00	0.17	0.055	0.408	0.049	0.01
37	3.08	0.17	0.055	0.406	0.049	0.01
38	3.17	0.17	0.055	0.404	0.049	0.01
39	3.25	0.17	0.055	0.402	0.049	0.01
40	3.33	0.17	0.055	0.401	0.049	0.01
41	3.42	0.17	0.055	0.399	0.049	0.01
42	3.50	0.17	0.055	0.397	0.049	0.01
43	3.58	0.17	0.055	0.396	0.049	0.01
44	3.67	0.17	0.055	0.394	0.049	0.01
45	3.75	0.17	0.055	0.392	0.049	0.01
46	3.83	0.20	0.066	0.391	0.059	0.01
47	3.92	0.20	0.066	0.389	0.059	0.01
48	4.00	0.20	0.066	0.388	0.059	0.01
49	4.08	0.20	0.066	0.386	0.059	0.01
50	4.17	0.20	0.066	0.384	0.059	0.01
51	4.25	0.20	0.066	0.383	0.059	0.01
52	4.33	0.23	0.077	0.381	0.069	0.01
53	4.42	0.23	0.077	0.379	0.069	0.01
54	4.50	0.23	0.077	0.378	0.069	0.01

55	4.58	0.23	0.077	0.376	0.069	0.01
56	4.67	0.23	0.077	0.374	0.069	0.01
57	4.75	0.23	0.077	0.373	0.069	0.01
58	4.83	0.27	0.088	0.371	0.079	0.01
59	4.92	0.27	0.088	0.370	0.079	0.01
60	5.00	0.27	0.088	0.368	0.079	0.01
61	5.08	0.20	0.066	0.366	0.059	0.01
62	5.17	0.20	0.066	0.365	0.059	0.01
63	5.25	0.20	0.066	0.363	0.059	0.01
64	5.33	0.23	0.077	0.362	0.069	0.01
65	5.42	0.23	0.077	0.360	0.069	0.01
66	5.50	0.23	0.077	0.359	0.069	0.01
67	5.58	0.27	0.088	0.357	0.079	0.01
68	5.67	0.27	0.088	0.355	0.079	0.01
69	5.75	0.27	0.088	0.354	0.079	0.01
70	5.83	0.27	0.088	0.352	0.079	0.01
71	5.92	0.27	0.088	0.351	0.079	0.01
72	6.00	0.27	0.088	0.349	0.079	0.01
73	6.08	0.30	0.099	0.348	0.089	0.01
74	6.17	0.30	0.099	0.346	0.089	0.01
75	6.25	0.30	0.099	0.344	0.089	0.01
76	6.33	0.30	0.099	0.343	0.089	0.01
77	6.42	0.30	0.099	0.341	0.089	0.01
78	6.50	0.30	0.099	0.340	0.089	0.01
79	6.58	0.33	0.110	0.338	0.099	0.01
80	6.67	0.33	0.110	0.337	0.099	0.01
81	6.75	0.33	0.110	0.335	0.099	0.01
82	6.83	0.33	0.110	0.334	0.099	0.01
83	6.92	0.33	0.110	0.332	0.099	0.01
84	7.00	0.33	0.110	0.331	0.099	0.01
85	7.08	0.33	0.110	0.329	0.099	0.01
86	7.17	0.33	0.110	0.328	0.099	0.01
87	7.25	0.33	0.110	0.326	0.099	0.01
88	7.33	0.37	0.121	0.325	0.109	0.01
89	7.42	0.37	0.121	0.323	0.109	0.01
90	7.50	0.37	0.121	0.322	0.109	0.01
91	7.58	0.40	0.132	0.320	0.119	0.01
92	7.67	0.40	0.132	0.319	0.119	0.01
93	7.75	0.40	0.132	0.317	0.119	0.01
94	7.83	0.43	0.143	0.316	0.129	0.01
95	7.92	0.43	0.143	0.314	0.129	0.01
96	8.00	0.43	0.143	0.313	0.129	0.01
97	8.08	0.50	0.165	0.312	0.148	0.02
98	8.17	0.50	0.165	0.310	0.148	0.02
99	8.25	0.50	0.165	0.309	0.148	0.02
100	8.33	0.50	0.165	0.307	0.148	0.02
101	8.42	0.50	0.165	0.306	0.148	0.02
102	8.50	0.50	0.165	0.304	0.148	0.02
103	8.58	0.53	0.176	0.303	0.158	0.02
104	8.67	0.53	0.176	0.302	0.158	0.02
105	8.75	0.53	0.176	0.300	0.158	0.02
106	8.83	0.57	0.187	0.299	0.168	0.02
107	8.92	0.57	0.187	0.297	0.168	0.02
108	9.00	0.57	0.187	0.296	0.168	0.02
109	9.08	0.63	0.209	0.294	0.188	0.02
110	9.17	0.63	0.209	0.293	0.188	0.02
111	9.25	0.63	0.209	0.292	0.188	0.02
112	9.33	0.67	0.220	0.290	0.198	0.02
113	9.42	0.67	0.220	0.289	0.198	0.02
114	9.50	0.67	0.220	0.288	0.198	0.02
115	9.58	0.70	0.231	0.286	0.208	0.02
116	9.67	0.70	0.231	0.285	0.208	0.02
117	9.75	0.70	0.231	0.283	0.208	0.02
118	9.83	0.73	0.242	0.282	0.218	0.02
119	9.92	0.73	0.242	0.281	0.218	0.02
120	10.00	0.73	0.242	0.279	0.218	0.02
121	10.08	0.50	0.165	0.278	0.148	0.02
122	10.17	0.50	0.165	0.277	0.148	0.02
123	10.25	0.50	0.165	0.275	0.148	0.02
124	10.33	0.50	0.165	0.274	0.148	0.02
125	10.42	0.50	0.165	0.273	0.148	0.02
126	10.50	0.50	0.165	0.271	0.148	0.02
127	10.58	0.67	0.220	0.270	0.198	0.02
128	10.67	0.67	0.220	0.269	0.198	0.02
129	10.75	0.67	0.220	0.267	0.198	0.02
130	10.83	0.67	0.220	0.266	0.198	0.02
131	10.92	0.67	0.220	0.265	0.198	0.02
132	11.00	0.67	0.220	0.263	0.198	0.02
133	11.08	0.63	0.209	0.262	0.188	0.02
134	11.17	0.63	0.209	0.261	0.188	0.02
135	11.25	0.63	0.209	0.260	0.188	0.02
136	11.33	0.63	0.209	0.258	0.188	0.02
137	11.42	0.63	0.209	0.257	0.188	0.02
138	11.50	0.63	0.209	0.256	0.188	0.02
139	11.58	0.57	0.187	0.254	0.168	0.02

140	11.67	0.57	0.187	0.253	0.168	0.02
141	11.75	0.57	0.187	0.252	0.168	0.02
142	11.83	0.60	0.198	0.251	0.178	0.02
143	11.92	0.60	0.198	0.249	0.178	0.02
144	12.00	0.60	0.198	0.248	0.178	0.02
145	12.08	0.83	0.275	0.247	---	0.03
146	12.17	0.83	0.275	0.246	---	0.03
147	12.25	0.83	0.275	0.244	---	0.03
148	12.33	0.87	0.286	0.243	---	0.04
149	12.42	0.87	0.286	0.242	---	0.04
150	12.50	0.87	0.286	0.241	---	0.05
151	12.58	0.93	0.308	0.240	---	0.07
152	12.67	0.93	0.308	0.238	---	0.07
153	12.75	0.93	0.308	0.237	---	0.07
154	12.83	0.97	0.319	0.236	---	0.08
155	12.92	0.97	0.319	0.235	---	0.08
156	13.00	0.97	0.319	0.234	---	0.09
157	13.08	1.13	0.374	0.232	---	0.14
158	13.17	1.13	0.374	0.231	---	0.14
159	13.25	1.13	0.374	0.230	---	0.14
160	13.33	1.13	0.374	0.229	---	0.14
161	13.42	1.13	0.374	0.228	---	0.15
162	13.50	1.13	0.374	0.227	---	0.15
163	13.58	0.77	0.253	0.225	---	0.03
164	13.67	0.77	0.253	0.224	---	0.03
165	13.75	0.77	0.253	0.223	---	0.03
166	13.83	0.77	0.253	0.222	---	0.03
167	13.92	0.77	0.253	0.221	---	0.03
168	14.00	0.77	0.253	0.220	---	0.03
169	14.08	0.90	0.297	0.219	---	0.08
170	14.17	0.90	0.297	0.217	---	0.08
171	14.25	0.90	0.297	0.216	---	0.08
172	14.33	0.87	0.286	0.215	---	0.07
173	14.42	0.87	0.286	0.214	---	0.07
174	14.50	0.87	0.286	0.213	---	0.07
175	14.58	0.87	0.286	0.212	---	0.07
176	14.67	0.87	0.286	0.211	---	0.07
177	14.75	0.87	0.286	0.210	---	0.08
178	14.83	0.83	0.275	0.209	---	0.07
179	14.92	0.83	0.275	0.208	---	0.07
180	15.00	0.83	0.275	0.207	---	0.07
181	15.08	0.80	0.264	0.206	---	0.06
182	15.17	0.80	0.264	0.204	---	0.06
183	15.25	0.80	0.264	0.203	---	0.06
184	15.33	0.77	0.253	0.202	---	0.05
185	15.42	0.77	0.253	0.201	---	0.05
186	15.50	0.77	0.253	0.200	---	0.05
187	15.58	0.63	0.209	0.199	---	0.01
188	15.67	0.63	0.209	0.198	---	0.01
189	15.75	0.63	0.209	0.197	---	0.01
190	15.83	0.63	0.209	0.196	---	0.01
191	15.92	0.63	0.209	0.195	---	0.01
192	16.00	0.63	0.209	0.194	---	0.01
193	16.08	0.13	0.044	0.193	0.040	0.00
194	16.17	0.13	0.044	0.192	0.040	0.00
195	16.25	0.13	0.044	0.191	0.040	0.00
196	16.33	0.13	0.044	0.190	0.040	0.00
197	16.42	0.13	0.044	0.189	0.040	0.00
198	16.50	0.13	0.044	0.188	0.040	0.00
199	16.58	0.10	0.033	0.187	0.030	0.00
200	16.67	0.10	0.033	0.186	0.030	0.00
201	16.75	0.10	0.033	0.186	0.030	0.00
202	16.83	0.10	0.033	0.185	0.030	0.00
203	16.92	0.10	0.033	0.184	0.030	0.00
204	17.00	0.10	0.033	0.183	0.030	0.00
205	17.08	0.17	0.055	0.182	0.049	0.01
206	17.17	0.17	0.055	0.181	0.049	0.01
207	17.25	0.17	0.055	0.180	0.049	0.01
208	17.33	0.17	0.055	0.179	0.049	0.01
209	17.42	0.17	0.055	0.178	0.049	0.01
210	17.50	0.17	0.055	0.177	0.049	0.01
211	17.58	0.17	0.055	0.176	0.049	0.01
212	17.67	0.17	0.055	0.175	0.049	0.01
213	17.75	0.17	0.055	0.175	0.049	0.01
214	17.83	0.13	0.044	0.174	0.040	0.00
215	17.92	0.13	0.044	0.173	0.040	0.00
216	18.00	0.13	0.044	0.172	0.040	0.00
217	18.08	0.13	0.044	0.171	0.040	0.00
218	18.17	0.13	0.044	0.170	0.040	0.00
219	18.25	0.13	0.044	0.170	0.040	0.00
220	18.33	0.13	0.044	0.169	0.040	0.00
221	18.42	0.13	0.044	0.168	0.040	0.00
222	18.50	0.13	0.044	0.167	0.040	0.00
223	18.58	0.10	0.033	0.166	0.030	0.00
224	18.67	0.10	0.033	0.165	0.030	0.00

225	18.75	0.10	0.033	0.165	0.030	0.00
226	18.83	0.07	0.022	0.164	0.020	0.00
227	18.92	0.07	0.022	0.163	0.020	0.00
228	19.00	0.07	0.022	0.162	0.020	0.00
229	19.08	0.10	0.033	0.162	0.030	0.00
230	19.17	0.10	0.033	0.161	0.030	0.00
231	19.25	0.10	0.033	0.160	0.030	0.00
232	19.33	0.13	0.044	0.159	0.040	0.00
233	19.42	0.13	0.044	0.159	0.040	0.00
234	19.50	0.13	0.044	0.158	0.040	0.00
235	19.58	0.10	0.033	0.157	0.030	0.00
236	19.67	0.10	0.033	0.156	0.030	0.00
237	19.75	0.10	0.033	0.156	0.030	0.00
238	19.83	0.07	0.022	0.155	0.020	0.00
239	19.92	0.07	0.022	0.154	0.020	0.00
240	20.00	0.07	0.022	0.154	0.020	0.00
241	20.08	0.10	0.033	0.153	0.030	0.00
242	20.17	0.10	0.033	0.152	0.030	0.00
243	20.25	0.10	0.033	0.152	0.030	0.00
244	20.33	0.10	0.033	0.151	0.030	0.00
245	20.42	0.10	0.033	0.150	0.030	0.00
246	20.50	0.10	0.033	0.150	0.030	0.00
247	20.58	0.10	0.033	0.149	0.030	0.00
248	20.67	0.10	0.033	0.148	0.030	0.00
249	20.75	0.10	0.033	0.148	0.030	0.00
250	20.83	0.07	0.022	0.147	0.020	0.00
251	20.92	0.07	0.022	0.147	0.020	0.00
252	21.00	0.07	0.022	0.146	0.020	0.00
253	21.08	0.10	0.033	0.145	0.030	0.00
254	21.17	0.10	0.033	0.145	0.030	0.00
255	21.25	0.10	0.033	0.144	0.030	0.00
256	21.33	0.07	0.022	0.144	0.020	0.00
257	21.42	0.07	0.022	0.143	0.020	0.00
258	21.50	0.07	0.022	0.143	0.020	0.00
259	21.58	0.10	0.033	0.142	0.030	0.00
260	21.67	0.10	0.033	0.142	0.030	0.00
261	21.75	0.10	0.033	0.141	0.030	0.00
262	21.83	0.07	0.022	0.141	0.020	0.00
263	21.92	0.07	0.022	0.140	0.020	0.00
264	22.00	0.07	0.022	0.140	0.020	0.00
265	22.08	0.10	0.033	0.139	0.030	0.00
266	22.17	0.10	0.033	0.139	0.030	0.00
267	22.25	0.10	0.033	0.138	0.030	0.00
268	22.33	0.07	0.022	0.138	0.020	0.00
269	22.42	0.07	0.022	0.137	0.020	0.00
270	22.50	0.07	0.022	0.137	0.020	0.00
271	22.58	0.07	0.022	0.137	0.020	0.00
272	22.67	0.07	0.022	0.136	0.020	0.00
273	22.75	0.07	0.022	0.136	0.020	0.00
274	22.83	0.07	0.022	0.136	0.020	0.00
275	22.92	0.07	0.022	0.135	0.020	0.00
276	23.00	0.07	0.022	0.135	0.020	0.00
277	23.08	0.07	0.022	0.135	0.020	0.00
278	23.17	0.07	0.022	0.134	0.020	0.00
279	23.25	0.07	0.022	0.134	0.020	0.00
280	23.33	0.07	0.022	0.134	0.020	0.00
281	23.42	0.07	0.022	0.133	0.020	0.00
282	23.50	0.07	0.022	0.133	0.020	0.00
283	23.58	0.07	0.022	0.133	0.020	0.00
284	23.67	0.07	0.022	0.133	0.020	0.00
285	23.75	0.07	0.022	0.133	0.020	0.00
286	23.83	0.07	0.022	0.132	0.020	0.00
287	23.92	0.07	0.022	0.132	0.020	0.00
288	24.00	0.07	0.022	0.132	0.020	0.00
Sum =		100.0			Sum =	5.0

Flood volume = Effective rainfall 0.41(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 4.3(Ac.Ft)
Total soil loss = 2.34(In)
Total soil loss = 24.153(Ac.Ft)
Total rainfall = 2.75(In)
Flood volume = 186011.8 Cubic Feet
Total soil loss = 1052106.6 Cubic Feet

Peak flow rate of this hydrograph = 17.103(CFS)

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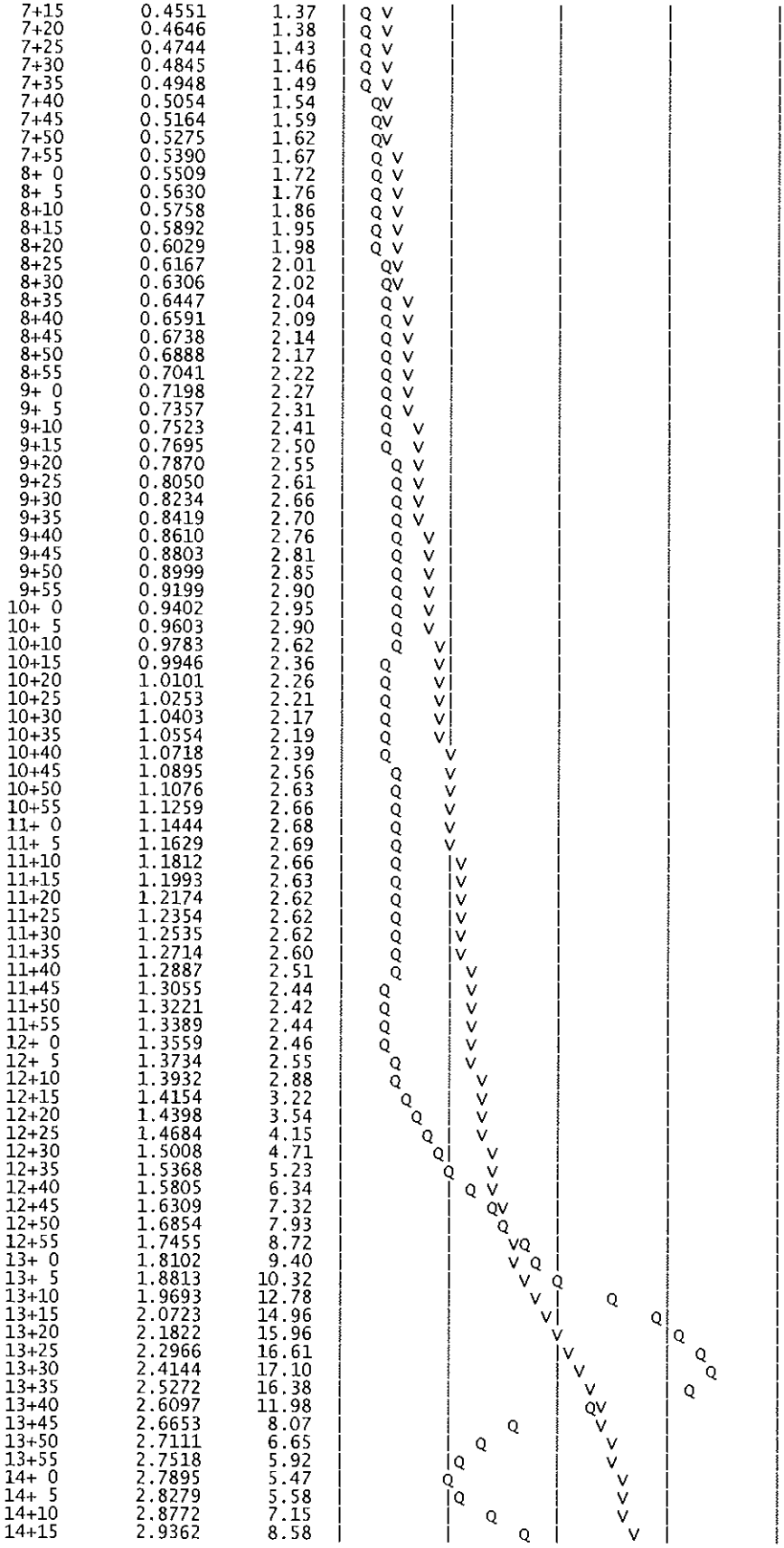
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

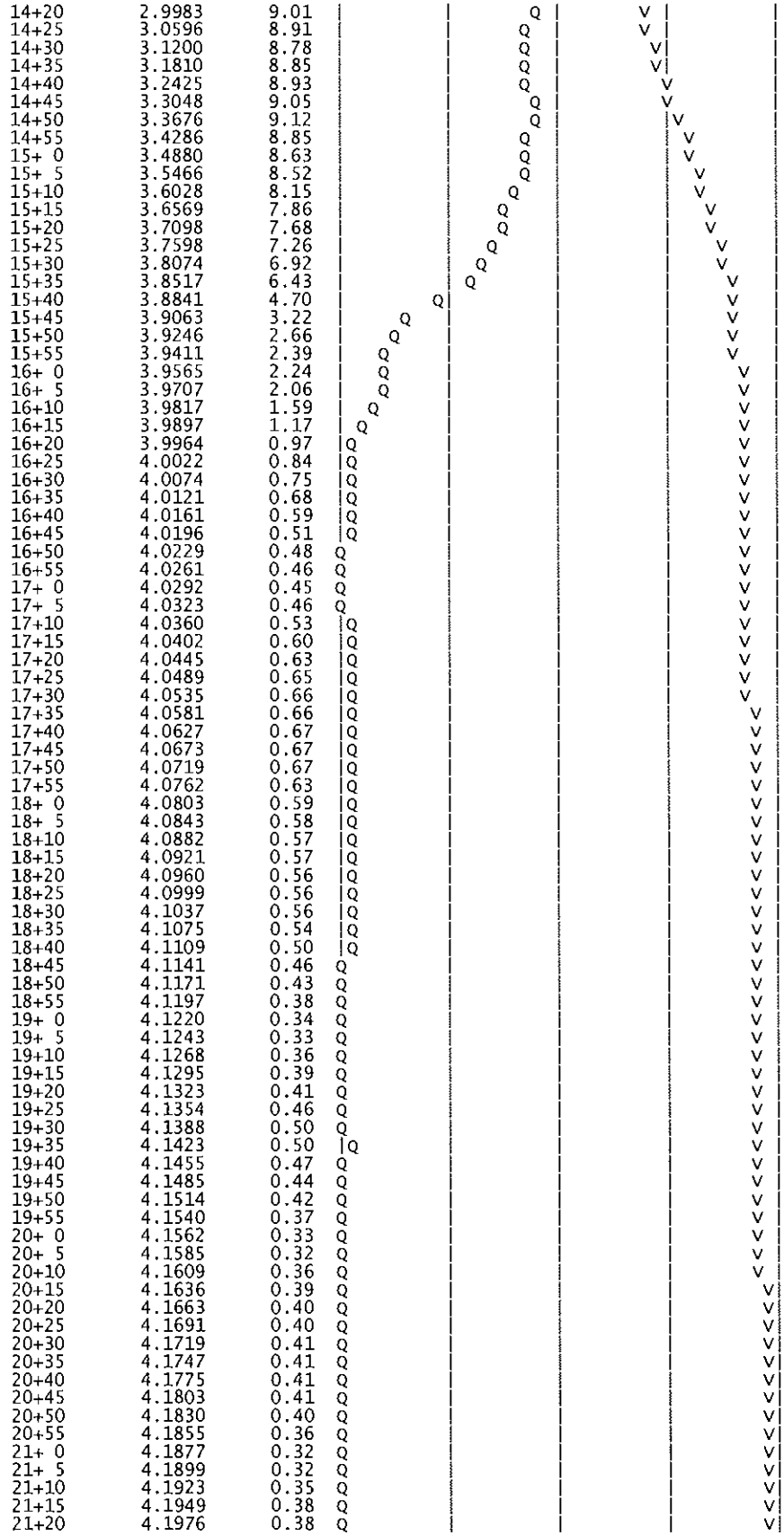
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0001	0.02	Q	|	|	|	|

0+10	0.0009	0.11	Q	|	|	|	|
0+15	0.0021	0.18	Q	|	|	|	|
0+20	0.0037	0.22	Q	|	|	|	|
0+25	0.0056	0.28	Q	|	|	|	|
0+30	0.0079	0.33	Q	|	|	|	|
0+35	0.0104	0.36	Q	|	|	|	|
0+40	0.0129	0.37	Q	|	|	|	|
0+45	0.0156	0.38	Q	|	|	|	|
0+50	0.0183	0.40	Q	|	|	|	|
0+55	0.0214	0.45	Q	|	|	|	|
1+ 0	0.0248	0.49	Q	|	|	|	|
1+ 5	0.0283	0.50	VQ	|	|	|	|
1+10	0.0315	0.47	Q	|	|	|	|
1+15	0.0346	0.44	Q	|	|	|	|
1+20	0.0375	0.43	Q	|	|	|	|
1+25	0.0405	0.43	Q	|	|	|	|
1+30	0.0434	0.42	Q	|	|	|	|
1+35	0.0463	0.42	Q	|	|	|	|
1+40	0.0491	0.42	Q	|	|	|	|
1+45	0.0520	0.42	Q	|	|	|	|
1+50	0.0550	0.43	Q	|	|	|	|
1+55	0.0582	0.47	Q	|	|	|	|
2+ 0	0.0617	0.51	VQ	|	|	|	|
2+ 5	0.0653	0.52	VQ	|	|	|	|
2+10	0.0689	0.53	VQ	|	|	|	|
2+15	0.0726	0.53	VQ	|	|	|	|
2+20	0.0763	0.54	VQ	|	|	|	|
2+25	0.0800	0.54	VQ	|	|	|	|
2+30	0.0838	0.54	VQ	|	|	|	|
2+35	0.0876	0.56	VQ	|	|	|	|
2+40	0.0917	0.60	VQ	|	|	|	|
2+45	0.0961	0.64	VQ	|	|	|	|
2+50	0.1006	0.66	VQ	|	|	|	|
2+55	0.1052	0.66	VQ	|	|	|	|
3+ 0	0.1098	0.67	|Q	|	|	|	|
3+ 5	0.1145	0.68	|Q	|	|	|	|
3+10	0.1192	0.68	|Q	|	|	|	|
3+15	0.1239	0.68	|Q	|	|	|	|
3+20	0.1286	0.68	|Q	|	|	|	|
3+25	0.1333	0.68	|Q	|	|	|	|
3+30	0.1380	0.69	|Q	|	|	|	|
3+35	0.1427	0.69	|Q	|	|	|	|
3+40	0.1475	0.69	|Q	|	|	|	|
3+45	0.1522	0.69	|Q	|	|	|	|
3+50	0.1570	0.70	|Q	|	|	|	|
3+55	0.1621	0.74	|Q	|	|	|	|
4+ 0	0.1675	0.78	|Q	|	|	|	|
4+ 5	0.1729	0.79	|Q	|	|	|	|
4+10	0.1785	0.80	|Q	|	|	|	|
4+15	0.1840	0.81	|Q	|	|	|	|
4+20	0.1897	0.82	|Q	|	|	|	|
4+25	0.1957	0.87	|Q	|	|	|	|
4+30	0.2020	0.91	|Q	|	|	|	|
4+35	0.2084	0.93	|Q	|	|	|	|
4+40	0.2148	0.94	|QV	|	|	|	|
4+45	0.2213	0.94	|QV	|	|	|	|
4+50	0.2279	0.96	|QV	|	|	|	|
4+55	0.2349	1.01	| Q	|	|	|	|
5+ 0	0.2421	1.05	| Q	|	|	|	|
5+ 5	0.2493	1.04	| Q	|	|	|	|
5+10	0.2559	0.97	|QV	|	|	|	|
5+15	0.2621	0.90	|QV	|	|	|	|
5+20	0.2682	0.88	|QV	|	|	|	|
5+25	0.2745	0.91	|QV	|	|	|	|
5+30	0.2810	0.94	|QV	|	|	|	|
5+35	0.2876	0.96	|QV	|	|	|	|
5+40	0.2946	1.01	| Q	|	|	|	|
5+45	0.3018	1.05	| Q	|	|	|	|
5+50	0.3091	1.07	| Q	|	|	|	|
5+55	0.3165	1.08	| Q	|	|	|	|
6+ 0	0.3240	1.08	| QV	|	|	|	|
6+ 5	0.3315	1.10	| QV	|	|	|	|
6+10	0.3394	1.14	| QV	|	|	|	|
6+15	0.3476	1.18	| QV	|	|	|	|
6+20	0.3558	1.20	| QV	|	|	|	|
6+25	0.3642	1.21	| QV	|	|	|	|
6+30	0.3726	1.22	| QV	|	|	|	|
6+35	0.3811	1.23	| QV	|	|	|	|
6+40	0.3899	1.28	| QV	|	|	|	|
6+45	0.3990	1.32	| QV	|	|	|	|
6+50	0.4083	1.34	| QV	|	|	|	|
6+55	0.4175	1.35	| QV	|	|	|	|
7+ 0	0.4269	1.36	| QV	|	|	|	|
7+ 5	0.4363	1.36	| Q V	|	|	|	|
7+10	0.4457	1.37	| Q V	|	|	|	|



7+15	0.4551	1.37	
7+20	0.4646	1.38	
7+25	0.4744	1.43	
7+30	0.4845	1.46	
7+35	0.4948	1.49	
7+40	0.5054	1.54	
7+45	0.5164	1.59	
7+50	0.5275	1.62	
7+55	0.5390	1.67	
8+ 0	0.5509	1.72	
8+ 5	0.5630	1.76	
8+10	0.5758	1.86	
8+15	0.5892	1.95	
8+20	0.6029	1.98	
8+25	0.6167	2.01	
8+30	0.6306	2.02	
8+35	0.6447	2.04	
8+40	0.6591	2.09	
8+45	0.6738	2.14	
8+50	0.6888	2.17	
8+55	0.7041	2.22	
9+ 0	0.7198	2.27	
9+ 5	0.7357	2.31	
9+10	0.7523	2.41	
9+15	0.7695	2.50	
9+20	0.7870	2.55	
9+25	0.8050	2.61	
9+30	0.8234	2.66	
9+35	0.8419	2.70	
9+40	0.8610	2.76	
9+45	0.8803	2.81	
9+50	0.8999	2.85	
9+55	0.9199	2.90	
10+ 0	0.9402	2.95	
10+ 5	0.9603	2.90	
10+10	0.9783	2.62	
10+15	0.9946	2.36	
10+20	1.0101	2.26	
10+25	1.0253	2.21	
10+30	1.0403	2.17	
10+35	1.0554	2.19	
10+40	1.0718	2.39	
10+45	1.0895	2.56	
10+50	1.1076	2.63	
10+55	1.1259	2.66	
11+ 0	1.1444	2.68	
11+ 5	1.1629	2.69	
11+10	1.1812	2.66	
11+15	1.1993	2.63	
11+20	1.2174	2.62	
11+25	1.2354	2.62	
11+30	1.2535	2.62	
11+35	1.2714	2.60	
11+40	1.2887	2.51	
11+45	1.3055	2.44	
11+50	1.3221	2.42	
11+55	1.3389	2.44	
12+ 0	1.3559	2.46	
12+ 5	1.3734	2.55	
12+10	1.3932	2.88	
12+15	1.4154	3.22	
12+20	1.4398	3.54	
12+25	1.4684	4.15	
12+30	1.5008	4.71	
12+35	1.5368	5.23	
12+40	1.5805	6.34	
12+45	1.6309	7.32	
12+50	1.6854	7.93	
12+55	1.7455	8.72	
13+ 0	1.8102	9.40	
13+ 5	1.8813	10.32	
13+10	1.9693	12.78	
13+15	2.0723	14.96	
13+20	2.1822	15.96	
13+25	2.2966	16.61	
13+30	2.4144	17.10	
13+35	2.5272	16.38	
13+40	2.6097	11.98	
13+45	2.6653	8.07	
13+50	2.7111	6.65	
13+55	2.7518	5.92	
14+ 0	2.7895	5.47	
14+ 5	2.8279	5.58	
14+10	2.8772	7.15	
14+15	2.9362	8.58	



14+20	2.9983	9.01	
14+25	3.0596	8.91	
14+30	3.1200	8.78	
14+35	3.1810	8.85	
14+40	3.2425	8.93	
14+45	3.3048	9.05	
14+50	3.3676	9.12	
14+55	3.4286	8.85	
15+ 0	3.4880	8.63	
15+ 5	3.5466	8.52	
15+10	3.6028	8.15	
15+15	3.6569	7.86	
15+20	3.7098	7.68	
15+25	3.7598	7.26	
15+30	3.8074	6.92	
15+35	3.8517	6.43	
15+40	3.8841	4.70	
15+45	3.9063	3.22	
15+50	3.9246	2.66	
15+55	3.9411	2.39	
16+ 0	3.9565	2.24	
16+ 5	3.9707	2.06	
16+10	3.9817	1.59	
16+15	3.9897	1.17	
16+20	3.9964	0.97	
16+25	4.0022	0.84	
16+30	4.0074	0.75	
16+35	4.0121	0.68	
16+40	4.0161	0.59	
16+45	4.0196	0.51	
16+50	4.0229	0.48	
16+55	4.0261	0.46	
17+ 0	4.0292	0.45	
17+ 5	4.0323	0.46	
17+10	4.0360	0.53	
17+15	4.0402	0.60	
17+20	4.0445	0.63	
17+25	4.0489	0.65	
17+30	4.0535	0.66	
17+35	4.0581	0.66	
17+40	4.0627	0.67	
17+45	4.0673	0.67	
17+50	4.0719	0.67	
17+55	4.0762	0.63	
18+ 0	4.0803	0.59	
18+ 5	4.0843	0.58	
18+10	4.0882	0.57	
18+15	4.0921	0.57	
18+20	4.0960	0.56	
18+25	4.0999	0.56	
18+30	4.1037	0.56	
18+35	4.1075	0.54	
18+40	4.1109	0.50	
18+45	4.1141	0.46	
18+50	4.1171	0.43	
18+55	4.1197	0.38	
19+ 0	4.1220	0.34	
19+ 5	4.1243	0.33	
19+10	4.1268	0.36	
19+15	4.1295	0.39	
19+20	4.1323	0.41	
19+25	4.1354	0.46	
19+30	4.1388	0.50	
19+35	4.1423	0.50	
19+40	4.1455	0.47	
19+45	4.1485	0.44	
19+50	4.1514	0.42	
19+55	4.1540	0.37	
20+ 0	4.1562	0.33	
20+ 5	4.1585	0.32	
20+10	4.1609	0.36	
20+15	4.1636	0.39	
20+20	4.1663	0.40	
20+25	4.1691	0.40	
20+30	4.1719	0.41	
20+35	4.1747	0.41	
20+40	4.1775	0.41	
20+45	4.1803	0.41	
20+50	4.1830	0.40	
20+55	4.1855	0.36	
21+ 0	4.1877	0.32	
21+ 5	4.1899	0.32	
21+10	4.1923	0.35	
21+15	4.1949	0.38	
21+20	4.1976	0.38	

21+25	4.1999	0.35	Q				V
21+30	4.2021	0.31	Q				V
21+35	4.2042	0.31	Q				V
21+40	4.2066	0.34	Q				V
21+45	4.2092	0.38	Q				V
21+50	4.2118	0.38	Q				V
21+55	4.2142	0.34	Q				V
22+ 0	4.2163	0.31	Q				V
22+ 5	4.2184	0.31	Q				V
22+10	4.2208	0.34	Q				V
22+15	4.2234	0.38	Q				V
22+20	4.2260	0.38	Q				V
22+25	4.2284	0.34	Q				V
22+30	4.2305	0.31	Q				V
22+35	4.2326	0.30	Q				V
22+40	4.2346	0.29	Q				V
22+45	4.2366	0.29	Q				V
22+50	4.2385	0.28	Q				V
22+55	4.2404	0.28	Q				V
23+ 0	4.2424	0.28	Q				V
23+ 5	4.2443	0.28	Q				V
23+10	4.2462	0.28	Q				V
23+15	4.2481	0.28	Q				V
23+20	4.2500	0.28	Q				V
23+25	4.2519	0.28	Q				V
23+30	4.2538	0.28	Q				V
23+35	4.2557	0.28	Q				V
23+40	4.2576	0.28	Q				V
23+45	4.2595	0.28	Q				V
23+50	4.2614	0.28	Q				V
23+55	4.2633	0.28	Q				V
24+ 0	4.2652	0.28	Q				V
24+ 5	4.2669	0.25	Q				V
24+10	4.2681	0.17	Q				V
24+15	4.2687	0.09	Q				V
24+20	4.2692	0.06	Q				V
24+25	4.2695	0.04	Q				V
24+30	4.2697	0.03	Q				V
24+35	4.2699	0.02	Q				V
24+40	4.2700	0.02	Q				V
24+45	4.2701	0.01	Q				V
24+50	4.2701	0.01	Q				V
24+55	4.2702	0.01	Q				V
25+ 0	4.2702	0.00	Q				V
25+ 5	4.2702	0.00	Q				V
25+10	4.2702	0.00	Q				V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E010610.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.10	136.51

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	2.50	310.25

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.676(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 1.675(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	0.587	0.103
65.0	65.0	0.416	0.000	0.416	0.380	0.158
56.0	56.0	0.511	0.900	0.097	0.032	0.003
					Sum (F) =	0.265

Area averaged mean soil loss (F) (In/Hr) = 0.265
Minimum soil loss rate ((In/Hr)) = 0.132
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.101	0.265	0.090	0.01
2	0.17	0.60	0.121	0.265	0.109	0.01
3	0.25	0.60	0.121	0.265	0.109	0.01
4	0.33	0.60	0.121	0.265	0.109	0.01
5	0.42	0.60	0.121	0.265	0.109	0.01
6	0.50	0.70	0.141	0.265	0.127	0.01
7	0.58	0.70	0.141	0.265	0.127	0.01
8	0.67	0.70	0.141	0.265	0.127	0.01
9	0.75	0.70	0.141	0.265	0.127	0.01
10	0.83	0.70	0.141	0.265	0.127	0.01
11	0.92	0.70	0.141	0.265	0.127	0.01
12	1.00	0.80	0.161	0.265	0.145	0.02
13	1.08	0.80	0.161	0.265	0.145	0.02
14	1.17	0.80	0.161	0.265	0.145	0.02
15	1.25	0.80	0.161	0.265	0.145	0.02
16	1.33	0.80	0.161	0.265	0.145	0.02
17	1.42	0.80	0.161	0.265	0.145	0.02
18	1.50	0.80	0.161	0.265	0.145	0.02
19	1.58	0.80	0.161	0.265	0.145	0.02
20	1.67	0.80	0.161	0.265	0.145	0.02
21	1.75	0.80	0.161	0.265	0.145	0.02
22	1.83	0.80	0.161	0.265	0.145	0.02
23	1.92	0.80	0.161	0.265	0.145	0.02
24	2.00	0.90	0.181	0.265	0.163	0.02
25	2.08	0.80	0.161	0.265	0.145	0.02
26	2.17	0.90	0.181	0.265	0.163	0.02
27	2.25	0.90	0.181	0.265	0.163	0.02
28	2.33	0.90	0.181	0.265	0.163	0.02
29	2.42	0.90	0.181	0.265	0.163	0.02
30	2.50	0.90	0.181	0.265	0.163	0.02
31	2.58	0.90	0.181	0.265	0.163	0.02
32	2.67	0.90	0.181	0.265	0.163	0.02
33	2.75	1.00	0.201	0.265	0.181	0.02
34	2.83	1.00	0.201	0.265	0.181	0.02
35	2.92	1.00	0.201	0.265	0.181	0.02
36	3.00	1.00	0.201	0.265	0.181	0.02
37	3.08	1.00	0.201	0.265	0.181	0.02
38	3.17	1.10	0.221	0.265	0.199	0.02
39	3.25	1.10	0.221	0.265	0.199	0.02
40	3.33	1.10	0.221	0.265	0.199	0.02
41	3.42	1.20	0.241	0.265	0.217	0.02
42	3.50	1.30	0.261	0.265	0.235	0.03
43	3.58	1.40	0.281	0.265	---	0.02
44	3.67	1.40	0.281	0.265	---	0.02
45	3.75	1.50	0.302	0.265	---	0.04
46	3.83	1.50	0.302	0.265	---	0.04
47	3.92	1.60	0.322	0.265	---	0.06
48	4.00	1.60	0.322	0.265	---	0.06
49	4.08	1.70	0.342	0.265	---	0.08
50	4.17	1.80	0.362	0.265	---	0.10
51	4.25	1.90	0.382	0.265	---	0.12
52	4.33	2.00	0.402	0.265	---	0.14
53	4.42	2.10	0.422	0.265	---	0.16
54	4.50	2.10	0.422	0.265	---	0.16

55	4.58	2.20	0.442	0.265	---	0.18
56	4.67	2.30	0.462	0.265	---	0.20
57	4.75	2.40	0.482	0.265	---	0.22
58	4.83	2.40	0.482	0.265	---	0.22
59	4.92	2.50	0.503	0.265	---	0.24
60	5.00	2.60	0.523	0.265	---	0.26
61	5.08	3.10	0.623	0.265	---	0.36
62	5.17	3.60	0.724	0.265	---	0.46
63	5.25	3.90	0.784	0.265	---	0.52
64	5.33	4.20	0.844	0.265	---	0.58
65	5.42	4.70	0.945	0.265	---	0.68
66	5.50	5.60	1.126	0.265	---	0.86
67	5.58	1.90	0.382	0.265	---	0.12
68	5.67	0.90	0.181	0.265	0.163	0.02
69	5.75	0.60	0.121	0.265	0.109	0.01
70	5.83	0.50	0.101	0.265	0.090	0.01
71	5.92	0.30	0.060	0.265	0.054	0.01
72	6.00	0.20	0.040	0.265	0.036	0.00
Sum =		100.0			Sum =	6.6

Flood volume = Effective rainfall 0.55(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 5.7(Ac.Ft)
Total soil loss = 1.12(In)
Total soil loss = 11.624(Ac.Ft)
Total rainfall = 1.68(In)
Flood volume = 248339.4 Cubic Feet
Total soil loss = 506335.1 Cubic Feet

Peak flow rate of this hydrograph = 76.816(CFS)

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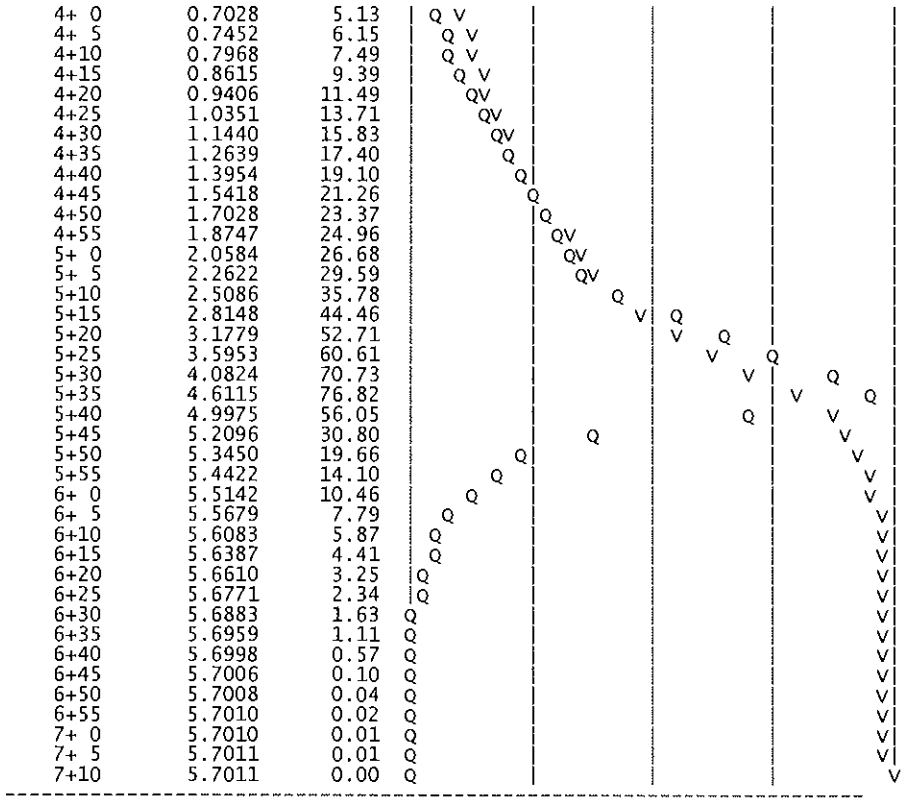
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	volume Ac.Ft	Q(CFS)	0	20.0	40.0	60.0	80.0
0+ 5	0.0006	0.09	Q				
0+10	0.0041	0.51	Q				
0+15	0.0105	0.93	Q				
0+20	0.0184	1.14	Q				
0+25	0.0270	1.25	Q				
0+30	0.0362	1.34	Q				
0+35	0.0463	1.47	Q				
0+40	0.0571	1.57	Q				
0+45	0.0683	1.63	Q				
0+50	0.0798	1.66	Q				
0+55	0.0914	1.69	Q				
1+ 0	0.1034	1.73	Q				
1+ 5	0.1159	1.83	Q				
1+10	0.1291	1.91	Q				
1+15	0.1425	1.95	Q				
1+20	0.1560	1.97	QV				
1+25	0.1696	1.98	QV				
1+30	0.1833	1.99	QV				
1+35	0.1971	1.99	QV				
1+40	0.2109	2.00	Q				
1+45	0.2247	2.00	Q				
1+50	0.2385	2.01	Q				
1+55	0.2523	2.01	Q				
2+ 0	0.2663	2.03	Q				
2+ 5	0.2807	2.09	Q				
2+10	0.2951	2.10	QV				
2+15	0.3099	2.14	QV				
2+20	0.3250	2.20	QV				
2+25	0.3403	2.22	QV				
2+30	0.3556	2.23	QV				
2+35	0.3710	2.24	QV				
2+40	0.3865	2.25	QV				
2+45	0.4022	2.27	QV				
2+50	0.4183	2.35	QV				
2+55	0.4350	2.42	Q V				
3+ 0	0.4519	2.45	Q V				
3+ 5	0.4690	2.47	Q V				
3+10	0.4862	2.50	Q V				
3+15	0.5040	2.59	Q V				
3+20	0.5224	2.67	Q V				
3+25	0.5411	2.72	Q V				
3+30	0.5606	2.83	Q V				
3+35	0.5807	2.91	Q V				
3+40	0.5990	2.66	Q V				
3+45	0.6167	2.58	Q V				
3+50	0.6392	3.27	Q V				
3+55	0.6675	4.10	Q V				


4+ 0 0.7028 5.13
4+ 5 0.7452 6.15
4+10 0.7968 7.49
4+15 0.8615 9.39
4+20 0.9406 11.49
4+25 1.0351 13.71
4+30 1.1440 15.83
4+35 1.2639 17.40
4+40 1.3954 19.10
4+45 1.5418 21.26
4+50 1.7028 23.37
4+55 1.8747 24.96
5+ 0 2.0584 26.68
5+ 5 2.2622 29.59
5+10 2.5086 35.78
5+15 2.8148 44.46
5+20 3.1779 52.71
5+25 3.5953 60.61
5+30 4.0824 70.73
5+35 4.6115 76.82
5+40 4.9975 56.05
5+45 5.2096 30.80
5+50 5.3450 19.66
5+55 5.4422 14.10
6+ 0 5.5142 10.46
6+ 5 5.5679 7.79
6+10 5.6083 5.87
6+15 5.6387 4.41
6+20 5.6610 3.25
6+25 5.6771 2.34
6+30 5.6883 1.63
6+35 5.6959 1.11
6+40 5.6998 0.57
6+45 5.7006 0.10
6+50 5.7008 0.04
6+55 5.7010 0.02
7+ 0 5.7010 0.01
7+ 5 5.7011 0.01
7+10 5.7011 0.00

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E010310.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

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 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	0.80	99.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.85	229.59

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 1.232(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 1.231(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	0.587	0.103
65.0	65.0	0.416	0.000	0.416	0.380	0.158
56.0	56.0	0.511	0.900	0.097	0.032	0.003
					Sum (F) =	0.265

Area averaged mean soil loss (F) (In/Hr) = 0.265
Minimum soil loss rate ((In/Hr)) = 0.132
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.192	0.265	0.173	0.02
2	0.17	1.30	0.192	0.265	0.173	0.02
3	0.25	1.10	0.163	0.265	0.146	0.02
4	0.33	1.50	0.222	0.265	0.199	0.02
5	0.42	1.50	0.222	0.265	0.199	0.02
6	0.50	1.80	0.266	0.265	---	0.00
7	0.58	1.50	0.222	0.265	0.199	0.02
8	0.67	1.80	0.266	0.265	---	0.00
9	0.75	1.80	0.266	0.265	---	0.00
10	0.83	1.50	0.222	0.265	0.199	0.02
11	0.92	1.60	0.236	0.265	0.213	0.02
12	1.00	1.80	0.266	0.265	---	0.00
13	1.08	2.20	0.325	0.265	---	0.06
14	1.17	2.20	0.325	0.265	---	0.06
15	1.25	2.20	0.325	0.265	---	0.06
16	1.33	2.00	0.296	0.265	---	0.03
17	1.42	2.60	0.384	0.265	---	0.12
18	1.50	2.70	0.399	0.265	---	0.13
19	1.58	2.40	0.355	0.265	---	0.09
20	1.67	2.70	0.399	0.265	---	0.13
21	1.75	3.30	0.488	0.265	---	0.22
22	1.83	3.10	0.458	0.265	---	0.19
23	1.92	2.90	0.428	0.265	---	0.16
24	2.00	3.00	0.443	0.265	---	0.18
25	2.08	3.10	0.458	0.265	---	0.19
26	2.17	4.20	0.621	0.265	---	0.36
27	2.25	5.00	0.739	0.265	---	0.47
28	2.33	3.50	0.517	0.265	---	0.25
29	2.42	6.80	1.005	0.265	---	0.74
30	2.50	7.30	1.079	0.265	---	0.81
31	2.58	8.20	1.212	0.265	---	0.95
32	2.67	5.90	0.872	0.265	---	0.61
33	2.75	2.00	0.296	0.265	---	0.03
34	2.83	1.80	0.266	0.265	---	0.00
35	2.92	1.80	0.266	0.265	---	0.00
36	3.00	0.60	0.089	0.265	0.080	0.01
Sum =		100.0			Sum =	6.1

Flood volume = Effective rainfall 0.50(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 5.2(Ac.Ft)
Total soil loss = 0.73(In)
Total soil loss = 7.518(Ac.Ft)
Total rainfall = 1.23(In)
Flood volume = 227182.1 Cubic Feet
Total soil loss = 327502.0 Cubic Feet

Peak flow rate of this hydrograph = 89.026(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	22.5	45.0	67.5	90.0
0+ 5	0.0012	0.18	Q				
0+10	0.0076	0.93	Q				
0+15	0.0184	1.57	Q				
0+20	0.0306	1.77	Q				
0+25	0.0448	2.05	Q				
0+30	0.0594	2.13	Q				
0+35	0.0708	1.64	Q				
0+40	0.0820	1.63	Q				
0+45	0.0910	1.31	Q				
0+50	0.0976	0.96	Q				
0+55	0.1086	1.58	Q				
1+ 0	0.1227	2.05	Q				
1+ 5	0.1364	2.00	QV				
1+10	0.1617	3.68	|Q				
1+15	0.1996	5.50	|VQ				
1+20	0.2405	5.93	|VQ				
1+25	0.2816	5.98	| Q				
1+30	0.3424	8.82	| VQ				
1+35	0.4239	11.84	| V Q				
1+40	0.5077	12.16	| V Q				
1+45	0.6043	14.03	| V Q				
1+50	0.7332	18.71	| V Q				
1+55	0.8780	21.03	| V Q				
2+ 0	1.0201	20.62	| V Q				
2+ 5	1.1639	20.88	| VQ				
2+10	1.3260	23.55	| Q				
2+15	1.5454	31.84	| V Q				
2+20	1.8239	40.44	| V Q				
2+25	2.1194	42.90	| V Q				
2+30	2.5197	58.13	| V Q				
2+35	3.0574	78.06	| V Q				
2+40	3.6705	89.03	| V Q				
2+45	4.2191	79.66	| V Q				
2+50	4.5635	50.01	| Q V				
2+55	4.7530	27.51	| Q V				
3+ 0	4.8783	18.20	| Q V				
3+ 5	4.9701	13.33	| Q V				
3+10	5.0384	9.92	| Q V				
3+15	5.0894	7.40	| Q V				
3+20	5.1286	5.70	| Q V				
3+25	5.1579	4.25	|Q V				
3+30	5.1794	3.12	|Q V				
3+35	5.1954	2.33	|Q V				
3+40	5.2063	1.58	Q V				
3+45	5.2128	0.94	Q V				
3+50	5.2151	0.34	Q V				
3+55	5.2152	0.03	Q V				
4+ 0	5.2153	0.01	Q V				
4+ 5	5.2154	0.01	Q V				
4+10	5.2154	0.00	Q V				

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E010110.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	0.48	59.57

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.20	148.92

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.776(In)
Areal adjustment factor = 99.89 %
Adjusted average point rain = 0.775(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	0.587	0.103
65.0	65.0	0.416	0.000	0.416	0.380	0.158
56.0	56.0	0.511	0.900	0.097	0.032	0.003
					Sum (F) =	0.265

Area averaged mean soil loss (F) (In/Hr) = 0.265
Minimum soil loss rate ((In/Hr)) = 0.132
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1 0.08	4.20	0.391	0.265	---	0.13
2 0.17	4.30	0.400	0.265	---	0.14
3 0.25	5.00	0.465	0.265	---	0.20
4 0.33	5.00	0.465	0.265	---	0.20
5 0.42	5.80	0.540	0.265	---	0.28
6 0.50	6.50	0.605	0.265	---	0.34
7 0.58	7.40	0.689	0.265	---	0.42
8 0.67	8.60	0.800	0.265	---	0.54
9 0.75	12.30	1.144	0.265	---	0.88
10 0.83	29.10	2.707	0.265	---	2.44
11 0.92	6.80	0.633	0.265	---	0.37
12 1.00	5.00	0.465	0.265	---	0.20
Sum =	100.0			Sum =	6.1

Flood volume = Effective rainfall 0.51(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 5.3(Ac.Ft)
Total soil loss = 0.26(In)
Total soil loss = 2.735(Ac.Ft)
Total rainfall = 0.78(In)
Flood volume = 230124.4 Cubic Feet
Total soil loss = 119153.5 Cubic Feet

Peak flow rate of this hydrograph = 144.584(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0081	1.17	Q				
0+10	0.0507	6.20	VQ				
0+15	0.1302	11.54	V Q				
0+20	0.2415	16.16	V Q				
0+25	0.3808	20.23	V Q				
0+30	0.5558	25.40	VQ				
0+35	0.7787	32.37	VQ				
0+40	1.0591	40.71	Q				
0+45	1.4256	53.21	Q				
0+50	2.0285	87.54	V Q				
0+55	3.0242	144.58	V Q				
1+ 0	3.8699	122.80	Q V				
1+ 5	4.3405	68.32	Q V				
1+10	4.6249	41.30	Q V				
1+15	4.8055	26.23	Q V				
1+20	4.9338	18.62	Q V				
1+25	5.0271	13.55	Q V				
1+30	5.0986	10.39	Q V				
1+35	5.1542	8.07	Q V				
1+40	5.1963	6.10	Q V				

1+45	5.2277	4.57	Q				V
1+50	5.2508	3.35	Q				V
1+55	5.2689	2.63	Q				V
2+ 0	5.2800	1.61	Q				V
2+ 5	5.2822	0.32	Q				V
2+10	5.2829	0.10	Q				V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E005245.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 5-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.70	210.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	4.25	527.42

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 4.250(In)

Point rain (area averaged) = 2.297(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 2.297(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.000	0.343	0.587	0.202
65.0	45.0	0.621	0.000	0.621	0.380	0.236
56.0	36.0	0.706	0.900	0.134	0.032	0.004
					Sum (F) =	0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.784	0.017	0.00
2	0.17	0.07	0.018	0.781	0.017	0.00
3	0.25	0.07	0.018	0.778	0.017	0.00
4	0.33	0.10	0.028	0.775	0.025	0.00
5	0.42	0.10	0.028	0.772	0.025	0.00
6	0.50	0.10	0.028	0.769	0.025	0.00
7	0.58	0.10	0.028	0.766	0.025	0.00
8	0.67	0.10	0.028	0.763	0.025	0.00
9	0.75	0.10	0.028	0.760	0.025	0.00
10	0.83	0.13	0.037	0.757	0.033	0.00
11	0.92	0.13	0.037	0.754	0.033	0.00
12	1.00	0.13	0.037	0.751	0.033	0.00
13	1.08	0.10	0.028	0.748	0.025	0.00
14	1.17	0.10	0.028	0.745	0.025	0.00
15	1.25	0.10	0.028	0.742	0.025	0.00
16	1.33	0.10	0.028	0.739	0.025	0.00
17	1.42	0.10	0.028	0.736	0.025	0.00
18	1.50	0.10	0.028	0.733	0.025	0.00
19	1.58	0.10	0.028	0.730	0.025	0.00
20	1.67	0.10	0.028	0.727	0.025	0.00
21	1.75	0.10	0.028	0.724	0.025	0.00
22	1.83	0.13	0.037	0.721	0.033	0.00
23	1.92	0.13	0.037	0.718	0.033	0.00
24	2.00	0.13	0.037	0.715	0.033	0.00
25	2.08	0.13	0.037	0.713	0.033	0.00
26	2.17	0.13	0.037	0.710	0.033	0.00
27	2.25	0.13	0.037	0.707	0.033	0.00
28	2.33	0.13	0.037	0.704	0.033	0.00
29	2.42	0.13	0.037	0.701	0.033	0.00
30	2.50	0.13	0.037	0.698	0.033	0.00
31	2.58	0.17	0.046	0.695	0.041	0.00
32	2.67	0.17	0.046	0.692	0.041	0.00
33	2.75	0.17	0.046	0.690	0.041	0.00
34	2.83	0.17	0.046	0.687	0.041	0.00
35	2.92	0.17	0.046	0.684	0.041	0.00
36	3.00	0.17	0.046	0.681	0.041	0.00
37	3.08	0.17	0.046	0.678	0.041	0.00
38	3.17	0.17	0.046	0.675	0.041	0.00
39	3.25	0.17	0.046	0.673	0.041	0.00
40	3.33	0.17	0.046	0.670	0.041	0.00
41	3.42	0.17	0.046	0.667	0.041	0.00
42	3.50	0.17	0.046	0.664	0.041	0.00
43	3.58	0.17	0.046	0.662	0.041	0.00
44	3.67	0.17	0.046	0.659	0.041	0.00
45	3.75	0.17	0.046	0.656	0.041	0.00
46	3.83	0.20	0.055	0.653	0.050	0.01
47	3.92	0.20	0.055	0.650	0.050	0.01
48	4.00	0.20	0.055	0.648	0.050	0.01
49	4.08	0.20	0.055	0.645	0.050	0.01
50	4.17	0.20	0.055	0.642	0.050	0.01
51	4.25	0.20	0.055	0.639	0.050	0.01
52	4.33	0.23	0.064	0.637	0.058	0.01
53	4.42	0.23	0.064	0.634	0.058	0.01
54	4.50	0.23	0.064	0.631	0.058	0.01

55	4.58	0.23	0.064	0.629	0.058	0.01
56	4.67	0.23	0.064	0.626	0.058	0.01
57	4.75	0.23	0.064	0.623	0.058	0.01
58	4.83	0.27	0.073	0.621	0.066	0.01
59	4.92	0.27	0.073	0.618	0.066	0.01
60	5.00	0.27	0.073	0.615	0.066	0.01
61	5.08	0.20	0.055	0.612	0.050	0.01
62	5.17	0.20	0.055	0.610	0.050	0.01
63	5.25	0.20	0.055	0.607	0.050	0.01
64	5.33	0.23	0.064	0.604	0.058	0.01
65	5.42	0.23	0.064	0.602	0.058	0.01
66	5.50	0.23	0.064	0.599	0.058	0.01
67	5.58	0.27	0.073	0.597	0.066	0.01
68	5.67	0.27	0.073	0.594	0.066	0.01
69	5.75	0.27	0.073	0.591	0.066	0.01
70	5.83	0.27	0.073	0.589	0.066	0.01
71	5.92	0.27	0.073	0.586	0.066	0.01
72	6.00	0.27	0.073	0.584	0.066	0.01
73	6.08	0.30	0.083	0.581	0.074	0.01
74	6.17	0.30	0.083	0.578	0.074	0.01
75	6.25	0.30	0.083	0.576	0.074	0.01
76	6.33	0.30	0.083	0.573	0.074	0.01
77	6.42	0.30	0.083	0.571	0.074	0.01
78	6.50	0.30	0.083	0.568	0.074	0.01
79	6.58	0.33	0.092	0.566	0.083	0.01
80	6.67	0.33	0.092	0.563	0.083	0.01
81	6.75	0.33	0.092	0.560	0.083	0.01
82	6.83	0.33	0.092	0.558	0.083	0.01
83	6.92	0.33	0.092	0.555	0.083	0.01
84	7.00	0.33	0.092	0.553	0.083	0.01
85	7.08	0.33	0.092	0.550	0.083	0.01
86	7.17	0.33	0.092	0.548	0.083	0.01
87	7.25	0.33	0.092	0.545	0.083	0.01
88	7.33	0.37	0.101	0.543	0.091	0.01
89	7.42	0.37	0.101	0.540	0.091	0.01
90	7.50	0.37	0.101	0.538	0.091	0.01
91	7.58	0.40	0.110	0.535	0.099	0.01
92	7.67	0.40	0.110	0.533	0.099	0.01
93	7.75	0.40	0.110	0.531	0.099	0.01
94	7.83	0.43	0.119	0.528	0.107	0.01
95	7.92	0.43	0.119	0.526	0.107	0.01
96	8.00	0.43	0.119	0.523	0.107	0.01
97	8.08	0.50	0.138	0.521	0.124	0.01
98	8.17	0.50	0.138	0.518	0.124	0.01
99	8.25	0.50	0.138	0.516	0.124	0.01
100	8.33	0.50	0.138	0.513	0.124	0.01
101	8.42	0.50	0.138	0.511	0.124	0.01
102	8.50	0.50	0.138	0.509	0.124	0.01
103	8.58	0.53	0.147	0.506	0.132	0.01
104	8.67	0.53	0.147	0.504	0.132	0.01
105	8.75	0.53	0.147	0.502	0.132	0.01
106	8.83	0.57	0.156	0.499	0.141	0.02
107	8.92	0.57	0.156	0.497	0.141	0.02
108	9.00	0.57	0.156	0.494	0.141	0.02
109	9.08	0.63	0.175	0.492	0.157	0.02
110	9.17	0.63	0.175	0.490	0.157	0.02
111	9.25	0.63	0.175	0.487	0.157	0.02
112	9.33	0.67	0.184	0.485	0.165	0.02
113	9.42	0.67	0.184	0.483	0.165	0.02
114	9.50	0.67	0.184	0.481	0.165	0.02
115	9.58	0.70	0.193	0.478	0.174	0.02
116	9.67	0.70	0.193	0.476	0.174	0.02
117	9.75	0.70	0.193	0.474	0.174	0.02
118	9.83	0.73	0.202	0.471	0.182	0.02
119	9.92	0.73	0.202	0.469	0.182	0.02
120	10.00	0.73	0.202	0.467	0.182	0.02
121	10.08	0.50	0.138	0.465	0.124	0.01
122	10.17	0.50	0.138	0.462	0.124	0.01
123	10.25	0.50	0.138	0.460	0.124	0.01
124	10.33	0.50	0.138	0.458	0.124	0.01
125	10.42	0.50	0.138	0.456	0.124	0.01
126	10.50	0.50	0.138	0.453	0.124	0.01
127	10.58	0.67	0.184	0.451	0.165	0.02
128	10.67	0.67	0.184	0.449	0.165	0.02
129	10.75	0.67	0.184	0.447	0.165	0.02
130	10.83	0.67	0.184	0.445	0.165	0.02
131	10.92	0.67	0.184	0.442	0.165	0.02
132	11.00	0.67	0.184	0.440	0.165	0.02
133	11.08	0.63	0.175	0.438	0.157	0.02
134	11.17	0.63	0.175	0.436	0.157	0.02
135	11.25	0.63	0.175	0.434	0.157	0.02
136	11.33	0.63	0.175	0.432	0.157	0.02
137	11.42	0.63	0.175	0.429	0.157	0.02
138	11.50	0.63	0.175	0.427	0.157	0.02
139	11.58	0.57	0.156	0.425	0.141	0.02

140	11.67	0.57	0.156	0.423	0.141	0.02
141	11.75	0.57	0.156	0.421	0.141	0.02
142	11.83	0.60	0.165	0.419	0.149	0.02
143	11.92	0.60	0.165	0.417	0.149	0.02
144	12.00	0.60	0.165	0.415	0.149	0.02
145	12.08	0.83	0.230	0.413	0.207	0.02
146	12.17	0.83	0.230	0.411	0.207	0.02
147	12.25	0.83	0.230	0.409	0.207	0.02
148	12.33	0.87	0.239	0.406	0.215	0.02
149	12.42	0.87	0.239	0.404	0.215	0.02
150	12.50	0.87	0.239	0.402	0.215	0.02
151	12.58	0.93	0.257	0.400	0.232	0.03
152	12.67	0.93	0.257	0.398	0.232	0.03
153	12.75	0.93	0.257	0.396	0.232	0.03
154	12.83	0.97	0.266	0.394	0.240	0.03
155	12.92	0.97	0.266	0.392	0.240	0.03
156	13.00	0.97	0.266	0.390	0.240	0.03
157	13.08	1.13	0.312	0.388	0.281	0.03
158	13.17	1.13	0.312	0.386	0.281	0.03
159	13.25	1.13	0.312	0.384	0.281	0.03
160	13.33	1.13	0.312	0.383	0.281	0.03
161	13.42	1.13	0.312	0.381	0.281	0.03
162	13.50	1.13	0.312	0.379	0.281	0.03
163	13.58	0.77	0.211	0.377	0.190	0.02
164	13.67	0.77	0.211	0.375	0.190	0.02
165	13.75	0.77	0.211	0.373	0.190	0.02
166	13.83	0.77	0.211	0.371	0.190	0.02
167	13.92	0.77	0.211	0.369	0.190	0.02
168	14.00	0.77	0.211	0.367	0.190	0.02
169	14.08	0.90	0.248	0.365	0.223	0.02
170	14.17	0.90	0.248	0.363	0.223	0.02
171	14.25	0.90	0.248	0.362	0.223	0.02
172	14.33	0.87	0.239	0.360	0.215	0.02
173	14.42	0.87	0.239	0.358	0.215	0.02
174	14.50	0.87	0.239	0.356	0.215	0.02
175	14.58	0.87	0.239	0.354	0.215	0.02
176	14.67	0.87	0.239	0.352	0.215	0.02
177	14.75	0.87	0.239	0.351	0.215	0.02
178	14.83	0.83	0.230	0.349	0.207	0.02
179	14.92	0.83	0.230	0.347	0.207	0.02
180	15.00	0.83	0.230	0.345	0.207	0.02
181	15.08	0.80	0.220	0.344	0.198	0.02
182	15.17	0.80	0.220	0.342	0.198	0.02
183	15.25	0.80	0.220	0.340	0.198	0.02
184	15.33	0.77	0.211	0.338	0.190	0.02
185	15.42	0.77	0.211	0.337	0.190	0.02
186	15.50	0.77	0.211	0.335	0.190	0.02
187	15.58	0.63	0.175	0.333	0.157	0.02
188	15.67	0.63	0.175	0.331	0.157	0.02
189	15.75	0.63	0.175	0.330	0.157	0.02
190	15.83	0.63	0.175	0.328	0.157	0.02
191	15.92	0.63	0.175	0.326	0.157	0.02
192	16.00	0.63	0.175	0.325	0.157	0.02
193	16.08	0.13	0.037	0.323	0.033	0.00
194	16.17	0.13	0.037	0.321	0.033	0.00
195	16.25	0.13	0.037	0.320	0.033	0.00
196	16.33	0.13	0.037	0.318	0.033	0.00
197	16.42	0.13	0.037	0.316	0.033	0.00
198	16.50	0.13	0.037	0.315	0.033	0.00
199	16.58	0.10	0.028	0.313	0.025	0.00
200	16.67	0.10	0.028	0.312	0.025	0.00
201	16.75	0.10	0.028	0.310	0.025	0.00
202	16.83	0.10	0.028	0.308	0.025	0.00
203	16.92	0.10	0.028	0.307	0.025	0.00
204	17.00	0.10	0.028	0.305	0.025	0.00
205	17.08	0.17	0.046	0.304	0.041	0.00
206	17.17	0.17	0.046	0.302	0.041	0.00
207	17.25	0.17	0.046	0.301	0.041	0.00
208	17.33	0.17	0.046	0.299	0.041	0.00
209	17.42	0.17	0.046	0.298	0.041	0.00
210	17.50	0.17	0.046	0.296	0.041	0.00
211	17.58	0.17	0.046	0.295	0.041	0.00
212	17.67	0.17	0.046	0.293	0.041	0.00
213	17.75	0.17	0.046	0.292	0.041	0.00
214	17.83	0.13	0.037	0.290	0.033	0.00
215	17.92	0.13	0.037	0.289	0.033	0.00
216	18.00	0.13	0.037	0.288	0.033	0.00
217	18.08	0.13	0.037	0.286	0.033	0.00
218	18.17	0.13	0.037	0.285	0.033	0.00
219	18.25	0.13	0.037	0.283	0.033	0.00
220	18.33	0.13	0.037	0.282	0.033	0.00
221	18.42	0.13	0.037	0.281	0.033	0.00
222	18.50	0.13	0.037	0.279	0.033	0.00
223	18.58	0.10	0.028	0.278	0.025	0.00
224	18.67	0.10	0.028	0.277	0.025	0.00

225	18.75	0.10	0.028	0.275	0.025	0.00
226	18.83	0.07	0.018	0.274	0.017	0.00
227	18.92	0.07	0.018	0.273	0.017	0.00
228	19.00	0.07	0.018	0.271	0.017	0.00
229	19.08	0.10	0.028	0.270	0.025	0.00
230	19.17	0.10	0.028	0.269	0.025	0.00
231	19.25	0.10	0.028	0.267	0.025	0.00
232	19.33	0.13	0.037	0.266	0.033	0.00
233	19.42	0.13	0.037	0.265	0.033	0.00
234	19.50	0.13	0.037	0.264	0.033	0.00
235	19.58	0.10	0.028	0.263	0.025	0.00
236	19.67	0.10	0.028	0.261	0.025	0.00
237	19.75	0.10	0.028	0.260	0.025	0.00
238	19.83	0.07	0.018	0.259	0.017	0.00
239	19.92	0.07	0.018	0.258	0.017	0.00
240	20.00	0.07	0.018	0.257	0.017	0.00
241	20.08	0.10	0.028	0.256	0.025	0.00
242	20.17	0.10	0.028	0.254	0.025	0.00
243	20.25	0.10	0.028	0.253	0.025	0.00
244	20.33	0.10	0.028	0.252	0.025	0.00
245	20.42	0.10	0.028	0.251	0.025	0.00
246	20.50	0.10	0.028	0.250	0.025	0.00
247	20.58	0.10	0.028	0.249	0.025	0.00
248	20.67	0.10	0.028	0.248	0.025	0.00
249	20.75	0.10	0.028	0.247	0.025	0.00
250	20.83	0.07	0.018	0.246	0.017	0.00
251	20.92	0.07	0.018	0.245	0.017	0.00
252	21.00	0.07	0.018	0.244	0.017	0.00
253	21.08	0.10	0.028	0.243	0.025	0.00
254	21.17	0.10	0.028	0.242	0.025	0.00
255	21.25	0.10	0.028	0.241	0.025	0.00
256	21.33	0.07	0.018	0.240	0.017	0.00
257	21.42	0.07	0.018	0.239	0.017	0.00
258	21.50	0.07	0.018	0.238	0.017	0.00
259	21.58	0.10	0.028	0.238	0.025	0.00
260	21.67	0.10	0.028	0.237	0.025	0.00
261	21.75	0.10	0.028	0.236	0.025	0.00
262	21.83	0.07	0.018	0.235	0.017	0.00
263	21.92	0.07	0.018	0.234	0.017	0.00
264	22.00	0.07	0.018	0.233	0.017	0.00
265	22.08	0.10	0.028	0.233	0.025	0.00
266	22.17	0.10	0.028	0.232	0.025	0.00
267	22.25	0.10	0.028	0.231	0.025	0.00
268	22.33	0.07	0.018	0.230	0.017	0.00
269	22.42	0.07	0.018	0.230	0.017	0.00
270	22.50	0.07	0.018	0.229	0.017	0.00
271	22.58	0.07	0.018	0.228	0.017	0.00
272	22.67	0.07	0.018	0.228	0.017	0.00
273	22.75	0.07	0.018	0.227	0.017	0.00
274	22.83	0.07	0.018	0.227	0.017	0.00
275	22.92	0.07	0.018	0.226	0.017	0.00
276	23.00	0.07	0.018	0.225	0.017	0.00
277	23.08	0.07	0.018	0.225	0.017	0.00
278	23.17	0.07	0.018	0.224	0.017	0.00
279	23.25	0.07	0.018	0.224	0.017	0.00
280	23.33	0.07	0.018	0.223	0.017	0.00
281	23.42	0.07	0.018	0.223	0.017	0.00
282	23.50	0.07	0.018	0.223	0.017	0.00
283	23.58	0.07	0.018	0.222	0.017	0.00
284	23.67	0.07	0.018	0.222	0.017	0.00
285	23.75	0.07	0.018	0.222	0.017	0.00
286	23.83	0.07	0.018	0.221	0.017	0.00
287	23.92	0.07	0.018	0.221	0.017	0.00
288	24.00	0.07	0.018	0.221	0.017	0.00
Sum =		100.0			Sum =	2.8

Flood volume = Effective rainfall 0.23(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 2.4(Ac.Ft)
Total soil loss = 2.07(In)
Total soil loss = 21.377(Ac.Ft)
Total rainfall = 2.30(In)
Flood volume = 103463.1 Cubic Feet
Total soil loss = 931168.0 Cubic Feet

Peak flow rate of this hydrograph = 3.831(CFS)

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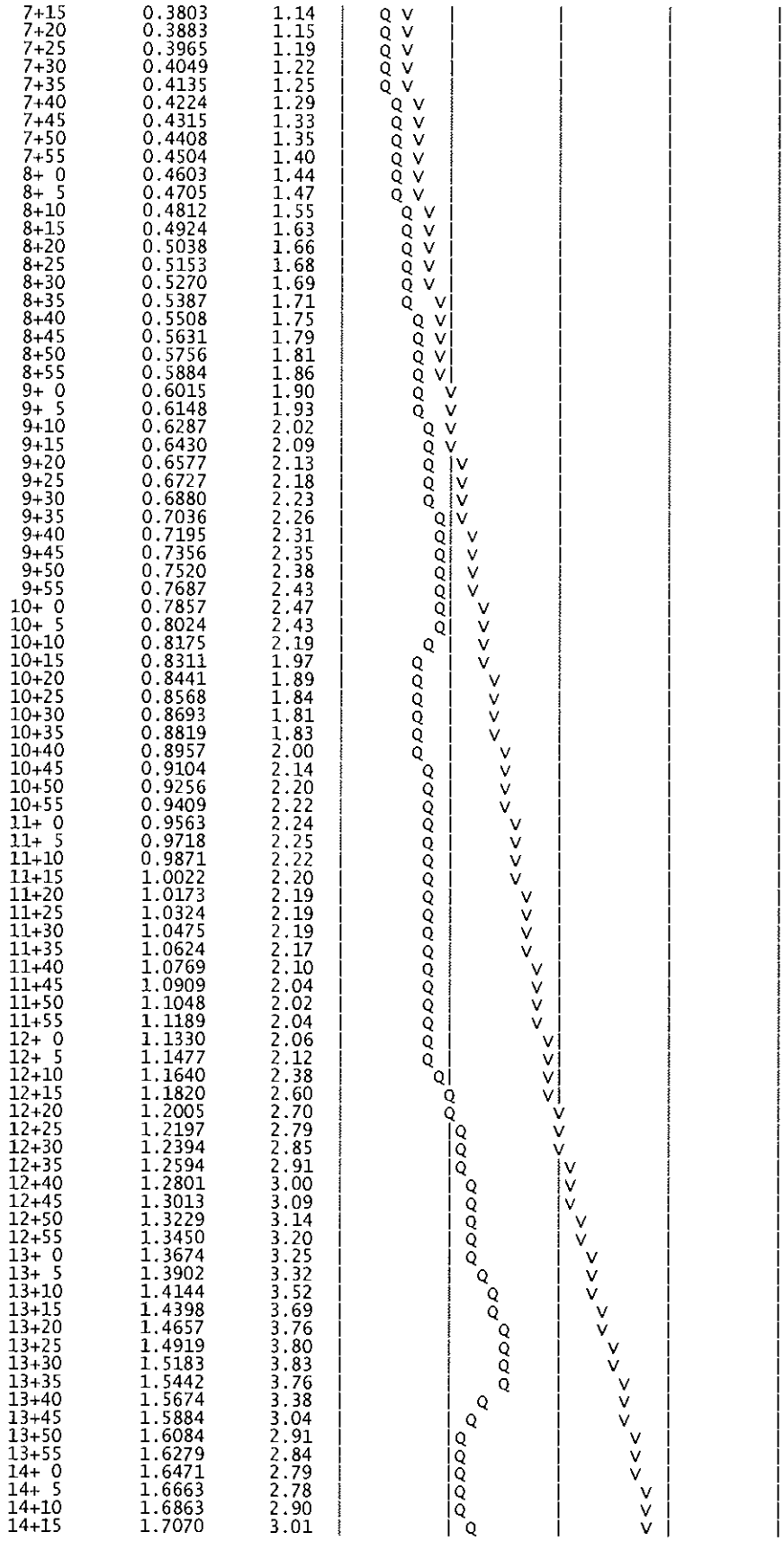
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

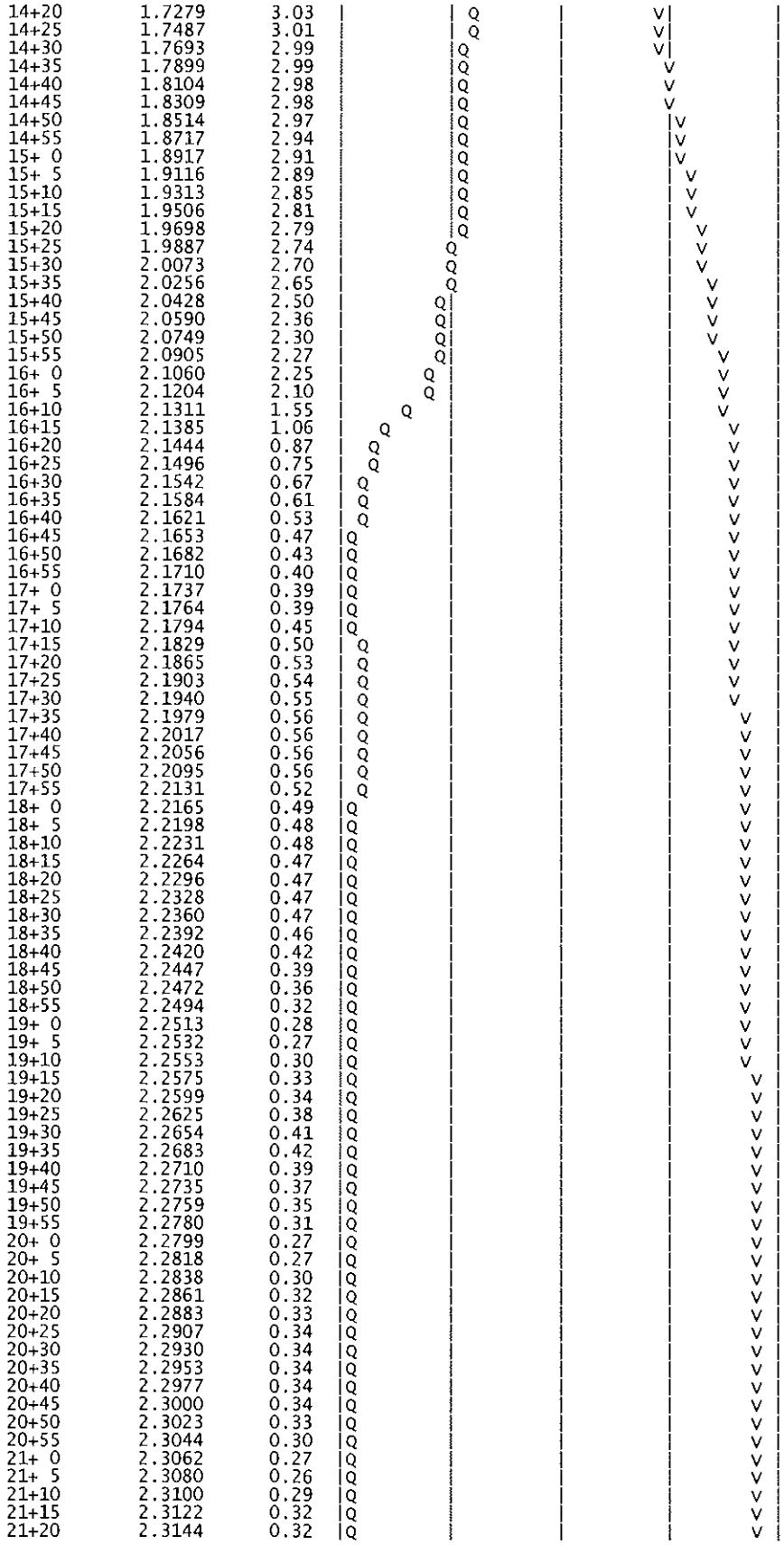
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q	|	|	|	|

0+10	0.0007	0.09	Q	|	|	|	|
0+15	0.0018	0.15	Q	|	|	|	|
0+20	0.0031	0.19	Q	|	|	|	|
0+25	0.0047	0.24	Q	|	|	|	|
0+30	0.0066	0.28	VQ	|	|	|	|
0+35	0.0087	0.30	VQ	|	|	|	|
0+40	0.0108	0.31	VQ	|	|	|	|
0+45	0.0130	0.32	VQ	|	|	|	|
0+50	0.0153	0.34	VQ	|	|	|	|
0+55	0.0179	0.38	VQ	|	|	|	|
1+ 0	0.0208	0.41	VQ	|	|	|	|
1+ 5	0.0236	0.42	VQ	|	|	|	|
1+10	0.0264	0.39	VQ	|	|	|	|
1+15	0.0289	0.37	VQ	|	|	|	|
1+20	0.0314	0.36	VQ	|	|	|	|
1+25	0.0338	0.36	VQ	|	|	|	|
1+30	0.0362	0.35	VQ	|	|	|	|
1+35	0.0387	0.35	VQ	|	|	|	|
1+40	0.0411	0.35	VQ	|	|	|	|
1+45	0.0435	0.35	VQ	|	|	|	|
1+50	0.0459	0.36	VQ	|	|	|	|
1+55	0.0486	0.39	VQ	|	|	|	|
2+ 0	0.0515	0.42	VQ	|	|	|	|
2+ 5	0.0545	0.43	VQ	|	|	|	|
2+10	0.0576	0.44	VQ	|	|	|	|
2+15	0.0606	0.45	|Q	|	|	|	|
2+20	0.0637	0.45	|Q	|	|	|	|
2+25	0.0669	0.45	|Q	|	|	|	|
2+30	0.0700	0.45	|Q	|	|	|	|
2+35	0.0732	0.46	|Q	|	|	|	|
2+40	0.0766	0.50	|VQ	|	|	|	|
2+45	0.0803	0.53	|VQ	|	|	|	|
2+50	0.0841	0.55	|VQ	|	|	|	|
2+55	0.0879	0.56	|VQ	|	|	|	|
3+ 0	0.0918	0.56	|VQ	|	|	|	|
3+ 5	0.0957	0.56	|VQ	|	|	|	|
3+10	0.0996	0.57	|VQ	|	|	|	|
3+15	0.1035	0.57	|VQ	|	|	|	|
3+20	0.1074	0.57	|VQ	|	|	|	|
3+25	0.1114	0.57	|VQ	|	|	|	|
3+30	0.1153	0.57	|VQ	|	|	|	|
3+35	0.1193	0.57	| Q	|	|	|	|
3+40	0.1232	0.57	| Q	|	|	|	|
3+45	0.1272	0.57	| Q	|	|	|	|
3+50	0.1312	0.58	| Q	|	|	|	|
3+55	0.1355	0.62	| Q	|	|	|	|
4+ 0	0.1399	0.65	| Q	|	|	|	|
4+ 5	0.1445	0.66	| Q	|	|	|	|
4+10	0.1491	0.67	| Q	|	|	|	|
4+15	0.1538	0.68	| Q	|	|	|	|
4+20	0.1585	0.69	| Q	|	|	|	|
4+25	0.1635	0.73	| Q	|	|	|	|
4+30	0.1688	0.76	| VQ	|	|	|	|
4+35	0.1741	0.77	| VQ	|	|	|	|
4+40	0.1795	0.78	| Q	|	|	|	|
4+45	0.1849	0.79	| Q	|	|	|	|
4+50	0.1905	0.80	| Q	|	|	|	|
4+55	0.1963	0.84	| Q	|	|	|	|
5+ 0	0.2023	0.88	| Q	|	|	|	|
5+ 5	0.2083	0.87	| Q	|	|	|	|
5+10	0.2139	0.81	| Q	|	|	|	|
5+15	0.2191	0.75	| Q	|	|	|	|
5+20	0.2241	0.74	| QV	|	|	|	|
5+25	0.2294	0.76	| Q	|	|	|	|
5+30	0.2348	0.79	| Q	|	|	|	|
5+35	0.2404	0.80	| QV	|	|	|	|
5+40	0.2462	0.84	| QV	|	|	|	|
5+45	0.2522	0.88	| QV	|	|	|	|
5+50	0.2583	0.89	| QV	|	|	|	|
5+55	0.2645	0.90	| QV	|	|	|	|
6+ 0	0.2707	0.90	| QV	|	|	|	|
6+ 5	0.2771	0.92	| QV	|	|	|	|
6+10	0.2836	0.95	| QV	|	|	|	|
6+15	0.2904	0.99	| QV	|	|	|	|
6+20	0.2974	1.00	| QV	|	|	|	|
6+25	0.3043	1.01	| QV	|	|	|	|
6+30	0.3113	1.02	| QV	|	|	|	|
6+35	0.3185	1.03	| QV	|	|	|	|
6+40	0.3258	1.07	| QV	|	|	|	|
6+45	0.3334	1.11	| QV	|	|	|	|
6+50	0.3412	1.12	| QV	|	|	|	|
6+55	0.3489	1.13	| QV	|	|	|	|
7+ 0	0.3567	1.13	| Q V	|	|	|	|
7+ 5	0.3646	1.14	| Q V	|	|	|	|
7+10	0.3724	1.14	| Q V	|	|	|	|



7+15	0.3803	1.14	Q V
7+20	0.3883	1.15	Q V
7+25	0.3965	1.19	Q V
7+30	0.4049	1.22	Q V
7+35	0.4135	1.25	Q V
7+40	0.4224	1.29	Q V
7+45	0.4315	1.33	Q V
7+50	0.4408	1.35	Q V
7+55	0.4504	1.40	Q V
8+ 0	0.4603	1.44	Q V
8+ 5	0.4705	1.47	Q V
8+10	0.4812	1.55	Q V
8+15	0.4924	1.63	Q V
8+20	0.5038	1.66	Q V
8+25	0.5153	1.68	Q V
8+30	0.5270	1.69	Q V
8+35	0.5387	1.71	Q V
8+40	0.5508	1.75	Q V
8+45	0.5631	1.79	Q V
8+50	0.5756	1.81	Q V
8+55	0.5884	1.86	Q V
9+ 0	0.6015	1.90	Q V
9+ 5	0.6148	1.93	Q V
9+10	0.6287	2.02	Q V
9+15	0.6430	2.09	Q V
9+20	0.6577	2.13	Q V
9+25	0.6727	2.18	Q V
9+30	0.6880	2.23	Q V
9+35	0.7036	2.26	Q V
9+40	0.7195	2.31	Q V
9+45	0.7356	2.35	Q V
9+50	0.7520	2.38	Q V
9+55	0.7687	2.43	Q V
10+ 0	0.7857	2.47	Q V
10+ 5	0.8024	2.43	Q V
10+10	0.8175	2.19	Q V
10+15	0.8311	1.97	Q V
10+20	0.8441	1.89	Q V
10+25	0.8568	1.84	Q V
10+30	0.8693	1.81	Q V
10+35	0.8819	1.83	Q V
10+40	0.8957	2.00	Q V
10+45	0.9104	2.14	Q V
10+50	0.9256	2.20	Q V
10+55	0.9409	2.22	Q V
11+ 0	0.9563	2.24	Q V
11+ 5	0.9718	2.25	Q V
11+10	0.9871	2.22	Q V
11+15	1.0022	2.20	Q V
11+20	1.0173	2.19	Q V
11+25	1.0324	2.19	Q V
11+30	1.0475	2.19	Q V
11+35	1.0624	2.17	Q V
11+40	1.0769	2.10	Q V
11+45	1.0909	2.04	Q V
11+50	1.1048	2.02	Q V
11+55	1.1189	2.04	Q V
12+ 0	1.1330	2.06	Q V
12+ 5	1.1477	2.12	Q V
12+10	1.1640	2.38	Q V
12+15	1.1820	2.60	Q V
12+20	1.2005	2.70	Q V
12+25	1.2197	2.79	Q V
12+30	1.2394	2.85	Q V
12+35	1.2594	2.91	Q V
12+40	1.2801	3.00	Q V
12+45	1.3013	3.09	Q V
12+50	1.3229	3.14	Q V
12+55	1.3450	3.20	Q V
13+ 0	1.3674	3.25	Q V
13+ 5	1.3902	3.32	Q V
13+10	1.4144	3.52	Q V
13+15	1.4398	3.69	Q V
13+20	1.4657	3.76	Q V
13+25	1.4919	3.80	Q V
13+30	1.5183	3.83	Q V
13+35	1.5442	3.76	Q V
13+40	1.5674	3.38	Q V
13+45	1.5884	3.04	Q V
13+50	1.6084	2.91	Q V
13+55	1.6279	2.84	Q V
14+ 0	1.6471	2.79	Q V
14+ 5	1.6663	2.78	Q V
14+10	1.6863	2.90	Q V
14+15	1.7070	3.01	Q V



14+20	1.7279	3.03	
14+25	1.7487	3.01	
14+30	1.7693	2.99	
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14+40	1.8104	2.98	
14+45	1.8309	2.98	
14+50	1.8514	2.97	
14+55	1.8717	2.94	
15+ 0	1.8917	2.91	
15+ 5	1.9116	2.89	
15+10	1.9313	2.85	
15+15	1.9506	2.81	
15+20	1.9698	2.79	
15+25	1.9887	2.74	
15+30	2.0073	2.70	
15+35	2.0256	2.65	
15+40	2.0428	2.50	
15+45	2.0590	2.36	
15+50	2.0749	2.30	
15+55	2.0905	2.27	
16+ 0	2.1060	2.25	
16+ 5	2.1204	2.10	
16+10	2.1311	1.55	
16+15	2.1385	1.06	
16+20	2.1444	0.87	
16+25	2.1496	0.75	
16+30	2.1542	0.67	
16+35	2.1584	0.61	
16+40	2.1621	0.53	
16+45	2.1653	0.47	
16+50	2.1682	0.43	
16+55	2.1710	0.40	
17+ 0	2.1737	0.39	
17+ 5	2.1764	0.39	
17+10	2.1794	0.45	
17+15	2.1829	0.50	
17+20	2.1865	0.53	
17+25	2.1903	0.54	
17+30	2.1940	0.55	
17+35	2.1979	0.56	
17+40	2.2017	0.56	
17+45	2.2056	0.56	
17+50	2.2095	0.56	
17+55	2.2131	0.52	
18+ 0	2.2165	0.49	
18+ 5	2.2198	0.48	
18+10	2.2231	0.48	
18+15	2.2264	0.47	
18+20	2.2296	0.47	
18+25	2.2328	0.47	
18+30	2.2360	0.47	
18+35	2.2392	0.46	
18+40	2.2420	0.42	
18+45	2.2447	0.39	
18+50	2.2472	0.36	
18+55	2.2494	0.32	
19+ 0	2.2513	0.28	
19+ 5	2.2532	0.27	
19+10	2.2553	0.30	
19+15	2.2575	0.33	
19+20	2.2599	0.34	
19+25	2.2625	0.38	
19+30	2.2654	0.41	
19+35	2.2683	0.42	
19+40	2.2710	0.39	
19+45	2.2735	0.37	
19+50	2.2759	0.35	
19+55	2.2780	0.31	
20+ 0	2.2799	0.27	
20+ 5	2.2818	0.27	
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20+15	2.2861	0.32	
20+20	2.2883	0.33	
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20+30	2.2930	0.34	
20+35	2.2953	0.34	
20+40	2.2977	0.34	
20+45	2.3000	0.34	
20+50	2.3023	0.33	
20+55	2.3044	0.30	
21+ 0	2.3062	0.27	
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21+10	2.3100	0.29	
21+15	2.3122	0.32	
21+20	2.3144	0.32	

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21+25       2.3164      0.29  |Q          |           |           |           V|
21+30       2.3182      0.26  |Q          |           |           |           V|
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21+40       2.3220      0.29  |Q          |           |           |           V|
21+45       2.3242      0.32  |Q          |           |           |           V|
21+50       2.3264      0.32  |Q          |           |           |           V|
21+55       2.3283      0.29  |Q          |           |           |           V|
22+ 0       2.3301      0.26  |Q          |           |           |           V|
22+ 5       2.3319      0.26  |Q          |           |           |           V|
22+10       2.3339      0.29  |Q          |           |           |           V|
22+15       2.3360      0.32  |Q          |           |           |           V|
22+20       2.3382      0.32  |Q          |           |           |           V|
22+25       2.3402      0.29  |Q          |           |           |           V|
22+30       2.3420      0.26  |Q          |           |           |           V|
22+35       2.3437      0.25  Q           |           |           |           V|
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22+45       2.3470      0.24  Q           |           |           |           V|
22+50       2.3487      0.24  Q           |           |           |           V|
22+55       2.3503      0.24  Q           |           |           |           V|
23+ 0       2.3519      0.23  Q           |           |           |           V|
23+ 5       2.3535      0.23  Q           |           |           |           V|
23+10       2.3551      0.23  Q           |           |           |           V|
23+15       2.3567      0.23  Q           |           |           |           V|
23+20       2.3583      0.23  Q           |           |           |           V|
23+25       2.3599      0.23  Q           |           |           |           V|
23+30       2.3615      0.23  Q           |           |           |           V|
23+35       2.3630      0.23  Q           |           |           |           V|
23+40       2.3646      0.23  Q           |           |           |           V|
23+45       2.3662      0.23  Q           |           |           |           V|
23+50       2.3678      0.23  Q           |           |           |           V|
23+55       2.3694      0.23  Q           |           |           |           V|
24+ 0       2.3710      0.23  Q           |           |           |           V|
24+ 5       2.3724      0.21  Q           |           |           |           V|
24+10       2.3734      0.14  Q           |           |           |           V|
24+15       2.3739      0.08  Q           |           |           |           V|
24+20       2.3743      0.05  Q           |           |           |           V|
24+25       2.3745      0.04  Q           |           |           |           V|
24+30       2.3747      0.03  Q           |           |           |           V|
24+35       2.3749      0.02  Q           |           |           |           V|
24+40       2.3750      0.02  Q           |           |           |           V|
24+45       2.3750      0.01  Q           |           |           |           V|
24+50       2.3751      0.01  Q           |           |           |           V|
24+55       2.3751      0.01  Q           |           |           |           V|
25+ 0       2.3752      0.00  Q           |           |           |           V|
25+ 5       2.3752      0.00  Q           |           |           |           V|
25+10       2.3752      0.00  Q           |           |           |            V
-------------------------------------------------------------------------------
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E00565.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 5-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.10	136.51

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	2.50	310.25

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.428(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 1.427(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.000	0.343	0.587	0.202
65.0	45.0	0.621	0.000	0.621	0.380	0.236
56.0	36.0	0.706	0.900	0.134	0.032	0.004
					Sum (F) =	0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900
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Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.086	0.442	0.077	0.01
2	0.17	0.60	0.103	0.442	0.092	0.01
3	0.25	0.60	0.103	0.442	0.092	0.01
4	0.33	0.60	0.103	0.442	0.092	0.01
5	0.42	0.60	0.103	0.442	0.092	0.01
6	0.50	0.70	0.120	0.442	0.108	0.01
7	0.58	0.70	0.120	0.442	0.108	0.01
8	0.67	0.70	0.120	0.442	0.108	0.01
9	0.75	0.70	0.120	0.442	0.108	0.01
10	0.83	0.70	0.120	0.442	0.108	0.01
11	0.92	0.70	0.120	0.442	0.108	0.01
12	1.00	0.80	0.137	0.442	0.123	0.01
13	1.08	0.80	0.137	0.442	0.123	0.01
14	1.17	0.80	0.137	0.442	0.123	0.01
15	1.25	0.80	0.137	0.442	0.123	0.01
16	1.33	0.80	0.137	0.442	0.123	0.01
17	1.42	0.80	0.137	0.442	0.123	0.01
18	1.50	0.80	0.137	0.442	0.123	0.01
19	1.58	0.80	0.137	0.442	0.123	0.01
20	1.67	0.80	0.137	0.442	0.123	0.01
21	1.75	0.80	0.137	0.442	0.123	0.01
22	1.83	0.80	0.137	0.442	0.123	0.01
23	1.92	0.80	0.137	0.442	0.123	0.01
24	2.00	0.90	0.154	0.442	0.139	0.02
25	2.08	0.80	0.137	0.442	0.123	0.01
26	2.17	0.90	0.154	0.442	0.139	0.02
27	2.25	0.90	0.154	0.442	0.139	0.02
28	2.33	0.90	0.154	0.442	0.139	0.02
29	2.42	0.90	0.154	0.442	0.139	0.02
30	2.50	0.90	0.154	0.442	0.139	0.02
31	2.58	0.90	0.154	0.442	0.139	0.02
32	2.67	0.90	0.154	0.442	0.139	0.02
33	2.75	1.00	0.171	0.442	0.154	0.02
34	2.83	1.00	0.171	0.442	0.154	0.02
35	2.92	1.00	0.171	0.442	0.154	0.02
36	3.00	1.00	0.171	0.442	0.154	0.02
37	3.08	1.00	0.171	0.442	0.154	0.02
38	3.17	1.10	0.188	0.442	0.170	0.02
39	3.25	1.10	0.188	0.442	0.170	0.02
40	3.33	1.10	0.188	0.442	0.170	0.02
41	3.42	1.20	0.206	0.442	0.185	0.02
42	3.50	1.30	0.223	0.442	0.200	0.02
43	3.58	1.40	0.240	0.442	0.216	0.02
44	3.67	1.40	0.240	0.442	0.216	0.02
45	3.75	1.50	0.257	0.442	0.231	0.03
46	3.83	1.50	0.257	0.442	0.231	0.03
47	3.92	1.60	0.274	0.442	0.247	0.03
48	4.00	1.60	0.274	0.442	0.247	0.03
49	4.08	1.70	0.291	0.442	0.262	0.03
50	4.17	1.80	0.308	0.442	0.277	0.03
51	4.25	1.90	0.325	0.442	0.293	0.03
52	4.33	2.00	0.343	0.442	0.308	0.03
53	4.42	2.10	0.360	0.442	0.324	0.04
54	4.50	2.10	0.360	0.442	0.324	0.04

55	4.58	2.20	0.377	0.442	0.339	0.04
56	4.67	2.30	0.394	0.442	0.355	0.04
57	4.75	2.40	0.411	0.442	0.370	0.04
58	4.83	2.40	0.411	0.442	0.370	0.04
59	4.92	2.50	0.428	0.442	0.385	0.04
60	5.00	2.60	0.445	0.442	---	0.00
61	5.08	3.10	0.531	0.442	---	0.09
62	5.17	3.60	0.617	0.442	---	0.17
63	5.25	3.90	0.668	0.442	---	0.23
64	5.33	4.20	0.719	0.442	---	0.28
65	5.42	4.70	0.805	0.442	---	0.36
66	5.50	5.60	0.959	0.442	---	0.52
67	5.58	1.90	0.325	0.442	0.293	0.03
68	5.67	0.90	0.154	0.442	0.139	0.02
69	5.75	0.60	0.103	0.442	0.092	0.01
70	5.83	0.50	0.086	0.442	0.077	0.01
71	5.92	0.30	0.051	0.442	0.046	0.01
72	6.00	0.20	0.034	0.442	0.031	0.00
Sum =		100.0			Sum =	2.9

Flood volume = Effective rainfall 0.24(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 2.5(Ac.Ft)
Total soil loss = 1.19(In)
Total soil loss = 12.272(Ac.Ft)
Total rainfall = 1.43(In)
Flood volume = 108423.1 Cubic Feet
Total soil loss = 534553.5 Cubic Feet

Peak flow rate of this hydrograph = 40.365(CFS)

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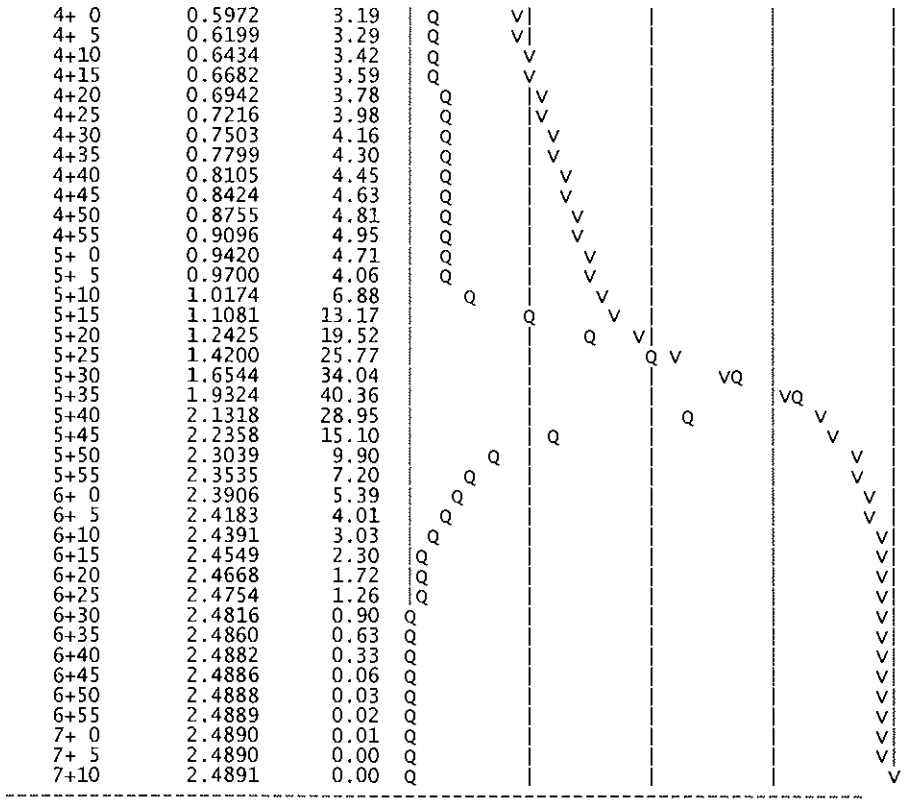
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0005	0.08	Q				
0+10	0.0035	0.43	Q				
0+15	0.0090	0.79	Q				
0+20	0.0157	0.97	Q				
0+25	0.0230	1.06	Q				
0+30	0.0308	1.14	Q				
0+35	0.0394	1.25	Q				
0+40	0.0487	1.34	VQ				
0+45	0.0582	1.39	VQ				
0+50	0.0680	1.42	|Q				
0+55	0.0779	1.44	|Q				
1+ 0	0.0881	1.48	|Q				
1+ 5	0.0988	1.56	|Q				
1+10	0.1100	1.63	|Q				
1+15	0.1214	1.66	|Q				
1+20	0.1329	1.67	|QV				
1+25	0.1445	1.69	|QV				
1+30	0.1562	1.69	|QV				
1+35	0.1679	1.70	|QV				
1+40	0.1796	1.70	|QV				
1+45	0.1914	1.71	|Q V				
1+50	0.2032	1.71	|Q V				
1+55	0.2150	1.71	|Q V				
2+ 0	0.2269	1.73	|Q V				
2+ 5	0.2391	1.78	|Q V				
2+10	0.2515	1.79	|Q V				
2+15	0.2640	1.82	|Q V				
2+20	0.2769	1.87	|Q V				
2+25	0.2899	1.89	|Q V				
2+30	0.3030	1.90	|Q V				
2+35	0.3161	1.91	|Q V				
2+40	0.3293	1.91	|Q V				
2+45	0.3426	1.93	|Q V				
2+50	0.3564	2.00	|Q V				
2+55	0.3707	2.07	|Q V				
3+ 0	0.3851	2.09	|Q V				
3+ 5	0.3996	2.11	|Q V				
3+10	0.4142	2.13	|Q V				
3+15	0.4294	2.21	|Q V				
3+20	0.4451	2.27	|Q V				
3+25	0.4610	2.31	|Q V				
3+30	0.4777	2.41	|Q V				
3+35	0.4953	2.57	| Q V				
3+40	0.5141	2.73	| Q V				
3+45	0.5337	2.84	| Q V				
3+50	0.5541	2.96	| Q V				
3+55	0.5753	3.07	| Q V				


4+ 0 0.5972 3.19
4+ 5 0.6199 3.29
4+10 0.6434 3.42
4+15 0.6682 3.59
4+20 0.6942 3.78
4+25 0.7216 3.98
4+30 0.7503 4.16
4+35 0.7799 4.30
4+40 0.8105 4.45
4+45 0.8424 4.63
4+50 0.8755 4.81
4+55 0.9096 4.95
5+ 0 0.9420 4.71
5+ 5 0.9700 4.06
5+10 1.0174 6.88
5+15 1.1081 13.17
5+20 1.2425 19.52
5+25 1.4200 25.77
5+30 1.6544 34.04
5+35 1.9324 40.36
5+40 2.1318 28.95
5+45 2.2358 15.10
5+50 2.3039 9.90
5+55 2.3535 7.20
6+ 0 2.3906 5.39
6+ 5 2.4183 4.01
6+10 2.4391 3.03
6+15 2.4549 2.30
6+20 2.4668 1.72
6+25 2.4754 1.26
6+30 2.4816 0.90
6+35 2.4860 0.63
6+40 2.4882 0.33
6+45 2.4886 0.06
6+50 2.4888 0.03
6+55 2.4889 0.02
7+ 0 2.4890 0.01
7+ 5 2.4890 0.00
7+10 2.4891 0.00

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E00535.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MOREND VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 5-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	0.80	99.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.85	229.59

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 1.046(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 1.045(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.000	0.343	0.587	0.202
65.0	45.0	0.621	0.000	0.621	0.380	0.236
56.0	36.0	0.706	0.900	0.134	0.032	0.004
					Sum (F) =	0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.163	0.442	0.147	0.02
2	0.17	1.30	0.163	0.442	0.147	0.02
3	0.25	1.10	0.138	0.442	0.124	0.01
4	0.33	1.50	0.188	0.442	0.169	0.02
5	0.42	1.50	0.188	0.442	0.169	0.02
6	0.50	1.80	0.226	0.442	0.203	0.02
7	0.58	1.50	0.188	0.442	0.169	0.02
8	0.67	1.80	0.226	0.442	0.203	0.02
9	0.75	1.80	0.226	0.442	0.203	0.02
10	0.83	1.50	0.188	0.442	0.169	0.02
11	0.92	1.60	0.201	0.442	0.181	0.02
12	1.00	1.80	0.226	0.442	0.203	0.02
13	1.08	2.20	0.276	0.442	0.248	0.03
14	1.17	2.20	0.276	0.442	0.248	0.03
15	1.25	2.20	0.276	0.442	0.248	0.03
16	1.33	2.00	0.251	0.442	0.226	0.03
17	1.42	2.60	0.326	0.442	0.294	0.03
18	1.50	2.70	0.339	0.442	0.305	0.03
19	1.58	2.40	0.301	0.442	0.271	0.03
20	1.67	2.70	0.339	0.442	0.305	0.03
21	1.75	3.30	0.414	0.442	0.373	0.04
22	1.83	3.10	0.389	0.442	0.350	0.04
23	1.92	2.90	0.364	0.442	0.327	0.04
24	2.00	3.00	0.376	0.442	0.339	0.04
25	2.08	3.10	0.389	0.442	0.350	0.04
26	2.17	4.20	0.527	0.442	---	0.08
27	2.25	5.00	0.627	0.442	---	0.19
28	2.33	3.50	0.439	0.442	0.395	0.04
29	2.42	6.80	0.853	0.442	---	0.41
30	2.50	7.30	0.916	0.442	---	0.47
31	2.58	8.20	1.029	0.442	---	0.59
32	2.67	5.90	0.740	0.442	---	0.30
33	2.75	2.00	0.251	0.442	0.226	0.03
34	2.83	1.80	0.226	0.442	0.203	0.02
35	2.92	1.80	0.226	0.442	0.203	0.02
36	3.00	0.60	0.075	0.442	0.068	0.01
Sum =		100.0			Sum =	2.8

Flood volume = Effective rainfall 0.24(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 2.4(Ac.Ft)
Total soil loss = 0.81(In)
Total soil loss = 8.377(Ac.Ft)
Total rainfall = 1.05(In)
Flood volume = 106030.7 Cubic Feet
Total soil loss = 364889.6 Cubic Feet

Peak flow rate of this hydrograph = 49.902(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0010	0.15	Q				
0+10	0.0065	0.79	Q				
0+15	0.0156	1.33	VQ				
0+20	0.0260	1.50	VQ				
0+25	0.0380	1.74	VQ				
0+30	0.0518	2.01	VQ				
0+35	0.0672	2.23	|Q				
0+40	0.0832	2.32	|Q				
0+45	0.1000	2.44	|Q				
0+50	0.1176	2.56	|VQ				
0+55	0.1348	2.49	|QV				
1+ 0	0.1519	2.48	|QV				
1+ 5	0.1702	2.65	| Q				
1+10	0.1905	2.95	| QV				
1+15	0.2124	3.17	| QV				
1+20	0.2346	3.24	| QV				
1+25	0.2571	3.26	| Q V				
1+30	0.2814	3.52	| Q V				
1+35	0.3075	3.79	| Q V				
1+40	0.3338	3.82	| Q V				
1+45	0.3613	3.99	| Q V				
1+50	0.3915	4.39	| Q V				
1+55	0.4231	4.59	| Q V				
2+ 0	0.4545	4.55	| Q V				
2+ 5	0.4860	4.58	| Q V				
2+10	0.5212	5.11	| Q V				
2+15	0.5756	7.90	| Q V				
2+20	0.6593	12.15	| QV				
2+25	0.7568	14.16	| QV				
2+30	0.9357	25.98	| V	Q			
2+35	1.2201	41.30	|	V		Q	
2+40	1.5638	49.90	|	| V		|	Q
2+45	1.8636	43.53	|	|		V Q	
2+50	2.0475	26.70	|	Q |		V	
2+55	2.1558	15.74	| Q	|		V	
3+ 0	2.2334	11.26	| Q	|		V	
3+ 5	2.2899	8.20	| Q	|		V	
3+10	2.3298	5.80	| Q	|		V	
3+15	2.3591	4.26	| Q	|		V	
3+20	2.3817	3.28	| Q	|		V	
3+25	2.3987	2.46	|Q	|		V	
3+30	2.4114	1.84	|Q	|		V	
3+35	2.4211	1.42	|Q	|		V	
3+40	2.4279	0.98	Q	|		V	
3+45	2.4319	0.58	Q	|		V	
3+50	2.4334	0.21	Q	|		V	
3+55	2.4338	0.05	Q	|		V	
4+ 0	2.4340	0.03	Q	|		V	
4+ 5	2.4341	0.02	Q	|		V	
4+10	2.4341	0.00	Q	|		V	

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E00515.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 5-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	0.48	59.57

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.20	148.92

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.649(In)
Areal adjustment factor = 99.89 %
Adjusted average point rain = 0.648(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.000	0.343	0.587	0.202
65.0	45.0	0.621	0.000	0.621	0.380	0.236
56.0	36.0	0.706	0.900	0.134	0.032	0.004
					Sum (F) =	0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.327	0.442	0.294	0.03
2	0.17	4.30	0.334	0.442	0.301	0.03
3	0.25	5.00	0.389	0.442	0.350	0.04
4	0.33	5.00	0.389	0.442	0.350	0.04
5	0.42	5.80	0.451	0.442	---	0.01
6	0.50	6.50	0.505	0.442	---	0.06
7	0.58	7.40	0.575	0.442	---	0.13
8	0.67	8.60	0.669	0.442	---	0.23
9	0.75	12.30	0.956	0.442	---	0.51
10	0.83	29.10	2.263	0.442	---	1.82
11	0.92	6.80	0.529	0.442	---	0.09
12	1.00	5.00	0.389	0.442	0.350	0.04
Sum =		100.0			Sum =	3.0

Flood volume = Effective rainfall 0.25(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 2.6(Ac.Ft)
Total soil loss = 0.39(In)
Total soil loss = 4.084(Ac.Ft)
Total rainfall = 0.65(In)
Flood volume = 113973.5 Cubic Feet
Total soil loss = 177899.8 Cubic Feet

Peak flow rate of this hydrograph = 94.720(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 25.0 50.0 75.0 100.0
0+ 5	0.0021	0.30	Q
0+10	0.0130	1.59	Q
0+15	0.0323	2.80	VQ
0+20	0.0563	3.49	VQ
0+25	0.0816	3.67	|Q
0+30	0.1041	3.26	|Q
0+35	0.1397	5.17	| Q
0+40	0.2111	10.37	| VQ
0+45	0.3470	19.72	| V Q
0+50	0.6750	47.63	| V Q
0+55	1.3273	94.72	| V Q
1+ 0	1.8572	76.95	| V Q
1+ 5	2.1044	35.89	| Q V
1+10	2.2510	21.28	| Q V
1+15	2.3490	14.23	| Q V
1+20	2.4195	10.25	| Q V
1+25	2.4707	7.44	| Q V
1+30	2.5106	5.78	| Q V
1+35	2.5420	4.56	|Q V
1+40	2.5660	3.48	|Q V

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    1+45       2.5842      2.64  |Q        |         |         |         V|
    1+50       2.5978      1.97  Q         |         |         |         V|
    1+55       2.6091      1.64  Q         |         |         |         V|
    2+ 0       2.6159      0.99  Q         |         |         |         V|
    2+ 5       2.6163      0.07  Q         |         |         |         V|
    2+10       2.6165      0.02  Q         |         |         |         V|
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E002242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 2-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.70	210.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	4.25	527.42

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 4.250(In)

Point rain (area averaged) = 1.700(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.000	0.343	0.587	0.202
65.0	45.0	0.621	0.000	0.621	0.380	0.236
56.0	36.0	0.706	0.900	0.134	0.032	0.004
					Sum (F) =	0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.014	0.784	0.012	0.00
2	0.17	0.07	0.014	0.781	0.012	0.00
3	0.25	0.07	0.014	0.778	0.012	0.00
4	0.33	0.10	0.020	0.775	0.018	0.00
5	0.42	0.10	0.020	0.772	0.018	0.00
6	0.50	0.10	0.020	0.769	0.018	0.00
7	0.58	0.10	0.020	0.766	0.018	0.00
8	0.67	0.10	0.020	0.763	0.018	0.00
9	0.75	0.10	0.020	0.760	0.018	0.00
10	0.83	0.13	0.027	0.757	0.024	0.00
11	0.92	0.13	0.027	0.754	0.024	0.00
12	1.00	0.13	0.027	0.751	0.024	0.00
13	1.08	0.10	0.020	0.748	0.018	0.00
14	1.17	0.10	0.020	0.745	0.018	0.00
15	1.25	0.10	0.020	0.742	0.018	0.00
16	1.33	0.10	0.020	0.739	0.018	0.00
17	1.42	0.10	0.020	0.736	0.018	0.00
18	1.50	0.10	0.020	0.733	0.018	0.00
19	1.58	0.10	0.020	0.730	0.018	0.00
20	1.67	0.10	0.020	0.727	0.018	0.00
21	1.75	0.10	0.020	0.724	0.018	0.00
22	1.83	0.13	0.027	0.721	0.024	0.00
23	1.92	0.13	0.027	0.718	0.024	0.00
24	2.00	0.13	0.027	0.715	0.024	0.00
25	2.08	0.13	0.027	0.713	0.024	0.00
26	2.17	0.13	0.027	0.710	0.024	0.00
27	2.25	0.13	0.027	0.707	0.024	0.00
28	2.33	0.13	0.027	0.704	0.024	0.00
29	2.42	0.13	0.027	0.701	0.024	0.00
30	2.50	0.13	0.027	0.698	0.024	0.00
31	2.58	0.17	0.034	0.695	0.031	0.00
32	2.67	0.17	0.034	0.692	0.031	0.00
33	2.75	0.17	0.034	0.690	0.031	0.00
34	2.83	0.17	0.034	0.687	0.031	0.00
35	2.92	0.17	0.034	0.684	0.031	0.00
36	3.00	0.17	0.034	0.681	0.031	0.00
37	3.08	0.17	0.034	0.678	0.031	0.00
38	3.17	0.17	0.034	0.675	0.031	0.00
39	3.25	0.17	0.034	0.673	0.031	0.00
40	3.33	0.17	0.034	0.670	0.031	0.00
41	3.42	0.17	0.034	0.667	0.031	0.00
42	3.50	0.17	0.034	0.664	0.031	0.00
43	3.58	0.17	0.034	0.662	0.031	0.00
44	3.67	0.17	0.034	0.659	0.031	0.00
45	3.75	0.17	0.034	0.656	0.031	0.00
46	3.83	0.20	0.041	0.653	0.037	0.00
47	3.92	0.20	0.041	0.650	0.037	0.00
48	4.00	0.20	0.041	0.648	0.037	0.00
49	4.08	0.20	0.041	0.645	0.037	0.00
50	4.17	0.20	0.041	0.642	0.037	0.00
51	4.25	0.20	0.041	0.639	0.037	0.00
52	4.33	0.23	0.048	0.637	0.043	0.00
53	4.42	0.23	0.048	0.634	0.043	0.00
54	4.50	0.23	0.048	0.631	0.043	0.00

55	4.58	0.23	0.048	0.629	0.043	0.00
56	4.67	0.23	0.048	0.626	0.043	0.00
57	4.75	0.23	0.048	0.623	0.043	0.00
58	4.83	0.27	0.054	0.621	0.049	0.01
59	4.92	0.27	0.054	0.618	0.049	0.01
60	5.00	0.27	0.054	0.615	0.049	0.01
61	5.08	0.20	0.041	0.612	0.037	0.00
62	5.17	0.20	0.041	0.610	0.037	0.00
63	5.25	0.20	0.041	0.607	0.037	0.00
64	5.33	0.23	0.048	0.604	0.043	0.00
65	5.42	0.23	0.048	0.602	0.043	0.00
66	5.50	0.23	0.048	0.599	0.043	0.00
67	5.58	0.27	0.054	0.597	0.049	0.01
68	5.67	0.27	0.054	0.594	0.049	0.01
69	5.75	0.27	0.054	0.591	0.049	0.01
70	5.83	0.27	0.054	0.589	0.049	0.01
71	5.92	0.27	0.054	0.586	0.049	0.01
72	6.00	0.27	0.054	0.584	0.049	0.01
73	6.08	0.30	0.061	0.581	0.055	0.01
74	6.17	0.30	0.061	0.578	0.055	0.01
75	6.25	0.30	0.061	0.576	0.055	0.01
76	6.33	0.30	0.061	0.573	0.055	0.01
77	6.42	0.30	0.061	0.571	0.055	0.01
78	6.50	0.30	0.061	0.568	0.055	0.01
79	6.58	0.33	0.068	0.566	0.061	0.01
80	6.67	0.33	0.068	0.563	0.061	0.01
81	6.75	0.33	0.068	0.560	0.061	0.01
82	6.83	0.33	0.068	0.558	0.061	0.01
83	6.92	0.33	0.068	0.555	0.061	0.01
84	7.00	0.33	0.068	0.553	0.061	0.01
85	7.08	0.33	0.068	0.550	0.061	0.01
86	7.17	0.33	0.068	0.548	0.061	0.01
87	7.25	0.33	0.068	0.545	0.061	0.01
88	7.33	0.37	0.075	0.543	0.067	0.01
89	7.42	0.37	0.075	0.540	0.067	0.01
90	7.50	0.37	0.075	0.538	0.067	0.01
91	7.58	0.40	0.082	0.535	0.073	0.01
92	7.67	0.40	0.082	0.533	0.073	0.01
93	7.75	0.40	0.082	0.531	0.073	0.01
94	7.83	0.43	0.088	0.528	0.080	0.01
95	7.92	0.43	0.088	0.526	0.080	0.01
96	8.00	0.43	0.088	0.523	0.080	0.01
97	8.08	0.50	0.102	0.521	0.092	0.01
98	8.17	0.50	0.102	0.518	0.092	0.01
99	8.25	0.50	0.102	0.516	0.092	0.01
100	8.33	0.50	0.102	0.513	0.092	0.01
101	8.42	0.50	0.102	0.511	0.092	0.01
102	8.50	0.50	0.102	0.509	0.092	0.01
103	8.58	0.53	0.109	0.506	0.098	0.01
104	8.67	0.53	0.109	0.504	0.098	0.01
105	8.75	0.53	0.109	0.502	0.098	0.01
106	8.83	0.57	0.116	0.499	0.104	0.01
107	8.92	0.57	0.116	0.497	0.104	0.01
108	9.00	0.57	0.116	0.494	0.104	0.01
109	9.08	0.63	0.129	0.492	0.116	0.01
110	9.17	0.63	0.129	0.490	0.116	0.01
111	9.25	0.63	0.129	0.487	0.116	0.01
112	9.33	0.67	0.136	0.485	0.122	0.01
113	9.42	0.67	0.136	0.483	0.122	0.01
114	9.50	0.67	0.136	0.481	0.122	0.01
115	9.58	0.70	0.143	0.478	0.128	0.01
116	9.67	0.70	0.143	0.476	0.128	0.01
117	9.75	0.70	0.143	0.474	0.128	0.01
118	9.83	0.73	0.150	0.471	0.135	0.01
119	9.92	0.73	0.150	0.469	0.135	0.01
120	10.00	0.73	0.150	0.467	0.135	0.01
121	10.08	0.50	0.102	0.465	0.092	0.01
122	10.17	0.50	0.102	0.462	0.092	0.01
123	10.25	0.50	0.102	0.460	0.092	0.01
124	10.33	0.50	0.102	0.458	0.092	0.01
125	10.42	0.50	0.102	0.456	0.092	0.01
126	10.50	0.50	0.102	0.453	0.092	0.01
127	10.58	0.67	0.136	0.451	0.122	0.01
128	10.67	0.67	0.136	0.449	0.122	0.01
129	10.75	0.67	0.136	0.447	0.122	0.01
130	10.83	0.67	0.136	0.445	0.122	0.01
131	10.92	0.67	0.136	0.442	0.122	0.01
132	11.00	0.67	0.136	0.440	0.122	0.01
133	11.08	0.63	0.129	0.438	0.116	0.01
134	11.17	0.63	0.129	0.436	0.116	0.01
135	11.25	0.63	0.129	0.434	0.116	0.01
136	11.33	0.63	0.129	0.432	0.116	0.01
137	11.42	0.63	0.129	0.429	0.116	0.01
138	11.50	0.63	0.129	0.427	0.116	0.01
139	11.58	0.57	0.116	0.425	0.104	0.01

140	11.67	0.57	0.116	0.423	0.104	0.01
141	11.75	0.57	0.116	0.421	0.104	0.01
142	11.83	0.60	0.122	0.419	0.110	0.01
143	11.92	0.60	0.122	0.417	0.110	0.01
144	12.00	0.60	0.122	0.415	0.110	0.01
145	12.08	0.83	0.170	0.413	0.153	0.02
146	12.17	0.83	0.170	0.411	0.153	0.02
147	12.25	0.83	0.170	0.409	0.153	0.02
148	12.33	0.87	0.177	0.406	0.159	0.02
149	12.42	0.87	0.177	0.404	0.159	0.02
150	12.50	0.87	0.177	0.402	0.159	0.02
151	12.58	0.93	0.190	0.400	0.171	0.02
152	12.67	0.93	0.190	0.398	0.171	0.02
153	12.75	0.93	0.190	0.396	0.171	0.02
154	12.83	0.97	0.197	0.394	0.177	0.02
155	12.92	0.97	0.197	0.392	0.177	0.02
156	13.00	0.97	0.197	0.390	0.177	0.02
157	13.08	1.13	0.231	0.388	0.208	0.02
158	13.17	1.13	0.231	0.386	0.208	0.02
159	13.25	1.13	0.231	0.384	0.208	0.02
160	13.33	1.13	0.231	0.383	0.208	0.02
161	13.42	1.13	0.231	0.381	0.208	0.02
162	13.50	1.13	0.231	0.379	0.208	0.02
163	13.58	0.77	0.156	0.377	0.141	0.02
164	13.67	0.77	0.156	0.375	0.141	0.02
165	13.75	0.77	0.156	0.373	0.141	0.02
166	13.83	0.77	0.156	0.371	0.141	0.02
167	13.92	0.77	0.156	0.369	0.141	0.02
168	14.00	0.77	0.156	0.367	0.141	0.02
169	14.08	0.90	0.184	0.365	0.165	0.02
170	14.17	0.90	0.184	0.363	0.165	0.02
171	14.25	0.90	0.184	0.362	0.165	0.02
172	14.33	0.87	0.177	0.360	0.159	0.02
173	14.42	0.87	0.177	0.358	0.159	0.02
174	14.50	0.87	0.177	0.356	0.159	0.02
175	14.58	0.87	0.177	0.354	0.159	0.02
176	14.67	0.87	0.177	0.352	0.159	0.02
177	14.75	0.87	0.177	0.351	0.159	0.02
178	14.83	0.83	0.170	0.349	0.153	0.02
179	14.92	0.83	0.170	0.347	0.153	0.02
180	15.00	0.83	0.170	0.345	0.153	0.02
181	15.08	0.80	0.163	0.344	0.147	0.02
182	15.17	0.80	0.163	0.342	0.147	0.02
183	15.25	0.80	0.163	0.340	0.147	0.02
184	15.33	0.77	0.156	0.338	0.141	0.02
185	15.42	0.77	0.156	0.337	0.141	0.02
186	15.50	0.77	0.156	0.335	0.141	0.02
187	15.58	0.63	0.129	0.333	0.116	0.01
188	15.67	0.63	0.129	0.331	0.116	0.01
189	15.75	0.63	0.129	0.330	0.116	0.01
190	15.83	0.63	0.129	0.328	0.116	0.01
191	15.92	0.63	0.129	0.326	0.116	0.01
192	16.00	0.63	0.129	0.325	0.116	0.01
193	16.08	0.13	0.027	0.323	0.024	0.00
194	16.17	0.13	0.027	0.321	0.024	0.00
195	16.25	0.13	0.027	0.320	0.024	0.00
196	16.33	0.13	0.027	0.318	0.024	0.00
197	16.42	0.13	0.027	0.316	0.024	0.00
198	16.50	0.13	0.027	0.315	0.024	0.00
199	16.58	0.10	0.020	0.313	0.018	0.00
200	16.67	0.10	0.020	0.312	0.018	0.00
201	16.75	0.10	0.020	0.310	0.018	0.00
202	16.83	0.10	0.020	0.308	0.018	0.00
203	16.92	0.10	0.020	0.307	0.018	0.00
204	17.00	0.10	0.020	0.305	0.018	0.00
205	17.08	0.17	0.034	0.304	0.031	0.00
206	17.17	0.17	0.034	0.302	0.031	0.00
207	17.25	0.17	0.034	0.301	0.031	0.00
208	17.33	0.17	0.034	0.299	0.031	0.00
209	17.42	0.17	0.034	0.298	0.031	0.00
210	17.50	0.17	0.034	0.296	0.031	0.00
211	17.58	0.17	0.034	0.295	0.031	0.00
212	17.67	0.17	0.034	0.293	0.031	0.00
213	17.75	0.17	0.034	0.292	0.031	0.00
214	17.83	0.13	0.027	0.290	0.024	0.00
215	17.92	0.13	0.027	0.289	0.024	0.00
216	18.00	0.13	0.027	0.288	0.024	0.00
217	18.08	0.13	0.027	0.286	0.024	0.00
218	18.17	0.13	0.027	0.285	0.024	0.00
219	18.25	0.13	0.027	0.283	0.024	0.00
220	18.33	0.13	0.027	0.282	0.024	0.00
221	18.42	0.13	0.027	0.281	0.024	0.00
222	18.50	0.13	0.027	0.279	0.024	0.00
223	18.58	0.10	0.020	0.278	0.018	0.00
224	18.67	0.10	0.020	0.277	0.018	0.00

225	18.75	0.10	0.020	0.275	0.018	0.00
226	18.83	0.07	0.014	0.274	0.012	0.00
227	18.92	0.07	0.014	0.273	0.012	0.00
228	19.00	0.07	0.014	0.271	0.012	0.00
229	19.08	0.10	0.020	0.270	0.018	0.00
230	19.17	0.10	0.020	0.269	0.018	0.00
231	19.25	0.10	0.020	0.267	0.018	0.00
232	19.33	0.13	0.027	0.266	0.024	0.00
233	19.42	0.13	0.027	0.265	0.024	0.00
234	19.50	0.13	0.027	0.264	0.024	0.00
235	19.58	0.10	0.020	0.263	0.018	0.00
236	19.67	0.10	0.020	0.261	0.018	0.00
237	19.75	0.10	0.020	0.260	0.018	0.00
238	19.83	0.07	0.014	0.259	0.012	0.00
239	19.92	0.07	0.014	0.258	0.012	0.00
240	20.00	0.07	0.014	0.257	0.012	0.00
241	20.08	0.10	0.020	0.256	0.018	0.00
242	20.17	0.10	0.020	0.254	0.018	0.00
243	20.25	0.10	0.020	0.253	0.018	0.00
244	20.33	0.10	0.020	0.252	0.018	0.00
245	20.42	0.10	0.020	0.251	0.018	0.00
246	20.50	0.10	0.020	0.250	0.018	0.00
247	20.58	0.10	0.020	0.249	0.018	0.00
248	20.67	0.10	0.020	0.248	0.018	0.00
249	20.75	0.10	0.020	0.247	0.018	0.00
250	20.83	0.07	0.014	0.246	0.012	0.00
251	20.92	0.07	0.014	0.245	0.012	0.00
252	21.00	0.07	0.014	0.244	0.012	0.00
253	21.08	0.10	0.020	0.243	0.018	0.00
254	21.17	0.10	0.020	0.242	0.018	0.00
255	21.25	0.10	0.020	0.241	0.018	0.00
256	21.33	0.07	0.014	0.240	0.012	0.00
257	21.42	0.07	0.014	0.239	0.012	0.00
258	21.50	0.07	0.014	0.238	0.012	0.00
259	21.58	0.10	0.020	0.238	0.018	0.00
260	21.67	0.10	0.020	0.237	0.018	0.00
261	21.75	0.10	0.020	0.236	0.018	0.00
262	21.83	0.07	0.014	0.235	0.012	0.00
263	21.92	0.07	0.014	0.234	0.012	0.00
264	22.00	0.07	0.014	0.233	0.012	0.00
265	22.08	0.10	0.020	0.233	0.018	0.00
266	22.17	0.10	0.020	0.232	0.018	0.00
267	22.25	0.10	0.020	0.231	0.018	0.00
268	22.33	0.07	0.014	0.230	0.012	0.00
269	22.42	0.07	0.014	0.230	0.012	0.00
270	22.50	0.07	0.014	0.229	0.012	0.00
271	22.58	0.07	0.014	0.228	0.012	0.00
272	22.67	0.07	0.014	0.228	0.012	0.00
273	22.75	0.07	0.014	0.227	0.012	0.00
274	22.83	0.07	0.014	0.227	0.012	0.00
275	22.92	0.07	0.014	0.226	0.012	0.00
276	23.00	0.07	0.014	0.225	0.012	0.00
277	23.08	0.07	0.014	0.225	0.012	0.00
278	23.17	0.07	0.014	0.224	0.012	0.00
279	23.25	0.07	0.014	0.224	0.012	0.00
280	23.33	0.07	0.014	0.223	0.012	0.00
281	23.42	0.07	0.014	0.223	0.012	0.00
282	23.50	0.07	0.014	0.223	0.012	0.00
283	23.58	0.07	0.014	0.222	0.012	0.00
284	23.67	0.07	0.014	0.222	0.012	0.00
285	23.75	0.07	0.014	0.222	0.012	0.00
286	23.83	0.07	0.014	0.221	0.012	0.00
287	23.92	0.07	0.014	0.221	0.012	0.00
288	24.00	0.07	0.014	0.221	0.012	0.00
Sum =		100.0			Sum =	2.0

Flood volume = Effective rainfall 0.17(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 1.8(Ac.Ft)
Total soil loss = 1.53(In)
Total soil loss = 15.819(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 76563.5 Cubic Feet
Total soil loss = 689071.9 Cubic Feet

Peak flow rate of this hydrograph = 2.835(CFS)

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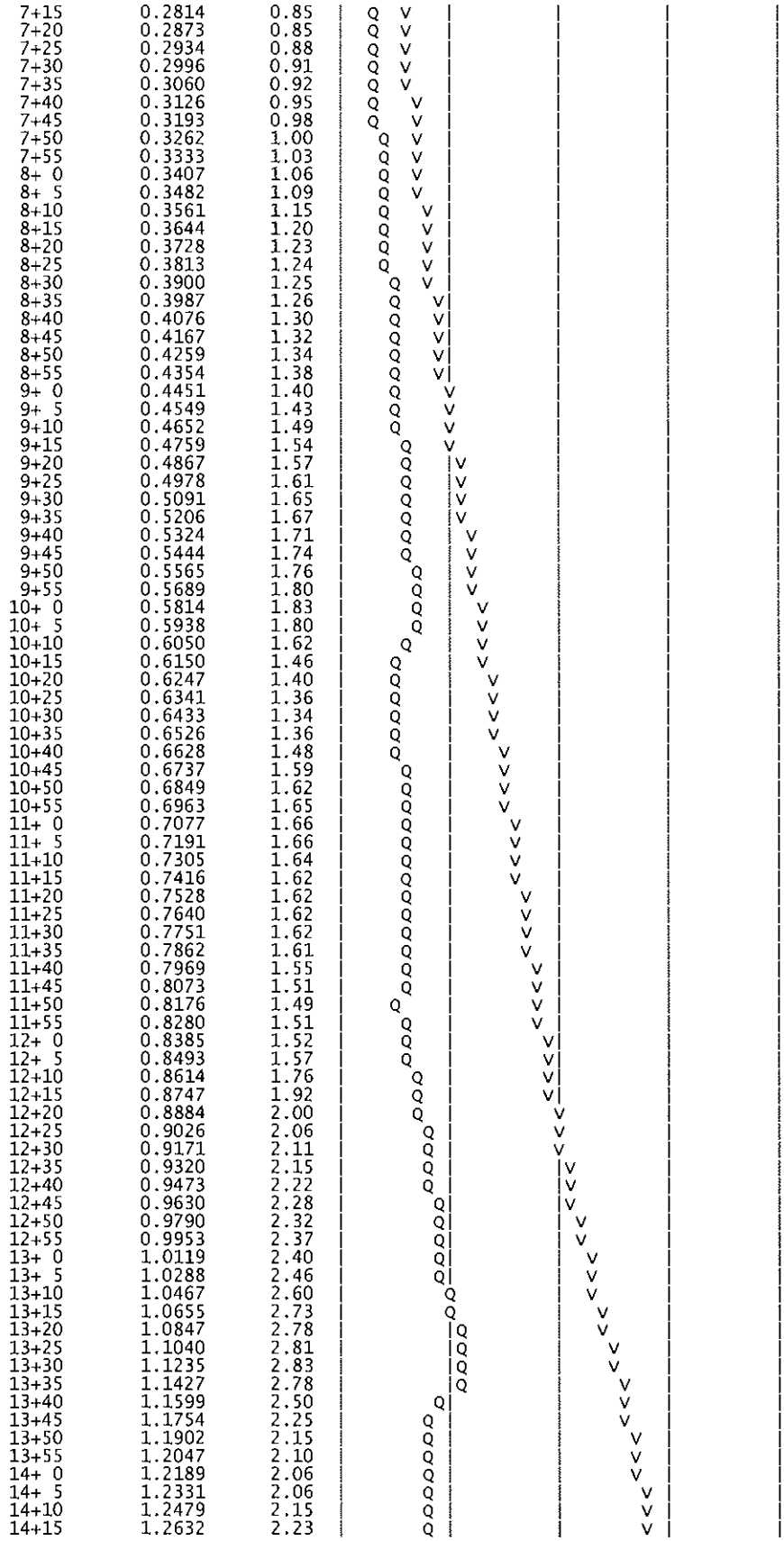
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

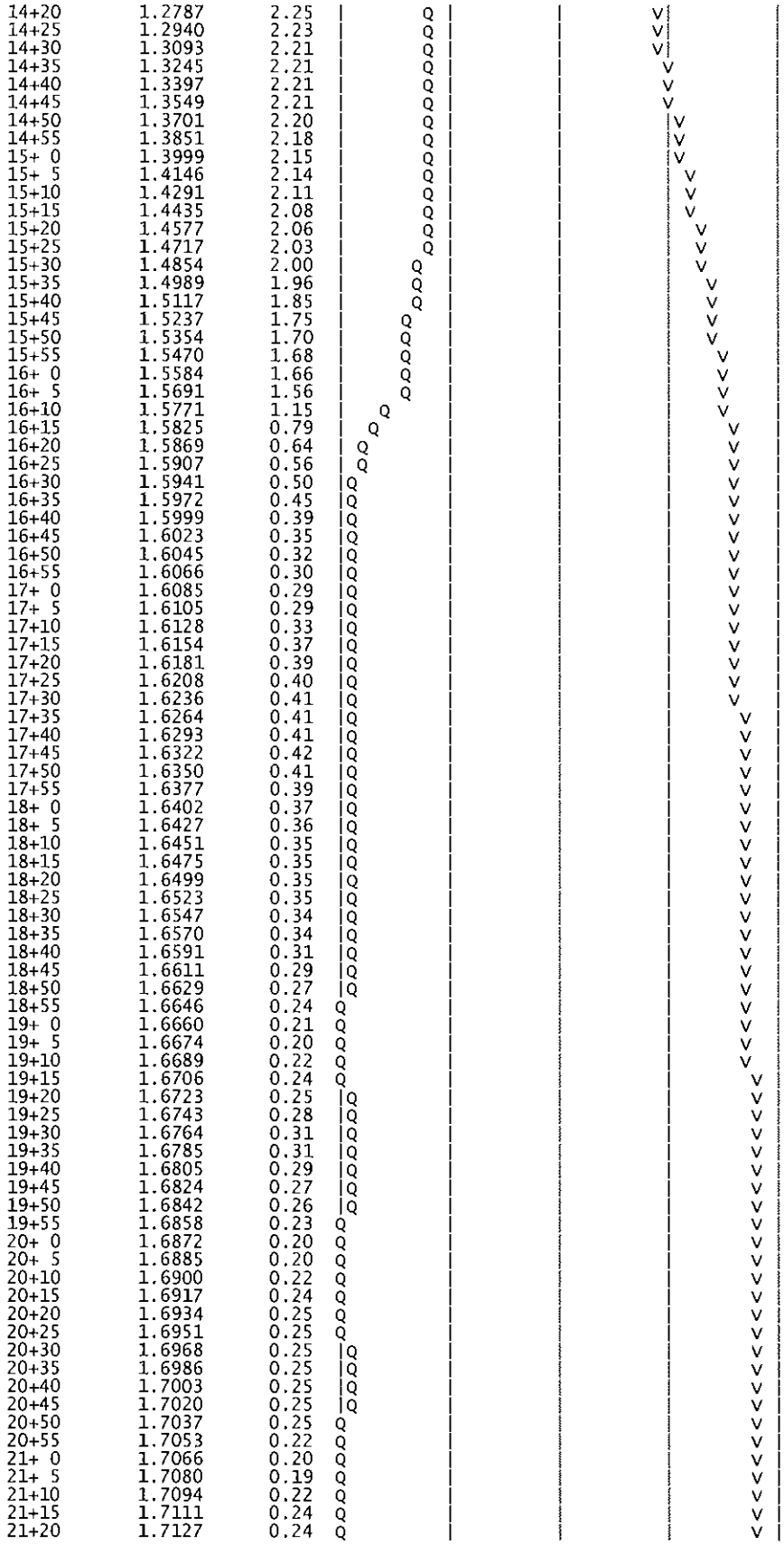
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q	|	|	|	|

0+10	0.0005	0.07	Q	|	|	|	|
0+15	0.0013	0.11	Q	|	|	|	|
0+20	0.0023	0.14	Q	|	|	|	|
0+25	0.0035	0.18	Q	|	|	|	|
0+30	0.0049	0.21	Q	|	|	|	|
0+35	0.0064	0.22	Q	|	|	|	|
0+40	0.0080	0.23	Q	|	|	|	|
0+45	0.0096	0.24	Q	|	|	|	|
0+50	0.0113	0.25	Q	|	|	|	|
0+55	0.0133	0.28	VQ	|	|	|	|
1+ 0	0.0154	0.30	VQ	|	|	|	|
1+ 5	0.0175	0.31	VQ	|	|	|	|
1+10	0.0195	0.29	VQ	|	|	|	|
1+15	0.0214	0.27	VQ	|	|	|	|
1+20	0.0232	0.27	VQ	|	|	|	|
1+25	0.0250	0.26	VQ	|	|	|	|
1+30	0.0268	0.26	VQ	|	|	|	|
1+35	0.0286	0.26	VQ	|	|	|	|
1+40	0.0304	0.26	VQ	|	|	|	|
1+45	0.0322	0.26	VQ	|	|	|	|
1+50	0.0340	0.26	VQ	|	|	|	|
1+55	0.0360	0.29	VQ	|	|	|	|
2+ 0	0.0381	0.31	VQ	|	|	|	|
2+ 5	0.0404	0.32	VQ	|	|	|	|
2+10	0.0426	0.33	VQ	|	|	|	|
2+15	0.0449	0.33	|Q	|	|	|	|
2+20	0.0472	0.33	|Q	|	|	|	|
2+25	0.0495	0.33	|Q	|	|	|	|
2+30	0.0518	0.34	|Q	|	|	|	|
2+35	0.0542	0.34	|Q	|	|	|	|
2+40	0.0567	0.37	|Q	|	|	|	|
2+45	0.0594	0.40	|Q	|	|	|	|
2+50	0.0622	0.41	|Q	|	|	|	|
2+55	0.0651	0.41	|Q	|	|	|	|
3+ 0	0.0679	0.42	|Q	|	|	|	|
3+ 5	0.0708	0.42	|Q	|	|	|	|
3+10	0.0737	0.42	|Q	|	|	|	|
3+15	0.0766	0.42	|Q	|	|	|	|
3+20	0.0795	0.42	|Q	|	|	|	|
3+25	0.0824	0.42	|Q	|	|	|	|
3+30	0.0853	0.42	|Q	|	|	|	|
3+35	0.0883	0.42	|QV	|	|	|	|
3+40	0.0912	0.43	|QV	|	|	|	|
3+45	0.0941	0.43	|QV	|	|	|	|
3+50	0.0971	0.43	|QV	|	|	|	|
3+55	0.1002	0.46	|QV	|	|	|	|
4+ 0	0.1036	0.48	|QV	|	|	|	|
4+ 5	0.1069	0.49	|QV	|	|	|	|
4+10	0.1104	0.50	|QV	|	|	|	|
4+15	0.1138	0.50	| Q	|	|	|	|
4+20	0.1173	0.51	| Q	|	|	|	|
4+25	0.1210	0.54	| Q	|	|	|	|
4+30	0.1249	0.56	| Q	|	|	|	|
4+35	0.1288	0.57	| Q	|	|	|	|
4+40	0.1328	0.58	| QV	|	|	|	|
4+45	0.1369	0.58	| QV	|	|	|	|
4+50	0.1409	0.59	| QV	|	|	|	|
4+55	0.1452	0.62	| QV	|	|	|	|
5+ 0	0.1497	0.65	| QV	|	|	|	|
5+ 5	0.1541	0.65	| QV	|	|	|	|
5+10	0.1583	0.60	| QV	|	|	|	|
5+15	0.1621	0.56	| QV	|	|	|	|
5+20	0.1659	0.55	| QV	|	|	|	|
5+25	0.1698	0.57	| QV	|	|	|	|
5+30	0.1738	0.58	| QV	|	|	|	|
5+35	0.1779	0.59	| Q V	|	|	|	|
5+40	0.1822	0.62	| Q V	|	|	|	|
5+45	0.1866	0.65	| Q V	|	|	|	|
5+50	0.1912	0.66	| Q V	|	|	|	|
5+55	0.1957	0.66	| Q V	|	|	|	|
6+ 0	0.2004	0.67	| Q V	|	|	|	|
6+ 5	0.2050	0.68	| Q V	|	|	|	|
6+10	0.2099	0.71	| Q V	|	|	|	|
6+15	0.2149	0.73	| Q V	|	|	|	|
6+20	0.2200	0.74	| Q V	|	|	|	|
6+25	0.2252	0.75	| Q V	|	|	|	|
6+30	0.2304	0.75	| Q V	|	|	|	|
6+35	0.2357	0.76	| Q V	|	|	|	|
6+40	0.2411	0.79	| Q V	|	|	|	|
6+45	0.2468	0.82	| Q V	|	|	|	|
6+50	0.2525	0.83	| Q V	|	|	|	|
6+55	0.2582	0.83	| Q V	|	|	|	|
7+ 0	0.2640	0.84	| Q V	|	|	|	|
7+ 5	0.2698	0.84	| Q V	|	|	|	|
7+10	0.2756	0.84	| Q V	|	|	|	|



7+15	0.2814	0.85	Q V
7+20	0.2873	0.85	Q V
7+25	0.2934	0.88	Q V
7+30	0.2996	0.91	Q V
7+35	0.3060	0.92	Q V
7+40	0.3126	0.95	Q V
7+45	0.3193	0.98	Q V
7+50	0.3262	1.00	Q V
7+55	0.3333	1.03	Q V
8+ 0	0.3407	1.06	Q V
8+ 5	0.3482	1.09	Q V
8+10	0.3561	1.15	Q V
8+15	0.3644	1.20	Q V
8+20	0.3728	1.23	Q V
8+25	0.3813	1.24	Q V
8+30	0.3900	1.25	Q V
8+35	0.3987	1.26	Q V
8+40	0.4076	1.30	Q V
8+45	0.4167	1.32	Q V
8+50	0.4259	1.34	Q V
8+55	0.4354	1.38	Q V
9+ 0	0.4451	1.40	Q V
9+ 5	0.4549	1.43	Q V
9+10	0.4652	1.49	Q V
9+15	0.4759	1.54	Q V
9+20	0.4867	1.57	Q V
9+25	0.4978	1.61	Q V
9+30	0.5091	1.65	Q V
9+35	0.5206	1.67	Q V
9+40	0.5324	1.71	Q V
9+45	0.5444	1.74	Q V
9+50	0.5565	1.76	Q V
9+55	0.5689	1.80	Q V
10+ 0	0.5814	1.83	Q V
10+ 5	0.5938	1.80	Q V
10+10	0.6050	1.62	Q V
10+15	0.6150	1.46	Q V
10+20	0.6247	1.40	Q V
10+25	0.6341	1.36	Q V
10+30	0.6433	1.34	Q V
10+35	0.6526	1.36	Q V
10+40	0.6628	1.48	Q V
10+45	0.6737	1.59	Q V
10+50	0.6849	1.62	Q V
10+55	0.6963	1.65	Q V
11+ 0	0.7077	1.66	Q V
11+ 5	0.7191	1.66	Q V
11+10	0.7305	1.64	Q V
11+15	0.7416	1.62	Q V
11+20	0.7528	1.62	Q V
11+25	0.7640	1.62	Q V
11+30	0.7751	1.62	Q V
11+35	0.7862	1.61	Q V
11+40	0.7969	1.55	Q V
11+45	0.8073	1.51	Q V
11+50	0.8176	1.49	Q V
11+55	0.8280	1.51	Q V
12+ 0	0.8385	1.52	Q V
12+ 5	0.8493	1.57	Q V
12+10	0.8614	1.76	Q V
12+15	0.8747	1.92	Q V
12+20	0.8884	2.00	Q V
12+25	0.9026	2.06	Q V
12+30	0.9171	2.11	Q V
12+35	0.9320	2.15	Q V
12+40	0.9473	2.22	Q V
12+45	0.9630	2.28	Q V
12+50	0.9790	2.32	Q V
12+55	0.9953	2.37	Q V
13+ 0	1.0119	2.40	Q V
13+ 5	1.0288	2.46	Q V
13+10	1.0467	2.60	Q V
13+15	1.0655	2.73	Q V
13+20	1.0847	2.78	Q V
13+25	1.1040	2.81	Q V
13+30	1.1235	2.83	Q V
13+35	1.1427	2.78	Q V
13+40	1.1599	2.50	Q V
13+45	1.1754	2.25	Q V
13+50	1.1902	2.15	Q V
13+55	1.2047	2.10	Q V
14+ 0	1.2189	2.06	Q V
14+ 5	1.2331	2.06	Q V
14+10	1.2479	2.15	Q V
14+15	1.2632	2.23	Q V



14+20	1.2787	2.25	Q V
14+25	1.2940	2.23	Q V
14+30	1.3093	2.21	Q V
14+35	1.3245	2.21	Q V
14+40	1.3397	2.21	Q V
14+45	1.3549	2.21	Q V
14+50	1.3701	2.20	Q V
14+55	1.3851	2.18	Q V
15+ 0	1.3999	2.15	Q V
15+ 5	1.4146	2.14	Q V
15+10	1.4291	2.11	Q V
15+15	1.4435	2.08	Q V
15+20	1.4577	2.06	Q V
15+25	1.4717	2.03	Q V
15+30	1.4854	2.00	Q V
15+35	1.4989	1.96	Q V
15+40	1.5117	1.85	Q V
15+45	1.5237	1.75	Q V
15+50	1.5354	1.70	Q V
15+55	1.5470	1.68	Q V
16+ 0	1.5584	1.66	Q V
16+ 5	1.5691	1.56	Q V
16+10	1.5771	1.15	Q V
16+15	1.5825	0.79	Q V
16+20	1.5869	0.64	Q V
16+25	1.5907	0.56	Q V
16+30	1.5941	0.50	Q V
16+35	1.5972	0.45	Q V
16+40	1.5999	0.39	Q V
16+45	1.6023	0.35	Q V
16+50	1.6045	0.32	Q V
16+55	1.6066	0.30	Q V
17+ 0	1.6085	0.29	Q V
17+ 5	1.6105	0.29	Q V
17+10	1.6128	0.33	Q V
17+15	1.6154	0.37	Q V
17+20	1.6181	0.39	Q V
17+25	1.6208	0.40	Q V
17+30	1.6236	0.41	Q V
17+35	1.6264	0.41	Q V
17+40	1.6293	0.41	Q V
17+45	1.6322	0.42	Q V
17+50	1.6350	0.41	Q V
17+55	1.6377	0.39	Q V
18+ 0	1.6402	0.37	Q V
18+ 5	1.6427	0.36	Q V
18+10	1.6451	0.35	Q V
18+15	1.6475	0.35	Q V
18+20	1.6499	0.35	Q V
18+25	1.6523	0.35	Q V
18+30	1.6547	0.34	Q V
18+35	1.6570	0.34	Q V
18+40	1.6591	0.31	Q V
18+45	1.6611	0.29	Q V
18+50	1.6629	0.27	Q V
18+55	1.6646	0.24	Q V
19+ 0	1.6660	0.21	Q V
19+ 5	1.6674	0.20	Q V
19+10	1.6689	0.22	Q V
19+15	1.6706	0.24	Q V
19+20	1.6723	0.25	Q V
19+25	1.6743	0.28	Q V
19+30	1.6764	0.31	Q V
19+35	1.6785	0.31	Q V
19+40	1.6805	0.29	Q V
19+45	1.6824	0.27	Q V
19+50	1.6842	0.26	Q V
19+55	1.6858	0.23	Q V
20+ 0	1.6872	0.20	Q V
20+ 5	1.6885	0.20	Q V
20+10	1.6900	0.22	Q V
20+15	1.6917	0.24	Q V
20+20	1.6934	0.25	Q V
20+25	1.6951	0.25	Q V
20+30	1.6968	0.25	Q V
20+35	1.6986	0.25	Q V
20+40	1.7003	0.25	Q V
20+45	1.7020	0.25	Q V
20+50	1.7037	0.25	Q V
20+55	1.7053	0.22	Q V
21+ 0	1.7066	0.20	Q V
21+ 5	1.7080	0.19	Q V
21+10	1.7094	0.22	Q V
21+15	1.7111	0.24	Q V
21+20	1.7127	0.24	Q V

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21+25       1.7142      0.21  Q          |           |           |          V|
21+30       1.7155      0.19  Q          |           |           |          V|
21+35       1.7168      0.19  Q          |           |           |          V|
21+40       1.7183      0.21  Q          |           |           |          V|
21+45       1.7199      0.23  Q          |           |           |          V|
21+50       1.7215      0.24  Q          |           |           |          V|
21+55       1.7230      0.21  Q          |           |           |          V|
22+ 0       1.7243      0.19  Q          |           |           |          V|
22+ 5       1.7256      0.19  Q          |           |           |          V|
22+10       1.7271      0.21  Q          |           |           |          V|
22+15       1.7287      0.23  Q          |           |           |          V|
22+20       1.7303      0.24  Q          |           |           |          V|
22+25       1.7318      0.21  Q          |           |           |          V|
22+30       1.7331      0.19  Q          |           |           |          V|
22+35       1.7344      0.18  Q          |           |           |          V|
22+40       1.7356      0.18  Q          |           |           |          V|
22+45       1.7368      0.18  Q          |           |           |          V|
22+50       1.7380      0.18  Q          |           |           |          V|
22+55       1.7392      0.17  Q          |           |           |          V|
23+ 0       1.7404      0.17  Q          |           |           |          V|
23+ 5       1.7416      0.17  Q          |           |           |          V|
23+10       1.7428      0.17  Q          |           |           |          V|
23+15       1.7440      0.17  Q          |           |           |          V|
23+20       1.7451      0.17  Q          |           |           |          V|
23+25       1.7463      0.17  Q          |           |           |          V|
23+30       1.7475      0.17  Q          |           |           |          V|
23+35       1.7487      0.17  Q          |           |           |          V|
23+40       1.7498      0.17  Q          |           |           |          V|
23+45       1.7510      0.17  Q          |           |           |          V|
23+50       1.7522      0.17  Q          |           |           |          V|
23+55       1.7534      0.17  Q          |           |           |          V|
24+ 0       1.7545      0.17  Q          |           |           |          V|
24+ 5       1.7556      0.16  Q          |           |           |          V|
24+10       1.7563      0.10  Q          |           |           |          V|
24+15       1.7567      0.06  Q          |           |           |          V|
24+20       1.7570      0.04  Q          |           |           |          V|
24+25       1.7572      0.03  Q          |           |           |          V|
24+30       1.7573      0.02  Q          |           |           |          V|
24+35       1.7574      0.01  Q          |           |           |          V|
24+40       1.7575      0.01  Q          |           |           |          V|
24+45       1.7576      0.01  Q          |           |           |          V|
24+50       1.7576      0.01  Q          |           |           |          V|
24+55       1.7576      0.00  Q          |           |           |          V|
25+ 0       1.7576      0.00  Q          |           |           |          V|
25+ 5       1.7577      0.00  Q          |           |           |          V|
25+10       1.7577      0.00  Q          |           |           |           V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E00262.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 2-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.10	136.51

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	2.50	310.25

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 99.96 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.000	0.343	0.587	0.202
65.0	45.0	0.621	0.000	0.621	0.380	0.236
56.0	36.0	0.706	0.900	0.134	0.032	0.004
					Sum (F) =	0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.066	0.442	0.059	0.01
2	0.17	0.60	0.079	0.442	0.071	0.01
3	0.25	0.60	0.079	0.442	0.071	0.01
4	0.33	0.60	0.079	0.442	0.071	0.01
5	0.42	0.60	0.079	0.442	0.071	0.01
6	0.50	0.70	0.092	0.442	0.083	0.01
7	0.58	0.70	0.092	0.442	0.083	0.01
8	0.67	0.70	0.092	0.442	0.083	0.01
9	0.75	0.70	0.092	0.442	0.083	0.01
10	0.83	0.70	0.092	0.442	0.083	0.01
11	0.92	0.70	0.092	0.442	0.083	0.01
12	1.00	0.80	0.106	0.442	0.095	0.01
13	1.08	0.80	0.106	0.442	0.095	0.01
14	1.17	0.80	0.106	0.442	0.095	0.01
15	1.25	0.80	0.106	0.442	0.095	0.01
16	1.33	0.80	0.106	0.442	0.095	0.01
17	1.42	0.80	0.106	0.442	0.095	0.01
18	1.50	0.80	0.106	0.442	0.095	0.01
19	1.58	0.80	0.106	0.442	0.095	0.01
20	1.67	0.80	0.106	0.442	0.095	0.01
21	1.75	0.80	0.106	0.442	0.095	0.01
22	1.83	0.80	0.106	0.442	0.095	0.01
23	1.92	0.80	0.106	0.442	0.095	0.01
24	2.00	0.90	0.119	0.442	0.107	0.01
25	2.08	0.80	0.106	0.442	0.095	0.01
26	2.17	0.90	0.119	0.442	0.107	0.01
27	2.25	0.90	0.119	0.442	0.107	0.01
28	2.33	0.90	0.119	0.442	0.107	0.01
29	2.42	0.90	0.119	0.442	0.107	0.01
30	2.50	0.90	0.119	0.442	0.107	0.01
31	2.58	0.90	0.119	0.442	0.107	0.01
32	2.67	0.90	0.119	0.442	0.107	0.01
33	2.75	1.00	0.132	0.442	0.119	0.01
34	2.83	1.00	0.132	0.442	0.119	0.01
35	2.92	1.00	0.132	0.442	0.119	0.01
36	3.00	1.00	0.132	0.442	0.119	0.01
37	3.08	1.00	0.132	0.442	0.119	0.01
38	3.17	1.10	0.145	0.442	0.131	0.01
39	3.25	1.10	0.145	0.442	0.131	0.01
40	3.33	1.10	0.145	0.442	0.131	0.01
41	3.42	1.20	0.158	0.442	0.142	0.02
42	3.50	1.30	0.172	0.442	0.154	0.02
43	3.58	1.40	0.185	0.442	0.166	0.02
44	3.67	1.40	0.185	0.442	0.166	0.02
45	3.75	1.50	0.198	0.442	0.178	0.02
46	3.83	1.50	0.198	0.442	0.178	0.02
47	3.92	1.60	0.211	0.442	0.190	0.02
48	4.00	1.60	0.211	0.442	0.190	0.02
49	4.08	1.70	0.224	0.442	0.202	0.02
50	4.17	1.80	0.237	0.442	0.214	0.02
51	4.25	1.90	0.251	0.442	0.226	0.03
52	4.33	2.00	0.264	0.442	0.237	0.03
53	4.42	2.10	0.277	0.442	0.249	0.03
54	4.50	2.10	0.277	0.442	0.249	0.03

55	4.58	2.20	0.290	0.442	0.261	0.03
56	4.67	2.30	0.303	0.442	0.273	0.03
57	4.75	2.40	0.317	0.442	0.285	0.03
58	4.83	2.40	0.317	0.442	0.285	0.03
59	4.92	2.50	0.330	0.442	0.297	0.03
60	5.00	2.60	0.343	0.442	0.309	0.03
61	5.08	3.10	0.409	0.442	0.368	0.04
62	5.17	3.60	0.475	0.442	---	0.03
63	5.25	3.90	0.515	0.442	---	0.07
64	5.33	4.20	0.554	0.442	---	0.11
65	5.42	4.70	0.620	0.442	---	0.18
66	5.50	5.60	0.739	0.442	---	0.30
67	5.58	1.90	0.251	0.442	0.226	0.03
68	5.67	0.90	0.119	0.442	0.107	0.01
69	5.75	0.60	0.079	0.442	0.071	0.01
70	5.83	0.50	0.066	0.442	0.059	0.01
71	5.92	0.30	0.040	0.442	0.036	0.00
72	6.00	0.20	0.026	0.442	0.024	0.00
Sum =		100.0			Sum =	1.7

Flood volume = Effective rainfall 0.14(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 1.5(Ac.Ft)
Total soil loss = 0.96(In)
Total soil loss = 9.887(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 64627.8 Cubic Feet
Total soil loss = 430692.2 Cubic Feet

Peak flow rate of this hydrograph = 20.830(CFS)

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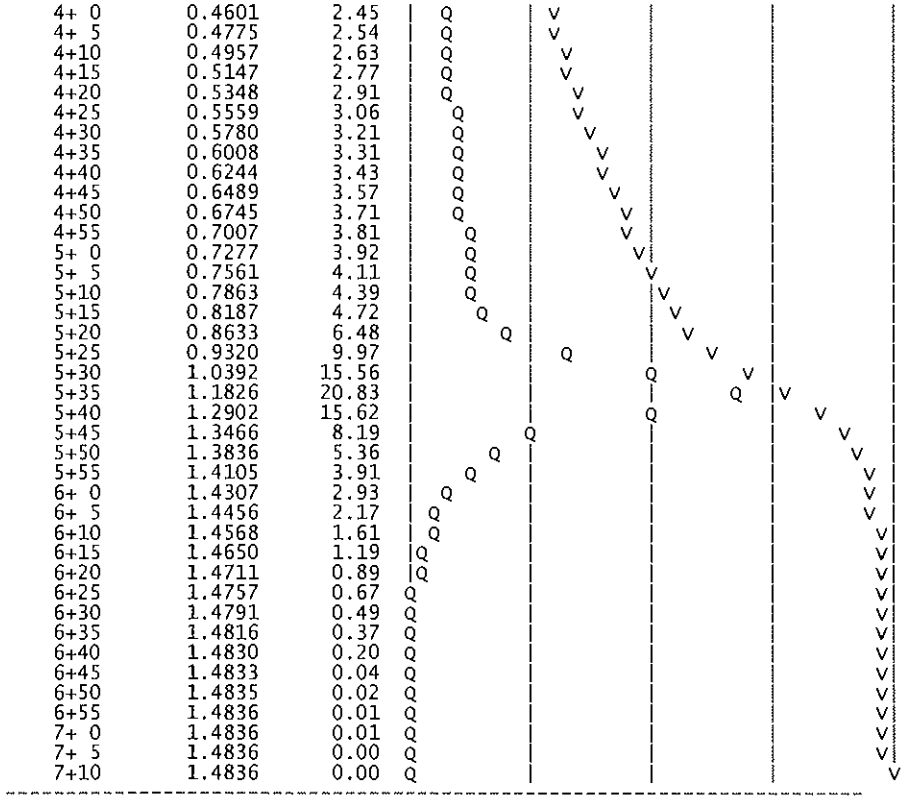
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0004	0.06	Q	|	|	|	|
0+10	0.0027	0.33	Q	|	|	|	|
0+15	0.0069	0.61	Q	|	|	|	|
0+20	0.0121	0.75	Q	|	|	|	|
0+25	0.0177	0.82	VQ	|	|	|	|
0+30	0.0238	0.88	VQ	|	|	|	|
0+35	0.0304	0.96	VQ	|	|	|	|
0+40	0.0375	1.03	|Q	|	|	|	|
0+45	0.0448	1.07	|Q	|	|	|	|
0+50	0.0524	1.09	|Q	|	|	|	|
0+55	0.0600	1.11	|Q	|	|	|	|
1+ 0	0.0678	1.14	|Q	|	|	|	|
1+ 5	0.0761	1.20	|QV	|	|	|	|
1+10	0.0847	1.25	|QV	|	|	|	|
1+15	0.0935	1.28	|QV	|	|	|	|
1+20	0.1024	1.29	|QV	|	|	|	|
1+25	0.1113	1.30	|Q V	|	|	|	|
1+30	0.1203	1.30	|Q V	|	|	|	|
1+35	0.1294	1.31	|Q V	|	|	|	|
1+40	0.1384	1.31	|Q V	|	|	|	|
1+45	0.1475	1.32	|Q V	|	|	|	|
1+50	0.1565	1.32	|Q V	|	|	|	|
1+55	0.1656	1.32	|Q V	|	|	|	|
2+ 0	0.1748	1.33	|Q V	|	|	|	|
2+ 5	0.1842	1.37	|Q V	|	|	|	|
2+10	0.1937	1.38	|Q V	|	|	|	|
2+15	0.2034	1.40	|Q V	|	|	|	|
2+20	0.2133	1.44	|Q V	|	|	|	|
2+25	0.2233	1.46	|Q V	|	|	|	|
2+30	0.2334	1.46	|Q V	|	|	|	|
2+35	0.2435	1.47	|Q V	|	|	|	|
2+40	0.2537	1.47	|Q V	|	|	|	|
2+45	0.2639	1.49	|Q V	|	|	|	|
2+50	0.2746	1.54	| Q V	|	|	|	|
2+55	0.2855	1.59	| Q V	|	|	|	|
3+ 0	0.2966	1.61	| Q V	|	|	|	|
3+ 5	0.3078	1.62	| Q V	|	|	|	|
3+10	0.3191	1.64	| Q V	|	|	|	|
3+15	0.3308	1.70	| Q V	|	|	|	|
3+20	0.3429	1.75	| Q V|	|	|	|	|
3+25	0.3552	1.78	| Q V|	|	|	|	|
3+30	0.3680	1.86	| Q V|	|	|	|	|
3+35	0.3816	1.98	| Q V	|	|	|	|
3+40	0.3961	2.10	| Q V	|	|	|	|
3+45	0.4111	2.19	| Q |V	|	|	|	|
3+50	0.4269	2.28	| Q |V	|	|	|	|
3+55	0.4432	2.37	| Q |V	|	|	|	|


4+ 0 0.4601 2.45
4+ 5 0.4775 2.54
4+10 0.4957 2.63
4+15 0.5147 2.77
4+20 0.5348 2.91
4+25 0.5559 3.06
4+30 0.5780 3.21
4+35 0.6008 3.31
4+40 0.6244 3.43
4+45 0.6489 3.57
4+50 0.6745 3.71
4+55 0.7007 3.81
5+ 0 0.7277 3.92
5+ 5 0.7561 4.11
5+10 0.7863 4.39
5+15 0.8187 4.72
5+20 0.8633 6.48
5+25 0.9320 9.97
5+30 1.0392 15.56
5+35 1.1826 20.83
5+40 1.2902 15.62
5+45 1.3466 8.19
5+50 1.3836 5.36
5+55 1.4105 3.91
6+ 0 1.4307 2.93
6+ 5 1.4456 2.17
6+10 1.4568 1.61
6+15 1.4650 1.19
6+20 1.4711 0.89
6+25 1.4757 0.67
6+30 1.4791 0.49
6+35 1.4816 0.37
6+40 1.4830 0.20
6+45 1.4833 0.04
6+50 1.4835 0.02
6+55 1.4836 0.01
7+ 0 1.4836 0.01
7+ 5 1.4836 0.00
7+10 1.4836 0.00

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
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Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	0.80	99.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.85	229.59

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 0.800(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 0.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.000	0.343	0.587	0.202
65.0	45.0	0.621	0.000	0.621	0.380	0.236
56.0	36.0	0.706	0.900	0.134	0.032	0.004
					Sum (F) =	0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.125	0.442	0.112	0.01
2	0.17	1.30	0.125	0.442	0.112	0.01
3	0.25	1.10	0.106	0.442	0.095	0.01
4	0.33	1.50	0.144	0.442	0.130	0.01
5	0.42	1.50	0.144	0.442	0.130	0.01
6	0.50	1.80	0.173	0.442	0.155	0.02
7	0.58	1.50	0.144	0.442	0.130	0.01
8	0.67	1.80	0.173	0.442	0.155	0.02
9	0.75	1.80	0.173	0.442	0.155	0.02
10	0.83	1.50	0.144	0.442	0.130	0.01
11	0.92	1.60	0.154	0.442	0.138	0.02
12	1.00	1.80	0.173	0.442	0.155	0.02
13	1.08	2.20	0.211	0.442	0.190	0.02
14	1.17	2.20	0.211	0.442	0.190	0.02
15	1.25	2.20	0.211	0.442	0.190	0.02
16	1.33	2.00	0.192	0.442	0.173	0.02
17	1.42	2.60	0.249	0.442	0.225	0.02
18	1.50	2.70	0.259	0.442	0.233	0.03
19	1.58	2.40	0.230	0.442	0.207	0.02
20	1.67	2.70	0.259	0.442	0.233	0.03
21	1.75	3.30	0.317	0.442	0.285	0.03
22	1.83	3.10	0.297	0.442	0.268	0.03
23	1.92	2.90	0.278	0.442	0.250	0.03
24	2.00	3.00	0.288	0.442	0.259	0.03
25	2.08	3.10	0.297	0.442	0.268	0.03
26	2.17	4.20	0.403	0.442	0.363	0.04
27	2.25	5.00	0.480	0.442	---	0.04
28	2.33	3.50	0.336	0.442	0.302	0.03
29	2.42	6.80	0.652	0.442	---	0.21
30	2.50	7.30	0.700	0.442	---	0.26
31	2.58	8.20	0.787	0.442	---	0.34
32	2.67	5.90	0.566	0.442	---	0.12
33	2.75	2.00	0.192	0.442	0.173	0.02
34	2.83	1.80	0.173	0.442	0.155	0.02
35	2.92	1.80	0.173	0.442	0.155	0.02
36	3.00	0.60	0.058	0.442	0.052	0.01
Sum =		100.0			Sum =	1.6

Flood volume = Effective rainfall 0.13(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.66(In)
Total soil loss = 6.876(Ac.Ft)
Total rainfall = 0.80(In)
Flood volume = 60666.5 Cubic Feet
Total soil loss = 299524.2 Cubic Feet

Peak flow rate of this hydrograph = 27.441(CFS)

++

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0008	0.12	Q				
0+10	0.0050	0.60	Q				
0+15	0.0120	1.02	VQ				
0+20	0.0199	1.15	VQ				
0+25	0.0291	1.33	VQ				
0+30	0.0396	1.53	VQ				
0+35	0.0514	1.71	VQ				
0+40	0.0636	1.78	VQ				
0+45	0.0765	1.87	Q				
0+50	0.0900	1.96	Q				
0+55	0.1031	1.91	Q				
1+ 0	0.1162	1.90	QV				
1+ 5	0.1302	2.03	QV				
1+10	0.1457	2.26	QV				
1+15	0.1624	2.43	QV				
1+20	0.1795	2.48	Q V				
1+25	0.1967	2.50	Q V				
1+30	0.2152	2.69	Q V				
1+35	0.2352	2.90	Q V				
1+40	0.2553	2.92	Q V				
1+45	0.2763	3.05	Q V				
1+50	0.2995	3.36	Q V				
1+55	0.3236	3.51	Q V				
2+ 0	0.3476	3.48	Q V				
2+ 5	0.3717	3.50	Q V				
2+10	0.3971	3.68	Q V				
2+15	0.4255	4.12	Q V				
2+20	0.4556	4.37	Q V				
2+25	0.4964	5.92	Q V				
2+30	0.5873	13.21	VQ				
2+35	0.7388	22.00	V Q				
2+40	0.9278	27.44	V Q				
2+45	1.0855	22.89	QV				
2+50	1.1795	13.66	Q V				
2+55	1.2383	8.54	Q V				
3+ 0	1.2818	6.32	Q V				
3+ 5	1.3136	4.62	Q V				
3+10	1.3357	3.21	Q V				
3+15	1.3517	2.32	Q V				
3+20	1.3639	1.77	Q V				
3+25	1.3730	1.33	Q V				
3+30	1.3800	1.02	Q V				
3+35	1.3854	0.78	Q V				
3+40	1.3892	0.55	Q V				
3+45	1.3914	0.32	Q V				
3+50	1.3922	0.11	Q V				
3+55	1.3924	0.04	Q V				
4+ 0	1.3926	0.02	Q V				
4+ 5	1.3927	0.01	Q V				
4+10	1.3927	0.00	Q V				

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/11/08 File: 0727E00212.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format

PROLOGIS PARK - MORENO VALLEY
EXISTING CONDITION
HYDROLOGIC ANALYSIS - 2-YEAR

Drainage Area = 124.10(Ac.) = 0.194 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 124.10(Ac.) = 0.194 Sq. Mi.
Length along longest watercourse = 2808.00(Ft.)
Length along longest watercourse measured to centroid = 1755.00(Ft.)
Length along longest watercourse = 0.532 Mi.
Length along longest watercourse measured to centroid = 0.332 Mi.
Difference in elevation = 68.90(Ft.)
Slope along watercourse = 129.5556 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.148 Hr.
Lag time = 8.87 Min.
25% of lag time = 2.22 Min.
40% of lag time = 3.55 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	0.48	59.57

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
124.10	1.20	148.92

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.480(In)
Areal adjustment factor = 99.89 %
Adjusted average point rain = 0.479(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
72.900	86.00	0.000
47.200	65.00	0.000
4.000	56.00	0.900

Total Area Entered = 124.10(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	71.6	0.343	0.000	0.343	0.587	0.202
65.0	45.0	0.621	0.000	0.621	0.380	0.236
56.0	36.0	0.706	0.900	0.134	0.032	0.004
					Sum (F) =	0.442

Area averaged mean soil loss (F) (In/Hr) = 0.442
Minimum soil loss rate ((In/Hr)) = 0.221
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	56.343	7.407	9.263
2	0.167	112.686	31.274	39.114
3	0.250	169.028	27.685	34.625
4	0.333	225.371	11.054	13.825
5	0.417	281.714	6.322	7.907
6	0.500	338.057	4.317	5.399
7	0.583	394.400	3.136	3.923
8	0.667	450.742	2.225	2.783
9	0.750	507.085	1.745	2.182
10	0.833	563.428	1.405	1.758
11	0.917	619.771	1.066	1.333
12	1.000	676.114	0.812	1.016
13	1.083	732.456	0.596	0.745
14	1.167	788.799	0.563	0.705
15	1.250	845.142	0.394	0.492
			Sum = 100.000	Sum= 125.070

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.242	0.442	0.217	0.02
2	0.17	4.30	0.247	0.442	0.223	0.02
3	0.25	5.00	0.288	0.442	0.259	0.03
4	0.33	5.00	0.288	0.442	0.259	0.03
5	0.42	5.80	0.334	0.442	0.300	0.03
6	0.50	6.50	0.374	0.442	0.337	0.04
7	0.58	7.40	0.426	0.442	0.383	0.04
8	0.67	8.60	0.495	0.442	---	0.05
9	0.75	12.30	0.708	0.442	---	0.27
10	0.83	29.10	1.674	0.442	---	1.23
11	0.92	6.80	0.391	0.442	0.352	0.04
12	1.00	5.00	0.288	0.442	0.259	0.03
Sum =		100.0			Sum =	1.8

Flood volume = Effective rainfall 0.15(In)
times area 124.1(Ac.)/[(In)/(Ft.)] = 1.6(Ac.Ft)
Total soil loss = 0.33(In)
Total soil loss = 3.374(Ac.Ft)
Total rainfall = 0.48(In)
Flood volume = 69007.2 Cubic Feet
Total soil loss = 146981.4 Cubic Feet

Peak flow rate of this hydrograph = 59.403(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0015	0.22	Q				
0+10	0.0096	1.17	Q				
0+15	0.0239	2.07	VQ				
0+20	0.0417	2.58	|Q				
0+25	0.0621	2.97	|Q				
0+30	0.0854	3.37	| Q				
0+35	0.1120	3.87	| Q				
0+40	0.1427	4.46	| QV				
0+45	0.1921	7.17	| Q				
0+50	0.3642	25.00	| V	Q			
0+55	0.7734	59.40	|	V			Q
1+ 0	1.1123	49.22	|	|	V	Q	|
1+ 5	1.2665	22.39	|	Q	|	V	|
1+10	1.3580	13.29	|	Q	|	V	|
1+15	1.4189	8.84	|	Q	|	V	|
1+20	1.4626	6.34	|	Q	|	V	|
1+25	1.4940	4.57	|	Q	|	V	|
1+30	1.5185	3.56	|	Q	|	V	|
1+35	1.5379	2.81	|Q	|	|	V	|
1+40	1.5526	2.13	|Q	|	|	|	V|

```
   1+45       1.5637      1.61  |Q        |         |         |        V|
   1+50       1.5720      1.21  Q         |         |         |        V|
   1+55       1.5793      1.06  Q         |         |         |        V|
   2+ 0       1.5838      0.66  Q         |         |         |        V|
   2+ 5       1.5841      0.04  Q         |         |         |        V|
   2+10       1.5842      0.01  Q         |         |         |         V
-------------------------------------------------------------------------
```

Technical Appendix C

Street Capacity Calculations
(Eucalyptus Avenue)

Hydrologic Analysis
Proposed Condition – Rational Method

EUCALYPTUS AVENUE CAPACITY (ROAD SECTION ON ONE SIDE)

****

>>>>STREETFLOW MODEL INPUT INFORMATION<<<<

CONSTANT STREET GRADE(FEET/FEET) = 0.007000
CONSTANT STREET FLOW DEPTH(FEET) = 0.67
AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) = 36.00
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 34.00
INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020000
CONSTANT SYMMETRICAL CURB HEIGHT(FEET) = 0.67
CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) = 2.00
CONSTANT SYMMETRICAL GUTTER-LIP(FEET) = 0.03125
CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) = 0.16700
FLOW ASSUMED TO FILL STREET ON ONE SIDE.

==========

STREET FLOW MODEL RESULTS:

STREET FLOW DEPTH(FEET) = 0.67
HALFSTREET FLOOD WIDTH(FEET) = 25.59
HALFSTREET FLOW(CFS) = 22.26
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.30
PRODUCT OF DEPTH&VELOCITY = 2.21

::::::::::::::::::::::::::::::::Results Options::::::::::::::::::::::::::::::::

EUCALYPTUS AVENUE CAPACITY (ROAD SECTION ON ONE SIDE)

****
>>>>STREETFLOW MODEL INPUT INFORMATION<<<<

CONSTANT STREET GRADE(FEET/FEET) = 0.011100
CONSTANT STREET FLOW DEPTH(FEET) = 0.67
AVERAGE STREETFLOW FRICTION FACTOR(MANNING) = 0.015000
CONSTANT SYMMETRICAL STREET HALF-WIDTH(FEET) = 36.00
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 34.00
INTERIOR STREET CROSSFALL(DECIMAL) = 0.020000
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020000
CONSTANT SYMMETRICAL CURB HEIGHT(FEET) = 0.67
CONSTANT SYMMETRICAL GUTTER-WIDTH(FEET) = 2.00
CONSTANT SYMMETRICAL GUTTER-LIP(FEET) = 0.03125
CONSTANT SYMMETRICAL GUTTER-HIKE(FEET) = 0.16700
FLOW ASSUMED TO FILL STREET ON ONE SIDE.

==========
STREET FLOW MODEL RESULTS:

STREET FLOW DEPTH(FEET) = 0.67
HALFSTREET FLOOD WIDTH(FEET) = 25.59
HALFSTREET FLOW(CFS) = 28.03
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.16
PRODUCT OF DEPTH&VELOCITY = 2.79
::::::::::::::::::::::::::::::::::Results Options::::::::::::::::::::::::::::::::::

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-99 Advanced Engineering Software (aes)
             Ver. 1.5A Release Date: 01/01/99  License ID 1435

                           Analysis prepared by:

                             THIENES ENGINEERING
                           16800 VALLEY VIEW AVENUE
                             LA MIRADA CA 90638
                       PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK                                                           *
* MORENO VALLEY                                                           *
* 100-YEAR HYDROLOGY                                                      *
 ****************************************************************************

  FILE NAME: C:\XDRIVE\2818\2818HYDA.DAT
  TIME/DATE OF STUDY: 13:20 10/28/2008
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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   38.0     33.0    0.020/0.020/0.020    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.*

****************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE   1001.00 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 =   659.00
  UPSTREAM ELEVATION =   1774.49
  DOWNSTREAM ELEVATION =   1770.07
  ELEVATION DIFFERENCE =      4.42
  TC = 0.303*[(  659.00**3)/(     4.42)]**.2 =   11.062
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.795
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8755
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      5.14
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      5.14

****************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE   1001.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.795
```

```
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8755
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     2.69
 TOTAL AREA(ACRES) =      3.20   TOTAL RUNOFF(CFS) =     7.83
 TC(MIN) =  11.06

****************************************************************************
 FLOW PROCESS FROM NODE    1001.00 TO NODE    1002.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1766.07  DOWNSTREAM(FEET) =  1764.20
 FLOW LENGTH(FEET) =   403.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.83
 PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =  12.38
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1002.00 =  1062.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1002.00 TO NODE    1002.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.643
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8744
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     4.20   SUBAREA RUNOFF(CFS) =     9.71
 TOTAL AREA(ACRES) =      7.40   TOTAL RUNOFF(CFS) =    17.54
 TC(MIN) =  12.38

****************************************************************************
 FLOW PROCESS FROM NODE    1002.00 TO NODE    1003.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1764.20  DOWNSTREAM(FEET) =  1764.00
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.46
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     17.54
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  12.47
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1003.00 =  1098.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1003.00 TO NODE    1004.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.633
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6438
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.51
 TOTAL AREA(ACRES) =      7.70   TOTAL RUNOFF(CFS) =    18.04
 TC(MIN) =  12.47

****************************************************************************
 FLOW PROCESS FROM NODE    1004.00 TO NODE    1005.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1762.00  DOWNSTREAM(FEET) =  1761.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.86
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     18.04
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  12.62
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1005.00 =  1178.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1005.00 TO NODE    1005.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.617
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8743
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     2.52
TOTAL AREA(ACRES) =      8.80   TOTAL RUNOFF(CFS) =    20.56
TC(MIN) =  12.62

****************************************************************************
FLOW PROCESS FROM NODE    1005.00 TO NODE    1020.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1761.00  DOWNSTREAM(FEET) =  1758.50
FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  13.52
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     20.56
PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  12.71
LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1020.00 =  1248.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    1020.00 TO NODE    1020.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  12.71
RAINFALL INTENSITY(INCH/HR) =   2.61
TOTAL STREAM AREA(ACRES) =    8.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.56

****************************************************************************
FLOW PROCESS FROM NODE    1010.00 TO NODE    1011.00 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 =   350.00
UPSTREAM ELEVATION =   1777.00
DOWNSTREAM ELEVATION =   1771.37
ELEVATION DIFFERENCE =      5.63
TC = 0.303*[(  350.00**3)/(     5.63)]**.2 =    7.210
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.463
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8791
SOIL CLASSIFICATION IS "B"
SUBAREA RUNOFF(CFS) =     10.35
TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =     10.35

****************************************************************************
FLOW PROCESS FROM NODE    1011.00 TO NODE    1012.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1767.37  DOWNSTREAM(FEET) =  1766.30
FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.36
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     10.35
PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   7.93
LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1012.00 =   581.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    1012.00 TO NODE    1012.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.302
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8783
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =     2.20   SUBAREA RUNOFF(CFS) =     6.38
TOTAL AREA(ACRES) =      5.60   TOTAL RUNOFF(CFS) =    16.73
TC(MIN) =   7.93
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1766.30  DOWNSTREAM(FEET) =  1765.50
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.73
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   8.36
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1013.00 =   745.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.215
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8779
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.55   SUBAREA RUNOFF(CFS) =    7.20
 TOTAL AREA(ACRES) =     8.15   TOTAL RUNOFF(CFS) =   23.93
 TC(MIN) =   8.36

****************************************************************************
 FLOW PROCESS FROM NODE   1013.00 TO NODE   1014.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1765.50  DOWNSTREAM(FEET) =  1764.70
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     23.93
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   8.76
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1014.00 =   909.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1014.00 TO NODE   1014.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.141
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8775
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    5.93
 TOTAL AREA(ACRES) =    10.30   TOTAL RUNOFF(CFS) =   29.85
 TC(MIN) =   8.76

****************************************************************************
 FLOW PROCESS FROM NODE   1014.00 TO NODE   1015.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1764.70  DOWNSTREAM(FEET) =  1763.90
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     29.85
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   9.15
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1015.00 =  1073.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1015.00 TO NODE   1015.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.073
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8771
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    5.80
 TOTAL AREA(ACRES) =    12.45   TOTAL RUNOFF(CFS) =   35.65
 TC(MIN) =   9.15
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    1015.00 TO NODE    1016.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1763.90  DOWNSTREAM(FEET) =  1763.10
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.44
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     35.65
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   9.52
  LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1016.00 =  1237.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    1016.00 TO NODE    1016.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.013
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8768
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    5.68
  TOTAL AREA(ACRES) =    14.60   TOTAL RUNOFF(CFS) =   41.33
  TC(MIN) =   9.52

****************************************************************************
  FLOW PROCESS FROM NODE    1016.00 TO NODE    1017.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1763.10  DOWNSTREAM(FEET) =  1762.30
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.80
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     41.33
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   9.87
  LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1017.00 =  1401.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    1017.00 TO NODE    1017.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.959
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8765
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    5.58
  TOTAL AREA(ACRES) =    16.75   TOTAL RUNOFF(CFS) =   46.90
  TC(MIN) =   9.87

****************************************************************************
  FLOW PROCESS FROM NODE    1017.00 TO NODE    1018.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1762.30  DOWNSTREAM(FEET) =  1761.50
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     46.90
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =  10.22
  LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1018.00 =  1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    1018.00 TO NODE    1018.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.909
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8762
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    4.40   SUBAREA RUNOFF(CFS) =   11.21
  TOTAL AREA(ACRES) =    21.15   TOTAL RUNOFF(CFS) =   58.12
```

```
 TC(MIN) =  10.22

****************************************************************************
 FLOW PROCESS FROM NODE    1018.00 TO NODE    1019.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1761.50  DOWNSTREAM(FEET) =  1759.50
 FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.54
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     58.12
 PIPE TRAVEL TIME(MIN.) =   1.22    Tc(MIN.) =  11.43
 LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1019.00 =  2115.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1019.00 TO NODE    1019.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.750
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8752
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.90   SUBAREA RUNOFF(CFS) =    4.57
 TOTAL AREA(ACRES) =    23.05   TOTAL RUNOFF(CFS) =   62.69
 TC(MIN) =  11.43

****************************************************************************
 FLOW PROCESS FROM NODE    1019.00 TO NODE    1020.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1759.50  DOWNSTREAM(FEET) =  1758.50
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.69
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     62.69
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =  11.80
 LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1020.00 =  2305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1020.00 TO NODE    1020.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  11.80
 RAINFALL INTENSITY(INCH/HR) =   2.71
 TOTAL STREAM AREA(ACRES) =   23.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     62.69

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        20.56     12.71         2.608          8.80
     2        62.69     11.80         2.707         23.05

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        81.78     11.80         2.707
     2        80.96     12.71         2.608

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     81.78   Tc(MIN.) =   11.80
 TOTAL AREA(ACRES) =     31.85
 LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1020.00 =  2305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1020.00 TO NODE    1021.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1758.50  DOWNSTREAM(FEET) =  1756.00
FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.87
ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     81.78
PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =  12.22
LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1021.00 =  2585.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   1021.00 TO NODE   1021.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.659
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8746
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    4.19
TOTAL AREA(ACRES) =    33.65   TOTAL RUNOFF(CFS) =   85.96
TC(MIN) =  12.22

****************************************************************************
FLOW PROCESS FROM NODE   1021.00 TO NODE   1022.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1756.00  DOWNSTREAM(FEET) =  1755.00
FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.98
ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     85.96
PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =  12.36
LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1022.00 =  2685.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   1021.00 TO NODE   1022.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.644
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8745
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.23
TOTAL AREA(ACRES) =    33.75   TOTAL RUNOFF(CFS) =   86.19
TC(MIN) =  12.36

****************************************************************************
FLOW PROCESS FROM NODE   1022.00 TO NODE   1023.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1755.00  DOWNSTREAM(FEET) =  1746.00
FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  16.49
ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     86.19
PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =  12.78
LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1023.00 =  3095.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   1023.00 TO NODE   1042.00 IS CODE =  10
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE   1030.00 TO NODE   1031.00 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 =   360.00
 UPSTREAM ELEVATION =   1767.50
 DOWNSTREAM ELEVATION =   1756.00
 ELEVATION DIFFERENCE =     11.50
 TC = 0.303*[(  360.00**3)/(    11.50)]**.2 =    6.357
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.688
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8801
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      6.17
 TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =      6.17

****************************************************************************
 FLOW PROCESS FROM NODE   1031.00 TO NODE   1032.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1752.00  DOWNSTREAM(FEET) =  1751.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.00
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.17
 PIPE TRAVEL TIME(MIN.) =   3.89    Tc(MIN.) =  10.25
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1032.00 =  1060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1032.00 TO NODE   1032.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.904
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8761
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.55   SUBAREA RUNOFF(CFS) =    1.40
 TOTAL AREA(ACRES) =     2.45   TOTAL RUNOFF(CFS) =    7.57
 TC(MIN) =  10.25

****************************************************************************
 FLOW PROCESS FROM NODE   1032.00 TO NODE   1033.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1751.00  DOWNSTREAM(FEET) =  1749.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.57
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =  10.68
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1033.00 =  1240.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1033.00 TO NODE   1033.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.845
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8758
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    4.49
 TOTAL AREA(ACRES) =     4.25   TOTAL RUNOFF(CFS) =   12.05
 TC(MIN) =  10.68

****************************************************************************
 FLOW PROCESS FROM NODE   1033.00 TO NODE   1034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1749.00  DOWNSTREAM(FEET) =  1747.50
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.05
 PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =  11.57
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1034.00 =  1550.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1034.00 TO NODE   1034.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.733
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8751
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     3.40   SUBAREA RUNOFF(CFS) =     8.13
 TOTAL AREA(ACRES) =      7.65   TOTAL RUNOFF(CFS) =    20.18
 TC(MIN) =  11.57

****************************************************************************
 FLOW PROCESS FROM NODE   1034.00 TO NODE   1041.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1747.50  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.19
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.18
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =  12.31
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1041.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1041.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.31
 RAINFALL INTENSITY(INCH/HR) =   2.65
 TOTAL STREAM AREA(ACRES) =    7.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.18

****************************************************************************
 FLOW PROCESS FROM NODE   1040.00 TO NODE   1041.00 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 =   522.00
 UPSTREAM ELEVATION =   1769.28
 DOWNSTREAM ELEVATION =   1764.93
 ELEVATION DIFFERENCE =      4.35
 TC = 0.303*[(  522.00**3)/(     4.35)]**.2 =    9.649
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.993
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8767
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =     19.42
 TOTAL AREA(ACRES) =      7.40   TOTAL RUNOFF(CFS) =     19.42

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1041.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.65
 RAINFALL INTENSITY(INCH/HR) =   2.99
 TOTAL STREAM AREA(ACRES) =    7.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.42

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        20.18     12.31         2.649          7.65
     2        19.42      9.65         2.993          7.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        35.23      9.65        2.993
     2        37.37     12.31        2.649

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     37.37   Tc(MIN.) =   12.31
 TOTAL AREA(ACRES) =      15.05
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1041.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1042.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.50  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.93
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     37.37
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  12.40
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1042.00 =  1920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        35.23      9.73        2.980        15.05
     2        37.37     12.40        2.640        15.05
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1042.00 =  1920.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        86.19     12.78        2.601        33.75
     2        85.22     13.69        2.513        33.75
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE   1042.00 =     0.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1      100.89       9.73        2.980
     2      121.00      12.40        2.640
     3      123.00      12.78        2.601
     4      120.78      13.69        2.513

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    123.00   Tc(MIN.) =   12.78
 TOTAL AREA(ACRES) =     48.80

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.601
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6416
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     3.10   SUBAREA RUNOFF(CFS) =     5.17
 TOTAL AREA(ACRES) =    51.90   TOTAL RUNOFF(CFS) =  128.18
 TC(MIN) =  12.78

****************************************************************************
 FLOW PROCESS FROM NODE   1043.00 TO NODE   1054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1742.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.48
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    128.18
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  12.93
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1054.00 =  2060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1054.00 TO NODE   1054.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.93
 RAINFALL INTENSITY(INCH/HR) =   2.59
 TOTAL STREAM AREA(ACRES) =   51.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    128.18

****************************************************************************
 FLOW PROCESS FROM NODE   1050.00 TO NODE   1051.00 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 =  1050.00
 UPSTREAM ELEVATION =   1768.50
 DOWNSTREAM ELEVATION =   1756.10
 ELEVATION DIFFERENCE =     12.40
 TC = 0.303*[( 1050.00**3)/(    12.40)]**.2 =   11.902
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.695
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8748
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      2.83
 TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      2.83

****************************************************************************
 FLOW PROCESS FROM NODE   1051.00 TO NODE   1052.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1756.10  DOWNSTREAM ELEVATION(FEET) = 1749.00
 STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.35
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.41
   HALFSTREET FLOOD WIDTH(FEET) =   12.83
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.37
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
 STREET FLOW TRAVEL TIME(MIN.) =   6.41   Tc(MIN.) =  18.31
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.173
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8707
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    3.03
 TOTAL AREA(ACRES) =    2.80      PEAK FLOW RATE(CFS) =      5.86

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  14.57
 FLOW VELOCITY(FEET/SEC.) =  2.53   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1052.00 =  1960.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE   1052.00 TO NODE   1053.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1744.00
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.86
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  18.43
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1053.00 =  2015.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1053.00 TO NODE   1053.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.165
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8707
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.00   SUBAREA RUNOFF(CFS) =    7.54
 TOTAL AREA(ACRES) =     6.80   TOTAL RUNOFF(CFS) =   13.40
 TC(MIN) =  18.43

****************************************************************************
 FLOW PROCESS FROM NODE   1053.00 TO NODE   1054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.51
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.40
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =  18.77
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1054.00 =  2205.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1054.00 TO NODE   1054.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  18.77
 RAINFALL INTENSITY(INCH/HR) =   2.15
 TOTAL STREAM AREA(ACRES) =    6.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.40

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1       107.05      9.89         2.956         51.90
     1       126.27     12.55         2.624         51.90
     1       128.18     12.93         2.586         51.90
     1       125.73     13.85         2.498         51.90
     2        13.40     18.77         2.146          6.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1       114.11      9.89         2.956
     2       135.23     12.55         2.624
     3       137.41     12.93         2.586
     4       135.61     13.85         2.498
     5       121.38     18.77         2.146

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    137.41   Tc(MIN.) =   12.93
 TOTAL AREA(ACRES) =     58.70
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1054.00 =  2205.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    1054.00 TO NODE    1055.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1740.00  DOWNSTREAM(FEET) =  1737.50
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.80
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    137.41
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =  13.81
  LONGEST FLOWPATH FROM NODE    1050.00 TO NODE    1055.00 =  2725.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     58.70  TC(MIN.) =     13.81
  PEAK FLOW RATE(CFS)    =    137.41
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)
  1      114.11       10.84
  2      135.23       13.44
  3      137.41       13.81
  4      135.61       14.73
  5      121.38       19.68
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-99 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK                                                           *
* MORENO VALLEY                                                           *
* 100-YEAR HYDROLOGY                                                      *
 *************************************************************************

  FILE NAME: C:\XDRIVE\2818\2818HYDB.DAT
  TIME/DATE OF STUDY: 15:25 05/12/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5001
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE   2000.00 TO NODE   2001.00 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 =   705.00
  UPSTREAM ELEVATION =   1757.36
  DOWNSTREAM ELEVATION =   1748.16
  ELEVATION DIFFERENCE =      9.20
  TC = 0.303*[(  705.00**3)/(     9.20)]**.2 =     9.948
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.948
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8764
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =     13.17
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =     13.17

****************************************************************************
  FLOW PROCESS FROM NODE   2001.00 TO NODE   2002.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1745.40  DOWNSTREAM(FEET) =  1745.00
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     13.17
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =  10.22
  LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2002.00 =   796.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2002.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.909
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8762
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.55
  TOTAL AREA(ACRES) =     6.10   TOTAL RUNOFF(CFS) =   15.72
  TC(MIN) =  10.22

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1744.84
  FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.16
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     15.72
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =  10.27
```

```
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2003.00 =   818.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2003.00 TO NODE   2004.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.901
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6612
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.38
 TOTAL AREA(ACRES) =     6.30   TOTAL RUNOFF(CFS) =   16.11
 TC(MIN) =  10.27

****************************************************************************
 FLOW PROCESS FROM NODE   2004.00 TO NODE   2034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.36  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =   168.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.49
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.11
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =  10.49
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2034.00 =   986.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2010.00 TO NODE   2011.00 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 =   329.00
 UPSTREAM ELEVATION =   1762.74
 DOWNSTREAM ELEVATION =   1755.30
 ELEVATION DIFFERENCE =      7.44
 TC = 0.303*[(  329.00**3)/(     7.44)]**.2 =    6.570
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.627
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8798
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      2.87
 TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      2.87

****************************************************************************
 FLOW PROCESS FROM NODE   2011.00 TO NODE   2012.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1751.30  DOWNSTREAM(FEET) =  1750.00
  FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.28
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.87
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =   7.48
  LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2012.00 =   562.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2012.00 TO NODE   2012.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.400
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8788
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.60
  TOTAL AREA(ACRES) =     1.10   TOTAL RUNOFF(CFS) =    3.47
  TC(MIN) =   7.48

****************************************************************************
  FLOW PROCESS FROM NODE   2012.00 TO NODE   2013.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1750.00  DOWNSTREAM(FEET) =  1749.50
  FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.35
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.47
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   7.85
  LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2013.00 =   658.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2013.00 TO NODE   2014.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.319
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8784
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    3.79
  TOTAL AREA(ACRES) =     2.40   TOTAL RUNOFF(CFS) =    7.26
  TC(MIN) =   7.85

****************************************************************************
  FLOW PROCESS FROM NODE   2013.00 TO NODE   2014.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.319
```

```
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6841
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.68
 TOTAL AREA(ACRES) =      2.70   TOTAL RUNOFF(CFS) =     7.94
 TC(MIN) =    7.85

****************************************************************************
 FLOW PROCESS FROM NODE    2014.00 TO NODE    2024.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1748.50  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS    8.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.93
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.94
 PIPE TRAVEL TIME(MIN.) =    0.11    Tc(MIN.) =    7.96
 LONGEST FLOWPATH FROM NODE    2010.00 TO NODE    2024.00 =    738.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    2024.00 TO NODE    2024.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.96
 RAINFALL INTENSITY(INCH/HR) =    3.30
 TOTAL STREAM AREA(ACRES) =     2.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.94

****************************************************************************
 FLOW PROCESS FROM NODE    2020.00 TO NODE    2021.00 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 =    496.00
 UPSTREAM ELEVATION =    1765.66
 DOWNSTREAM ELEVATION =    1752.39
 ELEVATION DIFFERENCE =      13.27
 TC = 0.303*[(  496.00**3)/(    13.27)]**.2 =     7.487
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.398
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8788
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =     15.23
 TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =     15.23

****************************************************************************
 FLOW PROCESS FROM NODE    2021.00 TO NODE    2022.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1748.00  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   622.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     15.23
 PIPE TRAVEL TIME(MIN.) =   1.82    Tc(MIN.) =   9.31
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2022.00 =  1118.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2022.00 TO NODE   2022.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.048
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8770
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    3.70   SUBAREA RUNOFF(CFS) =    9.89
 TOTAL AREA(ACRES) =     8.80   TOTAL RUNOFF(CFS) =   25.12
 TC(MIN) =   9.31

****************************************************************************
 FLOW PROCESS FROM NODE   2022.00 TO NODE   2023.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.50  DOWNSTREAM(FEET) =  1745.30
 FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.56
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     25.12
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   9.35
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2023.00 =  1141.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2023.00 TO NODE   2023.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.040
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8769
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.80
 TOTAL AREA(ACRES) =     9.10   TOTAL RUNOFF(CFS) =   25.92
 TC(MIN) =   9.35

****************************************************************************
 FLOW PROCESS FROM NODE   2023.00 TO NODE   2024.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.30  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.012
```

```
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.06
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     25.92
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   9.36
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2024.00 =  1152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2024.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.36
 RAINFALL INTENSITY(INCH/HR) =   3.04
 TOTAL STREAM AREA(ACRES) =    9.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.92

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)     (ACRE)
     1         7.94      7.96         3.296          2.70
     2        25.92      9.36         3.038          9.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        29.97      7.96        3.296
     2        33.24      9.36        3.038

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     33.24   Tc(MIN.) =    9.36
 TOTAL AREA(ACRES) =     11.80
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2024.00 =  1152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2025.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.25
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     33.24
 PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =  10.38
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2025.00 =  1717.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2025.00 TO NODE   2025.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.885
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8760
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.60   SUBAREA RUNOFF(CFS) =   11.63
 TOTAL AREA(ACRES) =    16.40   TOTAL RUNOFF(CFS) =   44.87
 TC(MIN) =  10.38

****************************************************************************
 FLOW PROCESS FROM NODE   2025.00 TO NODE   2026.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1740.00  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =   218.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     44.87
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =  10.86
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2026.00 =  1935.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2026.00 TO NODE   2033.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  10.86
 RAINFALL INTENSITY(INCH/HR) =   2.82
 TOTAL STREAM AREA(ACRES) =   16.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     44.87

****************************************************************************
 FLOW PROCESS FROM NODE   2030.00 TO NODE   2031.00 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 =   334.00
 UPSTREAM ELEVATION =   1751.50
 DOWNSTREAM ELEVATION =   1746.64
 ELEVATION DIFFERENCE =      4.86
 TC = 0.303*[(  334.00**3)/(     4.86)]**.2 =    7.219
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.460
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8791
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      3.65
 TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      3.65

****************************************************************************
```

```
 FLOW PROCESS FROM NODE   2031.00 TO NODE   2032.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1742.64  DOWNSTREAM(FEET) =  1739.60
 FLOW LENGTH(FEET) =    13.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.10
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.65
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   7.23
 LONGEST FLOWPATH FROM NODE   2030.00 TO NODE   2032.00 =   347.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2032.00 TO NODE   2033.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   7.23
 RAINFALL INTENSITY(INCH/HR) =   3.46
 TOTAL STREAM AREA(ACRES) =    1.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.65

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        42.45      9.50         3.016         16.40
     1        44.87     10.86         2.822         16.40
     2         3.65      7.23         3.457          1.20

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        35.96      7.23         3.457
     2        45.64      9.50         3.016
     3        47.84     10.86         2.822

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     47.84   Tc(MIN.) =   10.86
 TOTAL AREA(ACRES) =     17.60
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2033.00 =  1935.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2033.00 TO NODE   2033.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.822
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6563
```

```
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.80   SUBAREA RUNOFF(CFS) =     1.48
 TOTAL AREA(ACRES) =    18.40   TOTAL RUNOFF(CFS) =   49.33
 TC(MIN) =  10.86

****************************************************************************
 FLOW PROCESS FROM NODE   2033.00 TO NODE   2034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1739.60  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.46
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     49.33
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  11.00
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2034.00 =  2018.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        37.87      7.39        3.421        18.40
     2        47.25      9.65        2.992        18.40
     3        49.33     11.00        2.803        18.40
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2034.00 =  2018.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        16.11     10.49        2.870         6.30
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2034.00 =   986.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       49.21       7.39        3.421
     2       62.07       9.65        2.992
     3       63.15      10.49        2.870
     4       65.06      11.00        2.803

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     65.06   Tc(MIN.) =   11.00
 TOTAL AREA(ACRES) =     24.70

****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    2034.00 TO NODE    2035.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1739.00  DOWNSTREAM(FEET) =  1730.00
  FLOW LENGTH(FEET) =   476.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.50
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     65.06
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =  11.55
  LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2035.00 =  2494.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    2035.00 TO NODE    2035.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.736
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8751
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    6.50   SUBAREA RUNOFF(CFS) =   15.56
  TOTAL AREA(ACRES) =    31.20   TOTAL RUNOFF(CFS) =   80.62
  TC(MIN) =  11.55

****************************************************************************
  FLOW PROCESS FROM NODE    2035.00 TO NODE    2073.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1730.00  DOWNSTREAM(FEET) =  1722.00
  FLOW LENGTH(FEET) =   485.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.46
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     80.62
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =  12.11
  LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2073.00 =  2979.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    2073.00 TO NODE    2073.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    2040.00 TO NODE    2041.00 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 =   313.00
 UPSTREAM ELEVATION =   1756.60
 DOWNSTREAM ELEVATION =   1749.02
 ELEVATION DIFFERENCE =      7.58
 TC = 0.303*[(  313.00**3)/(     7.58)]**.2 =    6.353
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8801
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      3.57
 TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      3.57

****************************************************************************
 FLOW PROCESS FROM NODE   2041.00 TO NODE   2042.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1746.52  DOWNSTREAM(FEET) =  1745.90
 FLOW LENGTH(FEET) =   273.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.21
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.57
 PIPE TRAVEL TIME(MIN.) =   1.42    Tc(MIN.) =   7.77
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2042.00 =   586.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2042.00 TO NODE   2042.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.336
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8785
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.29
 TOTAL AREA(ACRES) =     1.20   TOTAL RUNOFF(CFS) =     3.86
 TC(MIN) =   7.77

****************************************************************************
 FLOW PROCESS FROM NODE   2042.00 TO NODE   2043.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.90  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.12
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.86
 PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   8.82
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2043.00 =   783.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2043.00 TO NODE   2056.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
================================================================================
  UPSTREAM NODE ELEVATION(FEET) =    1745.50
  DOWNSTREAM NODE ELEVATION(FEET) =    1741.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =    268.00
  "V" GUTTER WIDTH(FEET) =    3.00    GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.013    MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =    1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.912
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8762
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    3.26
  AVERAGE FLOW DEPTH(FEET) =    0.34    FLOOD WIDTH(FEET) =    18.57
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =    1.37    Tc(MIN.) =  10.19
  SUBAREA AREA(ACRES) =     2.00        SUBAREA RUNOFF(CFS) =     5.10
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =     3.20          PEAK FLOW RATE(CFS) =        8.97

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.37    FLOOD WIDTH(FEET) =    21.60
  FLOW VELOCITY(FEET/SEC.) =    3.47    DEPTH*VELOCITY(FT*FT/SEC) =    1.28
  LONGEST FLOWPATH FROM NODE    2040.00 TO NODE    2056.00 =  1051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    2056.00 TO NODE    2056.00 IS CODE =    1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  10.19
  RAINFALL INTENSITY(INCH/HR) =    2.91
  TOTAL STREAM AREA(ACRES) =     3.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.97

****************************************************************************
  FLOW PROCESS FROM NODE    2051.00 TO NODE    2051.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =     5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.158
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       0.37
  TOTAL AREA(ACRES) =       0.10    TOTAL RUNOFF(CFS) =       0.37

****************************************************************************
  FLOW PROCESS FROM NODE    2051.00 TO NODE    2052.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  1744.70  DOWNSTREAM(FEET) =  1744.50
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.41
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.37
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   5.27
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2052.00 =   307.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2052.00 TO NODE   2052.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.050
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8815
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.36
 TOTAL AREA(ACRES) =     0.20   TOTAL RUNOFF(CFS) =    0.72
 TC(MIN) =   5.27

****************************************************************************
 FLOW PROCESS FROM NODE   2052.00 TO NODE   2053.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.50  DOWNSTREAM(FEET) =  1744.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.69
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.72
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   6.01
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2053.00 =   427.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2053.00 TO NODE   2053.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.792
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8805
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    1.00
 TOTAL AREA(ACRES) =     0.50   TOTAL RUNOFF(CFS) =    1.73
 TC(MIN) =   6.01

****************************************************************************
 FLOW PROCESS FROM NODE   2053.00 TO NODE   2054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.00  DOWNSTREAM(FEET) =  1743.00
```

```
 FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.86
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.73
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   6.73
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2054.00 =   594.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2054.00 TO NODE   2054.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.583
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8796
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.63
 TOTAL AREA(ACRES) =     0.70   TOTAL RUNOFF(CFS) =     2.36
 TC(MIN) =   6.73

****************************************************************************
 FLOW PROCESS FROM NODE   2054.00 TO NODE   2055.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1743.00  DOWNSTREAM(FEET) =  1742.60
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.96
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.36
 PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   7.66
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2055.00 =   759.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2055.00 TO NODE   2056.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1742.60
 DOWNSTREAM NODE ELEVATION(FEET) =   1741.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   168.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.120
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8774
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.69
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.31
 AVERAGE FLOW DEPTH(FEET) =   0.34   FLOOD WIDTH(FEET) =   18.89
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   8.88
 SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =     4.65
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
```

```
 TOTAL AREA(ACRES) =    2.40          PEAK FLOW RATE(CFS) =       7.01

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.38   FLOOD WIDTH(FEET) =   22.72
 FLOW VELOCITY(FEET/SEC.) =   2.48   DEPTH*VELOCITY(FT*FT/SEC) =   0.94
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2056.00 =   927.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2056.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   8.88
 RAINFALL INTENSITY(INCH/HR) =   3.12
 TOTAL STREAM AREA(ACRES) =    2.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.01

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.97    10.19        2.912          3.20
     2        7.01     8.88        3.120          2.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       14.82     8.88        3.120
     2       15.51    10.19        2.912

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     15.51   Tc(MIN.) =   10.19
 TOTAL AREA(ACRES) =      5.60
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2056.00 =  1051.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2057.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1741.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1739.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.606
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8742
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     23.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.63
```

```
 AVERAGE FLOW DEPTH(FEET) =   0.56   FLOOD WIDTH(FEET) =   41.24
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =  12.72
 SUBAREA AREA(ACRES) =    6.60       SUBAREA RUNOFF(CFS) =   15.04
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =   12.20         PEAK FLOW RATE(CFS) =      30.55

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.61   FLOOD WIDTH(FEET) =   46.03
 FLOW VELOCITY(FEET/SEC.) =   2.82   DEPTH*VELOCITY(FT*FT/SEC) =   1.73
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2057.00 =  1451.00 FEET.
 ** PEAK FLOW RATE TABLE **
 STREAM   RUNOFF       Tc
 NUMBER    (CFS)     (MIN.)
    1       30.74      11.38
    2       30.56      12.70
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =    30.74  Tc(MIN.) =  11.38

****************************************************************************
 FLOW PROCESS FROM NODE   2057.00 TO NODE   2058.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1739.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1737.94
 CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.605
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8742
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     38.37
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.06
 AVERAGE FLOW DEPTH(FEET) =   0.65   FLOOD WIDTH(FEET) =   49.54
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.36   Tc(MIN.) =  12.74
 SUBAREA AREA(ACRES) =    6.70       SUBAREA RUNOFF(CFS) =   15.26
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =   18.90         PEAK FLOW RATE(CFS) =      46.00

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.68   FLOOD WIDTH(FEET) =   53.22
 FLOW VELOCITY(FEET/SEC.) =   3.19   DEPTH*VELOCITY(FT*FT/SEC) =   2.19
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2058.00 =  1701.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2058.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1732.94  DOWNSTREAM(FEET) =  1723.20
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.21
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     46.00
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.84
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2073.00 =  1836.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.84
 RAINFALL INTENSITY(INCH/HR) =   2.59
 TOTAL STREAM AREA(ACRES) =   18.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     46.00

****************************************************************************
 FLOW PROCESS FROM NODE   2070.00 TO NODE   2071.00 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 =   749.00
 UPSTREAM ELEVATION =   1751.30
 DOWNSTREAM ELEVATION =   1734.43
 ELEVATION DIFFERENCE =     16.87
 TC = 0.303*[(  749.00**3)/(    16.87)]**.2 =    9.138
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.076
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8771
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =     10.79
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =     10.79

****************************************************************************
 FLOW PROCESS FROM NODE   2071.00 TO NODE   2072.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1734.43  DOWNSTREAM ELEVATION(FEET) = 1728.90
 STREET LENGTH(FEET) =   346.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.93
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   17.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =  10.55
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.863
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8759
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.50      SUBAREA RUNOFF(CFS) =    6.27
  TOTAL AREA(ACRES) =    6.50        PEAK FLOW RATE(CFS) =      17.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  19.47
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   2.35
  LONGEST FLOWPATH FROM NODE   2070.00 TO NODE   2072.00 =  1095.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2072.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1725.70  DOWNSTREAM(FEET) =  1723.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     17.06
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =  11.71
  LONGEST FLOWPATH FROM NODE   2070.00 TO NODE   2073.00 =  1545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.71
  RAINFALL INTENSITY(INCH/HR) =   2.72
  TOTAL STREAM AREA(ACRES) =    6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.06

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1        46.00     12.84         2.595         18.90
      1        45.06     14.18         2.469         18.90
      2        17.06     11.71         2.717          6.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
```

```
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        59.01     11.71        2.717
      2        62.29     12.84        2.595
      3        60.56     14.18        2.469

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.29   Tc(MIN.) =   12.84
  TOTAL AREA(ACRES) =      25.40
  LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2073.00 =  1836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.595
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8741
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     2.49
  TOTAL AREA(ACRES) =     26.50   TOTAL RUNOFF(CFS) =    64.78
  TC(MIN) =  12.84

****************************************************************************
  FLOW PROCESS FROM NODE   2073.00 TO NODE   2074.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1723.20  DOWNSTREAM(FEET) =  1722.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.10
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     64.78
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.94
  LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2074.00 =  1916.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
      1        61.62     11.81        2.705        26.50
      2        64.78     12.94        2.584        26.50
      3        62.93     14.28        2.460        26.50
  LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2074.00 =  1916.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
      1        68.01      8.56        3.178        31.20
      2        78.64     10.77        2.833        31.20
      3        79.07     11.60        2.729        31.20
```

```
     4        80.62     12.11        2.672        31.20
  LONGEST FLOWPATH FROM NODE       0.00 TO NODE    2074.00 =      0.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF        Tc       INTENSITY
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
      1      112.67        8.56         3.178
      2      134.82       10.77         2.833
      3      139.60       11.60         2.729
      4      140.26       11.81         2.705
      5      141.48       12.11         2.672
      6      142.76       12.94         2.584
      7      137.17       14.28         2.460

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     142.76   Tc(MIN.) =    12.94
  TOTAL AREA(ACRES) =      57.70

****************************************************************************
  FLOW PROCESS FROM NODE    2074.00 TO NODE    2074.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    2074.00 TO NODE    2074.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.584
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6404
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     4.70   SUBAREA RUNOFF(CFS) =     7.78
  TOTAL AREA(ACRES) =     62.40   TOTAL RUNOFF(CFS) =  150.54
  TC(MIN) =  12.94
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      62.40  TC(MIN.) =      12.94
  PEAK FLOW RATE(CFS)    =     150.54
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)
  1       122.78        8.56
  2       143.57       10.77
  3       147.95       11.60
  4       148.51       11.81
  5       149.59       12.11
  6       150.54       12.94
  7       144.47       14.28
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-99 Advanced Engineering Software (aes)
             Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK                                                           *
* MORENO VALLEY                                                           *
* 10-YEAR HYDROLOGY                                                       *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\HYDA10.DAT
  TIME/DATE OF STUDY: 13:24 10/28/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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   38.0     33.0    0.020/0.020/0.020   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.*

**************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE   1001.00 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 =   659.00
  UPSTREAM ELEVATION =   1774.49
  DOWNSTREAM ELEVATION =   1770.07
  ELEVATION DIFFERENCE =      4.42
  TC = 0.303*[(  659.00**3)/(     4.42)]**.2 =   11.062
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.930
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8683
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      3.52
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      3.52

**************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE   1001.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
--------------------------------------------------------------------------
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.930
```

```
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8683
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     1.84
 TOTAL AREA(ACRES) =      3.20   TOTAL RUNOFF(CFS) =     5.36
 TC(MIN) =  11.06

****************************************************************************
 FLOW PROCESS FROM NODE    1001.00 TO NODE    1002.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1766.07  DOWNSTREAM(FEET) =  1764.20
 FLOW LENGTH(FEET) =   403.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.64
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.36
 PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =  12.51
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1002.00 =  1062.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1002.00 TO NODE    1002.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.815
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8671
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     4.20   SUBAREA RUNOFF(CFS) =     6.61
 TOTAL AREA(ACRES) =      7.40   TOTAL RUNOFF(CFS) =    11.97
 TC(MIN) =  12.51

****************************************************************************
 FLOW PROCESS FROM NODE    1002.00 TO NODE    1003.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1764.20  DOWNSTREAM(FEET) =  1764.00
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.97
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.61
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1003.00 =  1098.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1003.00 TO NODE    1004.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.808
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5698
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.31
 TOTAL AREA(ACRES) =      7.70   TOTAL RUNOFF(CFS) =    12.28
 TC(MIN) =  12.61

****************************************************************************
 FLOW PROCESS FROM NODE    1004.00 TO NODE    1005.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1762.00  DOWNSTREAM(FEET) =  1761.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.00
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.28
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  12.78
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1005.00 =  1178.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1005.00 TO NODE    1005.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.796
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8668
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     1.71
  TOTAL AREA(ACRES) =      8.80   TOTAL RUNOFF(CFS) =    13.99
  TC(MIN) =  12.78

****************************************************************************
  FLOW PROCESS FROM NODE    1005.00 TO NODE    1020.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1761.00  DOWNSTREAM(FEET) =  1758.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     13.99
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  12.87
  LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1020.00 =  1248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    1020.00 TO NODE    1020.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.87
  RAINFALL INTENSITY(INCH/HR) =   1.79
  TOTAL STREAM AREA(ACRES) =    8.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.99

****************************************************************************
  FLOW PROCESS FROM NODE    1010.00 TO NODE    1011.00 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 =   350.00
  UPSTREAM ELEVATION =   1777.00
  DOWNSTREAM ELEVATION =   1771.37
  ELEVATION DIFFERENCE =      5.63
  TC = 0.303*[(  350.00**3)/(     5.63)]**.2 =    7.210
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.391
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8726
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      7.09
  TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =      7.09

****************************************************************************
  FLOW PROCESS FROM NODE    1011.00 TO NODE    1012.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1767.37  DOWNSTREAM(FEET) =  1766.30
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.85
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.09
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   8.00
  LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1012.00 =   581.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    1012.00 TO NODE    1012.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.270
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8716
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     2.20   SUBAREA RUNOFF(CFS) =     4.35
  TOTAL AREA(ACRES) =      5.60   TOTAL RUNOFF(CFS) =    11.45
  TC(MIN) =   8.00
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1766.30  DOWNSTREAM(FEET) =  1765.50
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.45
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   8.50
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1013.00 =   745.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.203
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8710
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.55   SUBAREA RUNOFF(CFS) =    4.89
 TOTAL AREA(ACRES) =     8.15   TOTAL RUNOFF(CFS) =   16.34
 TC(MIN) =   8.50

****************************************************************************
 FLOW PROCESS FROM NODE   1013.00 TO NODE   1014.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1765.50  DOWNSTREAM(FEET) =  1764.70
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.34
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   8.95
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1014.00 =   909.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1014.00 TO NODE   1014.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.146
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8705
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    4.02
 TOTAL AREA(ACRES) =    10.30   TOTAL RUNOFF(CFS) =   20.35
 TC(MIN) =   8.95

****************************************************************************
 FLOW PROCESS FROM NODE   1014.00 TO NODE   1015.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1764.70  DOWNSTREAM(FEET) =  1763.90
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.35
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   9.37
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1015.00 =  1073.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1015.00 TO NODE   1015.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.097
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    3.92
 TOTAL AREA(ACRES) =    12.45   TOTAL RUNOFF(CFS) =   24.28
 TC(MIN) =   9.37
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1015.00 TO NODE   1016.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1763.90  DOWNSTREAM(FEET) =  1763.10
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     24.28
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   9.77
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1016.00 =  1237.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1016.00 TO NODE   1016.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.054
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8696
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    3.84
 TOTAL AREA(ACRES) =    14.60   TOTAL RUNOFF(CFS) =   28.12
 TC(MIN) =   9.77

****************************************************************************
 FLOW PROCESS FROM NODE   1016.00 TO NODE   1017.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1763.10  DOWNSTREAM(FEET) =  1762.30
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.00
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     28.12
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =  10.16
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1017.00 =  1401.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1017.00 TO NODE   1017.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.014
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8692
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    3.76
 TOTAL AREA(ACRES) =    16.75   TOTAL RUNOFF(CFS) =   31.88
 TC(MIN) =  10.16

****************************************************************************
 FLOW PROCESS FROM NODE   1017.00 TO NODE   1018.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1762.30  DOWNSTREAM(FEET) =  1761.50
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.32
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     31.88
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =  10.53
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1018.00 =  1565.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1018.00 TO NODE   1018.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.978
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8688
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.40   SUBAREA RUNOFF(CFS) =    7.56
 TOTAL AREA(ACRES) =    21.15   TOTAL RUNOFF(CFS) =   39.44
```

```
 TC(MIN) =  10.53

****************************************************************************
 FLOW PROCESS FROM NODE   1018.00 TO NODE   1019.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1761.50  DOWNSTREAM(FEET) =  1759.50
 FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.82
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     39.44
 PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =  11.88
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1019.00 =  2115.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1019.00 TO NODE   1019.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.863
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8676
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.90   SUBAREA RUNOFF(CFS) =    3.07
 TOTAL AREA(ACRES) =    23.05   TOTAL RUNOFF(CFS) =   42.52
 TC(MIN) =  11.88

****************************************************************************
 FLOW PROCESS FROM NODE   1019.00 TO NODE   1020.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1759.50  DOWNSTREAM(FEET) =  1758.50
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.09
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     42.52
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =  12.27
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1020.00 =  2305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1020.00 TO NODE   1020.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.27
 RAINFALL INTENSITY(INCH/HR) =   1.83
 TOTAL STREAM AREA(ACRES) =   23.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     42.52

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        13.99     12.87         1.789          8.80
     2        42.52     12.27         1.833         23.05

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        55.85     12.27         1.833
     2        55.50     12.87         1.789

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     55.85   Tc(MIN.) =   12.27
 TOTAL AREA(ACRES) =     31.85
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1020.00 =  2305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1020.00 TO NODE   1021.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1758.50  DOWNSTREAM(FEET) =  1756.00
FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   9.85
ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     55.85
PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =  12.74
LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1021.00 =  2585.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   1021.00 TO NODE   1021.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.798
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8669
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    2.81
TOTAL AREA(ACRES) =    33.65   TOTAL RUNOFF(CFS) =   58.66
TC(MIN) =  12.74

****************************************************************************
FLOW PROCESS FROM NODE   1021.00 TO NODE   1022.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1756.00  DOWNSTREAM(FEET) =  1755.00
FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.15
ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     58.66
PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  12.89
LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1022.00 =  2685.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   1021.00 TO NODE   1022.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.788
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8667
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.15
TOTAL AREA(ACRES) =    33.75   TOTAL RUNOFF(CFS) =   58.81
TC(MIN) =  12.89

****************************************************************************
FLOW PROCESS FROM NODE   1022.00 TO NODE   1023.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1755.00  DOWNSTREAM(FEET) =  1746.00
FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  14.83
ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     58.81
PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =  13.35
LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1023.00 =  3095.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   1023.00 TO NODE   1042.00 IS CODE =  10
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE   1030.00 TO NODE   1031.00 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 =   360.00
 UPSTREAM ELEVATION =   1767.50
 DOWNSTREAM ELEVATION =   1756.00
 ELEVATION DIFFERENCE =     11.50
 TC = 0.303*[(  360.00**3)/(    11.50)]**.2 =    6.357
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.547
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8738
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      4.23
 TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =      4.23

****************************************************************************
 FLOW PROCESS FROM NODE   1031.00 TO NODE   1032.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1752.00  DOWNSTREAM(FEET) =  1751.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.81
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.23
 PIPE TRAVEL TIME(MIN.) =   4.15    Tc(MIN.) =  10.50
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1032.00 =  1060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1032.00 TO NODE   1032.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.981
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8689
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.55   SUBAREA RUNOFF(CFS) =     0.95
 TOTAL AREA(ACRES) =     2.45   TOTAL RUNOFF(CFS) =     5.17
 TC(MIN) =  10.50

****************************************************************************
 FLOW PROCESS FROM NODE   1032.00 TO NODE   1033.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1751.00  DOWNSTREAM(FEET) =  1749.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.17
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =  10.97
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1033.00 =  1240.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1033.00 TO NODE   1033.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.938
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8684
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.80   SUBAREA RUNOFF(CFS) =     3.03
 TOTAL AREA(ACRES) =     4.25   TOTAL RUNOFF(CFS) =     8.20
 TC(MIN) =  10.97

****************************************************************************
 FLOW PROCESS FROM NODE   1033.00 TO NODE   1034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1749.00  DOWNSTREAM(FEET) =  1747.50
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      8.20
 PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =  11.96
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1034.00 =  1550.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1034.00 TO NODE   1034.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.856
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8675
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     3.40   SUBAREA RUNOFF(CFS) =     5.48
 TOTAL AREA(ACRES) =      7.65   TOTAL RUNOFF(CFS) =    13.68
 TC(MIN) =  11.96

****************************************************************************
 FLOW PROCESS FROM NODE   1034.00 TO NODE   1041.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1747.50  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.68
 PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =  12.77
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1041.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1041.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.77
 RAINFALL INTENSITY(INCH/HR) =   1.80
 TOTAL STREAM AREA(ACRES) =    7.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.68

****************************************************************************
 FLOW PROCESS FROM NODE   1040.00 TO NODE   1041.00 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 =   522.00
 UPSTREAM ELEVATION =   1769.28
 DOWNSTREAM ELEVATION =   1764.93
 ELEVATION DIFFERENCE =      4.35
 TC = 0.303*[(  522.00**3)/(     4.35)]**.2 =    9.649
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.067
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8697
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =     13.30
 TOTAL AREA(ACRES) =      7.40   TOTAL RUNOFF(CFS) =     13.30

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1041.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.65
 RAINFALL INTENSITY(INCH/HR) =   2.07
 TOTAL STREAM AREA(ACRES) =    7.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.30

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1         13.68     12.77         1.796          7.65
    2         13.30      9.65         2.067          7.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        23.64      9.65        2.067
     2        25.24     12.77        1.796

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      25.24   Tc(MIN.) =   12.77
 TOTAL AREA(ACRES) =      15.05
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1041.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1042.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.50  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.08
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     25.24
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  12.86
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1042.00 =  1920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY     AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
     1        23.64      9.75        2.056       15.05
     2        25.24     12.86        1.790       15.05
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1042.00 =  1920.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY     AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
     1        58.81     13.35        1.757       33.75
     2        58.39     13.95        1.718       33.75
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE   1042.00 =     0.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       66.57      9.75        2.056
     2       81.91     12.86        1.790
     3       83.59     13.35        1.757
     4       82.62     13.95        1.718

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      83.59   Tc(MIN.) =   13.35
 TOTAL AREA(ACRES) =      48.80

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.757
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5638
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     3.10   SUBAREA RUNOFF(CFS) =     3.07
 TOTAL AREA(ACRES) =     51.90   TOTAL RUNOFF(CFS) =    86.66
 TC(MIN) =  13.35

****************************************************************************
 FLOW PROCESS FROM NODE   1043.00 TO NODE   1054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1742.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.05
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     86.66
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  13.52
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1054.00 =  2060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1054.00 TO NODE   1054.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.52
 RAINFALL INTENSITY(INCH/HR) =   1.75
 TOTAL STREAM AREA(ACRES) =   51.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     86.66

****************************************************************************
 FLOW PROCESS FROM NODE   1050.00 TO NODE   1051.00 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 =  1050.00
 UPSTREAM ELEVATION =   1768.50
 DOWNSTREAM ELEVATION =   1756.10
 ELEVATION DIFFERENCE =     12.40
 TC = 0.303*[( 1050.00**3)/(    12.40)]**.2 =   11.902
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.861
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8676
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      1.94
 TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      1.94

****************************************************************************
 FLOW PROCESS FROM NODE   1051.00 TO NODE   1052.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1756.10  DOWNSTREAM ELEVATION(FEET) = 1749.00
 STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.96
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   10.83
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
 STREET FLOW TRAVEL TIME(MIN.) =   6.99   Tc(MIN.) =  18.89
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.477
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8627
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    2.04
 TOTAL AREA(ACRES) =    2.80      PEAK FLOW RATE(CFS) =       3.98

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  12.38
 FLOW VELOCITY(FEET/SEC.) =  2.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1052.00 =  1960.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    1052.00 TO NODE    1053.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1744.00
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.58
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.98
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =  19.03
 LONGEST FLOWPATH FROM NODE    1050.00 TO NODE    1053.00 =  2015.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1053.00 TO NODE    1053.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.471
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8626
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.00   SUBAREA RUNOFF(CFS) =    5.08
 TOTAL AREA(ACRES) =     6.80   TOTAL RUNOFF(CFS) =    9.05
 TC(MIN) =  19.03

****************************************************************************
 FLOW PROCESS FROM NODE    1053.00 TO NODE    1054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.05
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =  19.40
 LONGEST FLOWPATH FROM NODE    1050.00 TO NODE    1054.00 =  2205.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1054.00 TO NODE    1054.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  19.40
 RAINFALL INTENSITY(INCH/HR) =   1.46
 TOTAL STREAM AREA(ACRES) =    6.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.05

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        70.37      9.92         2.038         51.90
     1        85.06     13.03         1.778         51.90
     1        86.66     13.52         1.746         51.90
     1        85.60     14.12         1.708         51.90
     2         9.05     19.40         1.457          6.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        75.00      9.92         2.038
     2        91.14     13.03         1.778
     3        92.97     13.52         1.746
     4        92.19     14.12         1.708
     5        82.08     19.40         1.457

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     92.97   Tc(MIN.) =   13.52
 TOTAL AREA(ACRES) =     58.70
 LONGEST FLOWPATH FROM NODE    1050.00 TO NODE    1054.00 =  2205.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1054.00 TO NODE   1055.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1740.00  DOWNSTREAM(FEET) =  1737.50
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.80
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     92.97
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =  14.50
  LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1055.00 =  2725.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     58.70  TC(MIN.) =     14.50
  PEAK FLOW RATE(CFS)    =     92.97
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)
  1       75.00       10.95
  2       91.14       14.02
  3       92.97       14.50
  4       92.19       15.11
  5       82.08       20.40
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-99 Advanced Engineering Software (aes)
             Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK                                                           *
* MORENO VALLEY                                                           *
* 10-YEAR HYDROLOGY                                                       *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\HYDB10.DAT
  TIME/DATE OF STUDY: 12:47 05/08/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.828
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE   2000.00 TO NODE   2001.00 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 =   705.00
  UPSTREAM ELEVATION =   1757.36
  DOWNSTREAM ELEVATION =   1748.16
  ELEVATION DIFFERENCE =      9.20
  TC = 0.303*[(  705.00**3)/(     9.20)]**.2 =    9.948
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.035
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8694
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      9.02
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      9.02

****************************************************************************
  FLOW PROCESS FROM NODE   2001.00 TO NODE   2002.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1745.40  DOWNSTREAM(FEET) =  1745.00
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.02
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =  10.24
  LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2002.00 =   796.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2002.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.006
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8691
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    1.74
  TOTAL AREA(ACRES) =     6.10   TOTAL RUNOFF(CFS) =   10.77
  TC(MIN) =  10.24

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1744.84
  FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.52
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     10.77
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  10.30
```

```
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2003.00 =   818.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2003.00 TO NODE   2004.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.000
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5907
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.24
 TOTAL AREA(ACRES) =     6.30   TOTAL RUNOFF(CFS) =   11.00
 TC(MIN) =  10.30

****************************************************************************
 FLOW PROCESS FROM NODE   2004.00 TO NODE   2034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.36  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =   168.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.24
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.00
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =  10.55
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2034.00 =   986.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2010.00 TO NODE   2011.00 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 =   329.00
 UPSTREAM ELEVATION =   1762.74
 DOWNSTREAM ELEVATION =   1755.30
 ELEVATION DIFFERENCE =      7.44
 TC = 0.303*[(  329.00**3)/(     7.44)]**.2 =    6.570
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.505
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8735
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      1.97
 TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      1.97

****************************************************************************
 FLOW PROCESS FROM NODE   2011.00 TO NODE   2012.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1751.30  DOWNSTREAM(FEET) =  1750.00
  FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.86
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.97
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   7.58
  LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2012.00 =   562.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2012.00 TO NODE   2012.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.333
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8721
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =     1.10   TOTAL RUNOFF(CFS) =    2.38
  TC(MIN) =   7.58

****************************************************************************
  FLOW PROCESS FROM NODE   2012.00 TO NODE   2013.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1750.00  DOWNSTREAM(FEET) =  1749.50
  FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.90
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.38
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   7.98
  LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2013.00 =   658.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2013.00 TO NODE   2014.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.272
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8716
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    2.57
  TOTAL AREA(ACRES) =     2.40   TOTAL RUNOFF(CFS) =    4.95
  TC(MIN) =   7.98

****************************************************************************
  FLOW PROCESS FROM NODE   2013.00 TO NODE   2014.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.272
```

```
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6160
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.42
 TOTAL AREA(ACRES) =      2.70   TOTAL RUNOFF(CFS) =     5.37
 TC(MIN) =   7.98

****************************************************************************
 FLOW PROCESS FROM NODE   2014.00 TO NODE   2024.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1748.50  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.78
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.37
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   8.11
 LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2024.00 =   738.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2024.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   8.11
 RAINFALL INTENSITY(INCH/HR) =   2.25
 TOTAL STREAM AREA(ACRES) =    2.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.37

****************************************************************************
 FLOW PROCESS FROM NODE   2020.00 TO NODE   2021.00 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 =   496.00
 UPSTREAM ELEVATION =   1765.66
 DOWNSTREAM ELEVATION =   1752.39
 ELEVATION DIFFERENCE =     13.27
 TC = 0.303*[(  496.00**3)/(    13.27)]**.2 =    7.487
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.346
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8722
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =     10.44
 TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =     10.44

****************************************************************************
 FLOW PROCESS FROM NODE   2021.00 TO NODE   2022.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1748.00  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   622.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.44
 PIPE TRAVEL TIME(MIN.) =   2.06    Tc(MIN.) =   9.55
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2022.00 =  1118.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2022.00 TO NODE   2022.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.077
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8698
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    3.70   SUBAREA RUNOFF(CFS) =    6.69
 TOTAL AREA(ACRES) =     8.80   TOTAL RUNOFF(CFS) =   17.12
 TC(MIN) =   9.55

****************************************************************************
 FLOW PROCESS FROM NODE   2022.00 TO NODE   2023.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.50  DOWNSTREAM(FEET) =  1745.30
 FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.82
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     17.12
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.60
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2023.00 =  1141.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2023.00 TO NODE   2023.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.072
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8698
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.54
 TOTAL AREA(ACRES) =     9.10   TOTAL RUNOFF(CFS) =   17.66
 TC(MIN) =   9.60

****************************************************************************
 FLOW PROCESS FROM NODE   2023.00 TO NODE   2024.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.30  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.012
```

```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.81
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     17.66
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.61
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2024.00 =  1152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2024.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.61
 RAINFALL INTENSITY(INCH/HR) =   2.07
 TOTAL STREAM AREA(ACRES) =    9.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.66

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         5.37      8.11         2.255          2.70
     2        17.66      9.61         2.070          9.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        20.27      8.11         2.255
     2        22.60      9.61         2.070

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     22.60   Tc(MIN.) =    9.61
 TOTAL AREA(ACRES) =     11.80
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2024.00 =  1152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2025.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.46
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     22.60
 PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =  10.73
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2025.00 =  1717.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2025.00 TO NODE   2025.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.960
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8687
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     4.60   SUBAREA RUNOFF(CFS) =     7.83
 TOTAL AREA(ACRES) =     16.40   TOTAL RUNOFF(CFS) =    30.43
 TC(MIN) =  10.73

****************************************************************************
 FLOW PROCESS FROM NODE   2025.00 TO NODE   2026.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1740.00  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =   218.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     30.43
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =  11.24
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2026.00 =  1935.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2026.00 TO NODE   2033.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  11.24
 RAINFALL INTENSITY(INCH/HR) =   1.91
 TOTAL STREAM AREA(ACRES) =   16.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.43

****************************************************************************
 FLOW PROCESS FROM NODE   2030.00 TO NODE   2031.00 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 =   334.00
 UPSTREAM ELEVATION =   1751.50
 DOWNSTREAM ELEVATION =   1746.64
 ELEVATION DIFFERENCE =      4.86
 TC = 0.303*[(  334.00**3)/(     4.86)]**.2 =    7.219
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.390
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8726
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      2.50
 TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      2.50

****************************************************************************
```

```
 FLOW PROCESS FROM NODE   2031.00 TO NODE   2032.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1742.64  DOWNSTREAM(FEET) =  1739.60
 FLOW LENGTH(FEET) =    13.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.26
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.50
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   7.23
 LONGEST FLOWPATH FROM NODE   2030.00 TO NODE   2032.00 =   347.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2032.00 TO NODE   2033.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   7.23
 RAINFALL INTENSITY(INCH/HR) =   2.39
 TOTAL STREAM AREA(ACRES) =    1.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.50

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        28.71      9.81         2.050         16.40
     1        30.43     11.24         1.915         16.40
     2         2.50      7.23         2.387          1.20

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        23.68      7.23         2.387
     2        30.86      9.81         2.050
     3        32.43     11.24         1.915

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     32.43   Tc(MIN.) =   11.24
 TOTAL AREA(ACRES) =     17.60
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2033.00 =  1935.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2033.00 TO NODE   2033.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.915
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5817
```

```
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.80   SUBAREA RUNOFF(CFS) =     0.89
 TOTAL AREA(ACRES) =     18.40   TOTAL RUNOFF(CFS) =    33.33
 TC(MIN) =  11.24

****************************************************************************
 FLOW PROCESS FROM NODE   2033.00 TO NODE   2034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1739.60  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     33.33
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  11.40
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2034.00 =  2018.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        24.87      7.41        2.359        18.40
     2        31.83      9.97        2.033        18.40
     3        33.33     11.40        1.901        18.40
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2034.00 =  2018.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        11.00     10.55        1.977         6.30
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2034.00 =   986.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       32.60       7.41        2.359
     2       42.23       9.97        2.033
     3       41.95      10.55        1.977
     4       43.91      11.40        1.901

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     43.91   Tc(MIN.) =   11.40
 TOTAL AREA(ACRES) =     24.70

****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2035.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1739.00  DOWNSTREAM(FEET) =  1730.00
 FLOW LENGTH(FEET) =   476.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.89
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     43.91
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =  12.02
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2035.00 =  2494.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2035.00 TO NODE   2035.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.852
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8675
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    6.50   SUBAREA RUNOFF(CFS) =   10.44
 TOTAL AREA(ACRES) =    31.20   TOTAL RUNOFF(CFS) =   54.35
 TC(MIN) =  12.02

****************************************************************************
 FLOW PROCESS FROM NODE   2035.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1730.00  DOWNSTREAM(FEET) =  1722.00
 FLOW LENGTH(FEET) =   485.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.91
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     54.35
 PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =  12.65
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2073.00 =  2979.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2040.00 TO NODE   2041.00 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 =   313.00
 UPSTREAM ELEVATION =   1756.60
 DOWNSTREAM ELEVATION =   1749.02
 ELEVATION DIFFERENCE =      7.58
 TC = 0.303*[(  313.00**3)/(     7.58)]**.2 =    6.353
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.547
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8738
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      2.45
 TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      2.45

****************************************************************************
 FLOW PROCESS FROM NODE   2041.00 TO NODE   2042.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1746.52  DOWNSTREAM(FEET) =  1745.90
 FLOW LENGTH(FEET) =   273.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.91
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.45
 PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   7.92
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2042.00 =   586.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2042.00 TO NODE   2042.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.282
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8717
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.20
 TOTAL AREA(ACRES) =     1.20   TOTAL RUNOFF(CFS) =    2.65
 TC(MIN) =   7.92

****************************************************************************
 FLOW PROCESS FROM NODE   2042.00 TO NODE   2043.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.90  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.82
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.65
 PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   9.08
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2043.00 =   783.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2043.00 TO NODE   2056.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
==========================================================================
  UPSTREAM NODE ELEVATION(FEET) =    1745.50
  DOWNSTREAM NODE ELEVATION(FEET) =    1741.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =    268.00
  "V" GUTTER WIDTH(FEET) =    3.00    GUTTER HIKE(FEET) =   0.170
  PAVEMENT LIP(FEET) =   0.013    MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =    1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.979
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8689
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    3.11
  AVERAGE FLOW DEPTH(FEET) =    0.30    FLOOD WIDTH(FEET) =    15.21
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =    1.44    Tc(MIN.) =  10.52
  SUBAREA AREA(ACRES) =     2.00        SUBAREA RUNOFF(CFS) =     3.44
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =     3.20          PEAK FLOW RATE(CFS) =        6.09

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.33    FLOOD WIDTH(FEET) =    18.09
  FLOW VELOCITY(FEET/SEC.) =    3.23    DEPTH*VELOCITY(FT*FT/SEC) =    1.08
  LONGEST FLOWPATH FROM NODE    2040.00 TO NODE    2056.00 =  1051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    2056.00 TO NODE    2056.00 IS CODE =    1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  10.52
  RAINFALL INTENSITY(INCH/HR) =   1.98
  TOTAL STREAM AREA(ACRES) =    3.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.09

****************************************************************************
  FLOW PROCESS FROM NODE    2051.00 TO NODE    2051.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.872
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8759
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    2051.00 TO NODE    2052.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  1744.70  DOWNSTREAM(FEET) =  1744.50
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.13
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.25
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   5.31
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2052.00 =   307.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2052.00 TO NODE   2052.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.788
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8754
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.24
 TOTAL AREA(ACRES) =     0.20   TOTAL RUNOFF(CFS) =    0.50
 TC(MIN) =   5.31

****************************************************************************
 FLOW PROCESS FROM NODE   2052.00 TO NODE   2053.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.50  DOWNSTREAM(FEET) =  1744.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.41
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.50
 PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   6.13
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2053.00 =   427.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2053.00 TO NODE   2053.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.593
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8741
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.68
 TOTAL AREA(ACRES) =     0.50   TOTAL RUNOFF(CFS) =    1.18
 TC(MIN) =   6.13

****************************************************************************
 FLOW PROCESS FROM NODE   2053.00 TO NODE   2054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.00  DOWNSTREAM(FEET) =  1743.00
```

```
 FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.51
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.18
 PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   6.93
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2054.00 =   594.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2054.00 TO NODE   2054.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.439
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8730
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.43
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =     1.60
 TC(MIN) =   6.93

****************************************************************************
 FLOW PROCESS FROM NODE   2054.00 TO NODE   2055.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1743.00  DOWNSTREAM(FEET) =  1742.60
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.65
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.60
 PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =   7.96
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2055.00 =   759.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2055.00 TO NODE   2056.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1742.60
 DOWNSTREAM NODE ELEVATION(FEET) =   1741.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   168.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.113
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8702
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.17
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
 AVERAGE FLOW DEPTH(FEET) =   0.31   FLOOD WIDTH(FEET) =   15.37
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.26   Tc(MIN.) =   9.23
 SUBAREA AREA(ACRES) =     1.70      SUBAREA RUNOFF(CFS) =     3.13
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
```

```
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =     2.40          PEAK FLOW RATE(CFS) =        4.73

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.34   FLOOD WIDTH(FEET) =   18.89
 FLOW VELOCITY(FEET/SEC.) =   2.33   DEPTH*VELOCITY(FT*FT/SEC) =   0.79
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2056.00 =   927.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2056.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.23
 RAINFALL INTENSITY(INCH/HR) =   2.11
 TOTAL STREAM AREA(ACRES) =    2.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.73

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         6.09     10.52         1.979          3.20
     2         4.73      9.23         2.113          2.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        10.07      9.23        2.113
     2        10.52     10.52        1.979

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     10.52   Tc(MIN.) =   10.52
 TOTAL AREA(ACRES) =      5.60
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2056.00 =  1051.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2057.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1741.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1739.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.762
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8664
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.56
```

```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    2.42
 AVERAGE FLOW DEPTH(FEET) =    0.50   FLOOD WIDTH(FEET) =   35.17
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =    2.76   Tc(MIN.) =  13.27
 SUBAREA AREA(ACRES) =     6.60       SUBAREA RUNOFF(CFS) =   10.08
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =    12.20         PEAK FLOW RATE(CFS) =      20.59

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOOD WIDTH(FEET) =   39.32
 FLOW VELOCITY(FEET/SEC.) =    2.58   DEPTH*VELOCITY(FT*FT/SEC) =   1.41
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2057.00 =  1451.00 FEET.
 ** PEAK FLOW RATE TABLE **
 STREAM   RUNOFF       Tc
 NUMBER    (CFS)     (MIN.)
    1       20.70      11.96
    2       20.59      13.28
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =     20.70  Tc(MIN.) =  11.96

****************************************************************************
 FLOW PROCESS FROM NODE   2057.00 TO NODE   2058.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1739.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1737.94
 CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.751
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8663
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     25.78
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.80
 AVERAGE FLOW DEPTH(FEET) =   0.58   FLOOD WIDTH(FEET) =   42.36
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =  13.45
 SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =   10.16
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =    18.90         PEAK FLOW RATE(CFS) =      30.86

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.61   FLOOD WIDTH(FEET) =   45.55
 FLOW VELOCITY(FEET/SEC.) =    2.91   DEPTH*VELOCITY(FT*FT/SEC) =   1.77
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2058.00 =  1701.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2058.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1732.94  DOWNSTREAM(FEET) =  1723.20
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.012
```

```
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.13
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     30.86
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  13.56
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2073.00 =  1836.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.56
 RAINFALL INTENSITY(INCH/HR) =   1.74
 TOTAL STREAM AREA(ACRES) =   18.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.86

****************************************************************************
 FLOW PROCESS FROM NODE   2070.00 TO NODE   2071.00 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 =   749.00
 UPSTREAM ELEVATION =   1751.30
 DOWNSTREAM ELEVATION =   1734.43
 ELEVATION DIFFERENCE =     16.87
 TC = 0.303*[(  749.00**3)/(    16.87)]**.2 =    9.138
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.124
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8703
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      7.39
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =      7.39

****************************************************************************
 FLOW PROCESS FROM NODE   2071.00 TO NODE   2072.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1734.43  DOWNSTREAM ELEVATION(FEET) = 1728.90
 STREET LENGTH(FEET) =   346.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.53
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.47
  HALFSTREET FLOOD WIDTH(FEET) =   15.41
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.72
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =  10.69
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.963
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8687
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.50      SUBAREA RUNOFF(CFS) =    4.26
 TOTAL AREA(ACRES) =    6.50        PEAK FLOW RATE(CFS) =      11.66

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  16.70
 FLOW VELOCITY(FEET/SEC.) =  3.91   DEPTH*VELOCITY(FT*FT/SEC.) =   1.93
 LONGEST FLOWPATH FROM NODE   2070.00 TO NODE   2072.00 =  1095.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2072.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1725.70  DOWNSTREAM(FEET) =  1723.20
 FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.66
 PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =  11.96
 LONGEST FLOWPATH FROM NODE   2070.00 TO NODE   2073.00 =  1545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  11.96
 RAINFALL INTENSITY(INCH/HR) =   1.86
 TOTAL STREAM AREA(ACRES) =    6.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.66

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        30.86     13.56         1.743         18.90
     1        30.27     14.89         1.663         18.90
     2        11.66     11.96         1.856          6.50

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
```

```
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        38.89     11.96        1.856
     2        41.81     13.56        1.743
     3        40.72     14.89        1.663

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      41.81   Tc(MIN.) =   13.56
 TOTAL AREA(ACRES) =      25.40
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2073.00 =  1836.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.743
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8662
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     1.66
 TOTAL AREA(ACRES) =     26.50   TOTAL RUNOFF(CFS) =    43.47
 TC(MIN) =  13.56

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2074.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1723.20  DOWNSTREAM(FEET) =  1722.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.06
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     43.47
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  13.67
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2074.00 =  1916.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        40.66     12.07        1.847        26.50
     2        43.47     13.67        1.736        26.50
     3        42.30     15.00        1.657        26.50
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2074.00 =  1916.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        45.40      8.71        2.175        31.20
     2        53.37     11.21        1.917        31.20
```

```
     3        52.79     11.79        1.869        31.20
     4        54.35     12.65        1.805        31.20
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE   2074.00 =     0.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
      1      74.74       8.71         2.175
      2      91.13      11.21         1.917
      3      92.50      11.79         1.869
      4      92.83      12.07         1.847
      5      94.57      12.65         1.805
      6      95.75      13.67         1.736
      7      92.19      15.00         1.657

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     95.75   Tc(MIN.) =   13.67
  TOTAL AREA(ACRES) =     57.70

****************************************************************************
  FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.736
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5613
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     4.70   SUBAREA RUNOFF(CFS) =     4.58
  TOTAL AREA(ACRES) =    62.40   TOTAL RUNOFF(CFS) =  100.33
  TC(MIN) =  13.67
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     62.40  TC(MIN.) =     13.67
  PEAK FLOW RATE(CFS)    =    100.33
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)
  1       80.95        8.71
  2       96.38       11.21
  3       97.57       11.79
  4       97.82       12.07
  5       99.40       12.65
  6      100.33       13.67
  7       96.49       15.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARKD                                                          *
* MORENO VALLEY                                                           *
* 5-YEAR HYDROLOGY                                                        *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\HYDA5.DAT
  TIME/DATE OF STUDY: 13:28 10/28/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =     5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =     5.00   1-HOUR INTENSITY(INCH/HOUR) =    0.724
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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   38.0      33.0    0.020/0.020/0.020   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.*

**************************************************************************
  FLOW PROCESS FROM NODE    1000.00 TO NODE    1001.00 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 =   659.00
  UPSTREAM ELEVATION =   1774.49
  DOWNSTREAM ELEVATION =   1770.07
  ELEVATION DIFFERENCE =      4.42
  TC = 0.303*[(  659.00**3)/(     4.42)]**.2 =   11.062
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.686
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8655
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      3.06
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      3.06

**************************************************************************
  FLOW PROCESS FROM NODE    1000.00 TO NODE    1001.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.686
```

```
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8655
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     1.61
 TOTAL AREA(ACRES) =      3.20   TOTAL RUNOFF(CFS) =     4.67
 TC(MIN) =  11.06

****************************************************************************
 FLOW PROCESS FROM NODE    1001.00 TO NODE    1002.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1766.07  DOWNSTREAM(FEET) =  1764.20
 FLOW LENGTH(FEET) =   403.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.50
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.67
 PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =  12.56
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1002.00 =  1062.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1002.00 TO NODE    1002.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.583
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8642
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     4.20   SUBAREA RUNOFF(CFS) =     5.74
 TOTAL AREA(ACRES) =      7.40   TOTAL RUNOFF(CFS) =    10.41
 TC(MIN) =  12.56

****************************************************************************
 FLOW PROCESS FROM NODE    1002.00 TO NODE    1003.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1764.20  DOWNSTREAM(FEET) =  1764.00
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.41
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.66
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1003.00 =  1098.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1003.00 TO NODE    1004.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.576
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5407
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.26
 TOTAL AREA(ACRES) =      7.70   TOTAL RUNOFF(CFS) =    10.67
 TC(MIN) =  12.66

****************************************************************************
 FLOW PROCESS FROM NODE    1004.00 TO NODE    1005.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1762.00  DOWNSTREAM(FEET) =  1761.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.89
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.67
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  12.83
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1005.00 =  1178.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1005.00 TO NODE    1005.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.566
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8639
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     1.49
 TOTAL AREA(ACRES) =      8.80   TOTAL RUNOFF(CFS) =    12.16
 TC(MIN) =  12.83

****************************************************************************
 FLOW PROCESS FROM NODE   1005.00 TO NODE   1020.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1761.00  DOWNSTREAM(FEET) =  1758.50
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.16
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  12.93
 LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1020.00 =  1248.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1020.00 TO NODE   1020.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.93
 RAINFALL INTENSITY(INCH/HR) =   1.56
 TOTAL STREAM AREA(ACRES) =    8.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.16

****************************************************************************
 FLOW PROCESS FROM NODE   1010.00 TO NODE   1011.00 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 =   350.00
 UPSTREAM ELEVATION =   1777.00
 DOWNSTREAM ELEVATION =   1771.37
 ELEVATION DIFFERENCE =      5.63
 TC = 0.303*[(  350.00**3)/(     5.63)]**.2 =    7.210
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.089
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8699
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      6.18
 TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =      6.18

****************************************************************************
 FLOW PROCESS FROM NODE   1011.00 TO NODE   1012.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1767.37  DOWNSTREAM(FEET) =  1766.30
 FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.76
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.18
 PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =   8.02
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1012.00 =   581.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1012.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.981
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8689
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     2.20   SUBAREA RUNOFF(CFS) =     3.79
 TOTAL AREA(ACRES) =      5.60   TOTAL RUNOFF(CFS) =     9.97
 TC(MIN) =   8.02
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1766.30  DOWNSTREAM(FEET) =  1765.50
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.97
 PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   8.52
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1013.00 =   745.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.922
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8682
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.55   SUBAREA RUNOFF(CFS) =    4.25
 TOTAL AREA(ACRES) =     8.15   TOTAL RUNOFF(CFS) =   14.22
 TC(MIN) =   8.52

****************************************************************************
 FLOW PROCESS FROM NODE   1013.00 TO NODE   1014.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1765.50  DOWNSTREAM(FEET) =  1764.70
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.96
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.22
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   8.98
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1014.00 =   909.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1014.00 TO NODE   1014.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.872
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8677
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    3.49
 TOTAL AREA(ACRES) =    10.30   TOTAL RUNOFF(CFS) =   17.71
 TC(MIN) =   8.98

****************************************************************************
 FLOW PROCESS FROM NODE   1014.00 TO NODE   1015.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1764.70  DOWNSTREAM(FEET) =  1763.90
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     17.71
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   9.41
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1015.00 =  1073.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1015.00 TO NODE   1015.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.829
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8672
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    3.41
 TOTAL AREA(ACRES) =    12.45   TOTAL RUNOFF(CFS) =   21.12
 TC(MIN) =   9.41
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1015.00 TO NODE   1016.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1763.90  DOWNSTREAM(FEET) =  1763.10
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.52
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.12
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   9.83
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1016.00 =  1237.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1016.00 TO NODE   1016.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.789
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8668
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    3.33
 TOTAL AREA(ACRES) =    14.60   TOTAL RUNOFF(CFS) =   24.46
 TC(MIN) =   9.83

****************************************************************************
 FLOW PROCESS FROM NODE   1016.00 TO NODE   1017.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1763.10  DOWNSTREAM(FEET) =  1762.30
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.86
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     24.46
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =  10.23
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1017.00 =  1401.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1017.00 TO NODE   1017.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.754
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8663
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    3.27
 TOTAL AREA(ACRES) =    16.75   TOTAL RUNOFF(CFS) =   27.72
 TC(MIN) =  10.23

****************************************************************************
 FLOW PROCESS FROM NODE   1017.00 TO NODE   1018.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1762.30  DOWNSTREAM(FEET) =  1761.50
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     27.72
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =  10.62
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1018.00 =  1565.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1018.00 TO NODE   1018.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.721
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8659
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.40   SUBAREA RUNOFF(CFS) =    6.56
 TOTAL AREA(ACRES) =    21.15   TOTAL RUNOFF(CFS) =   34.28
```

```
 TC(MIN) =  10.62

****************************************************************************
 FLOW PROCESS FROM NODE   1018.00 TO NODE   1019.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1761.50  DOWNSTREAM(FEET) =  1759.50
 FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     34.28
 PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =  11.99
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1019.00 =  2115.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1019.00 TO NODE   1019.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.620
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8647
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.90   SUBAREA RUNOFF(CFS) =    2.66
 TOTAL AREA(ACRES) =    23.05   TOTAL RUNOFF(CFS) =   36.94
 TC(MIN) =  11.99

****************************************************************************
 FLOW PROCESS FROM NODE   1019.00 TO NODE   1020.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1759.50  DOWNSTREAM(FEET) =  1758.50
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.73
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     36.94
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =  12.40
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1020.00 =  2305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1020.00 TO NODE   1020.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.40
 RAINFALL INTENSITY(INCH/HR) =   1.59
 TOTAL STREAM AREA(ACRES) =   23.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.94

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        12.16     12.93         1.560          8.80
     2        36.94     12.40         1.593         23.05

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        48.60     12.40        1.593
     2        48.34     12.93        1.560

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     48.60   Tc(MIN.) =   12.40
 TOTAL AREA(ACRES) =     31.85
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1020.00 =  2305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1020.00 TO NODE   1021.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1758.50  DOWNSTREAM(FEET) =  1756.00
 FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  27.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.35
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     48.60
 PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =  12.90
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1021.00 =  2585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1021.00 TO NODE   1021.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.562
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8639
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    2.43
 TOTAL AREA(ACRES) =    33.65   TOTAL RUNOFF(CFS) =   51.03
 TC(MIN) =  12.90

****************************************************************************
 FLOW PROCESS FROM NODE   1021.00 TO NODE   1022.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1756.00  DOWNSTREAM(FEET) =  1755.00
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.66
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     51.03
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  13.05
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1022.00 =  2685.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1021.00 TO NODE   1022.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.552
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8637
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.13
 TOTAL AREA(ACRES) =    33.75   TOTAL RUNOFF(CFS) =   51.16
 TC(MIN) =  13.05

****************************************************************************
 FLOW PROCESS FROM NODE   1022.00 TO NODE   1023.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1755.00  DOWNSTREAM(FEET) =  1746.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.51
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     51.16
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =  13.52
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1023.00 =  3095.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1023.00 TO NODE   1042.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1030.00 TO NODE   1031.00 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 =   360.00
 UPSTREAM ELEVATION =   1767.50
 DOWNSTREAM ELEVATION =   1756.00
 ELEVATION DIFFERENCE =     11.50
 TC = 0.303*[(  360.00**3)/(    11.50)]**.2 =    6.357
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.225
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8712
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      3.68
 TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =      3.68

****************************************************************************
 FLOW PROCESS FROM NODE   1031.00 TO NODE   1032.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1752.00  DOWNSTREAM(FEET) =  1751.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.67
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.68
 PIPE TRAVEL TIME(MIN.) =   4.36    Tc(MIN.) =  10.72
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1032.00 =  1060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1032.00 TO NODE   1032.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.713
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8658
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.55   SUBAREA RUNOFF(CFS) =     0.82
 TOTAL AREA(ACRES) =      2.45   TOTAL RUNOFF(CFS) =     4.50
 TC(MIN) =  10.72

****************************************************************************
 FLOW PROCESS FROM NODE   1032.00 TO NODE   1033.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1751.00  DOWNSTREAM(FEET) =  1749.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.18
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.50
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =  11.21
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1033.00 =  1240.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1033.00 TO NODE   1033.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.675
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8654
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.80   SUBAREA RUNOFF(CFS) =     2.61
 TOTAL AREA(ACRES) =      4.25   TOTAL RUNOFF(CFS) =     7.11
 TC(MIN) =  11.21

****************************************************************************
 FLOW PROCESS FROM NODE   1033.00 TO NODE   1034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1749.00  DOWNSTREAM(FEET) =  1747.50
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.11
 PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =  12.25
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1034.00 =  1550.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1034.00 TO NODE   1034.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.602
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8644
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     3.40   SUBAREA RUNOFF(CFS) =     4.71
 TOTAL AREA(ACRES) =      7.65   TOTAL RUNOFF(CFS) =   11.82
 TC(MIN) =  12.25

****************************************************************************
 FLOW PROCESS FROM NODE   1034.00 TO NODE   1041.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1747.50  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.82
 PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =  13.11
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1041.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1041.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.11
 RAINFALL INTENSITY(INCH/HR) =   1.55
 TOTAL STREAM AREA(ACRES) =    7.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.82

****************************************************************************
 FLOW PROCESS FROM NODE   1040.00 TO NODE   1041.00 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 =   522.00
 UPSTREAM ELEVATION =   1769.28
 DOWNSTREAM ELEVATION =   1764.93
 ELEVATION DIFFERENCE =      4.35
 TC = 0.303*[(  522.00**3)/(     4.35)]**.2 =    9.649
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.806
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8670
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =     11.58
 TOTAL AREA(ACRES) =      7.40   TOTAL RUNOFF(CFS) =     11.58

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1041.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.65
 RAINFALL INTENSITY(INCH/HR) =   1.81
 TOTAL STREAM AREA(ACRES) =    7.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.58

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        11.82     13.11         1.549          7.65
     2        11.58      9.65         1.806          7.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        20.28      9.65        1.806
     2        21.76     13.11        1.549

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     21.76   Tc(MIN.) =   13.11
 TOTAL AREA(ACRES) =     15.05
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1041.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1042.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.50  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.62
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.76
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  13.20
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1042.00 =  1920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        20.28      9.75        1.796        15.05
     2        21.76     13.20        1.543        15.05
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1042.00 =  1920.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        51.16     13.52        1.525        33.75
     2        50.85     14.05        1.496        33.75
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE   1042.00 =     0.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       57.16      9.75        1.796
     2       71.70     13.20        1.543
     3       72.66     13.52        1.525
     4       71.93     14.05        1.496

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     72.66   Tc(MIN.) =   13.52
 TOTAL AREA(ACRES) =     48.80

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.525
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5335
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     3.10   SUBAREA RUNOFF(CFS) =     2.52
 TOTAL AREA(ACRES) =     51.90   TOTAL RUNOFF(CFS) =    75.18
 TC(MIN) =  13.52

****************************************************************************
 FLOW PROCESS FROM NODE   1043.00 TO NODE   1054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1742.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.46
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     75.18
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  13.70
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1054.00 =  2060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1054.00 TO NODE   1054.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.70
 RAINFALL INTENSITY(INCH/HR) =   1.52
 TOTAL STREAM AREA(ACRES) =   51.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     75.18

****************************************************************************
 FLOW PROCESS FROM NODE   1050.00 TO NODE   1051.00 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 =  1050.00
 UPSTREAM ELEVATION =   1768.50
 DOWNSTREAM ELEVATION =   1756.10
 ELEVATION DIFFERENCE =     12.40
 TC = 0.303*[( 1050.00**3)/(    12.40)]**.2 =   11.902
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.626
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8647
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      1.69
 TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      1.69

****************************************************************************
 FLOW PROCESS FROM NODE   1051.00 TO NODE   1052.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1756.10  DOWNSTREAM ELEVATION(FEET) = 1749.00
 STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   10.19
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
 STREET FLOW TRAVEL TIME(MIN.) =   7.24   Tc(MIN.) =  19.14
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.281
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8595
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    1.76
 TOTAL AREA(ACRES) =    2.80      PEAK FLOW RATE(CFS) =      3.45

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  11.61
 FLOW VELOCITY(FEET/SEC.) =  2.24   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1052.00 =  1960.00 FEET.

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```

```
 FLOW PROCESS FROM NODE   1052.00 TO NODE   1053.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1744.00
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.31
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.45
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  19.29
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1053.00 =  2015.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1053.00 TO NODE   1053.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.277
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8594
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.00   SUBAREA RUNOFF(CFS) =    4.39
 TOTAL AREA(ACRES) =     6.80   TOTAL RUNOFF(CFS) =    7.84
 TC(MIN) =  19.29

****************************************************************************
 FLOW PROCESS FROM NODE   1053.00 TO NODE   1054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.37
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.84
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =  19.67
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1054.00 =  2205.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1054.00 TO NODE   1054.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  19.67
 RAINFALL INTENSITY(INCH/HR) =   1.26
 TOTAL STREAM AREA(ACRES) =    6.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.84

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        60.32      9.93         1.780         51.90
     1        74.27     13.38         1.533         51.90
     1        75.18     13.70         1.515         51.90
     1        74.39     14.23         1.487         51.90
     2         7.84     19.67         1.264          6.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        64.28      9.93         1.780
     2        79.60     13.38         1.533
     3        80.64     13.70         1.515
     4        80.06     14.23         1.487
     5        71.09     19.67         1.264

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     80.64   Tc(MIN.) =   13.70
 TOTAL AREA(ACRES) =     58.70
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1054.00 =  2205.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1054.00 TO NODE   1055.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1740.00  DOWNSTREAM(FEET) =  1737.50
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.44
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     80.64
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =  14.72
  LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1055.00 =  2725.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     58.70  TC(MIN.) =     14.72
  PEAK FLOW RATE(CFS)    =     80.64
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)
  1       64.28       11.01
  2       79.60       14.40
  3       80.64       14.72
  4       80.06       15.25
  5       71.09       20.71
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
              Ver. 1.5A Release Date: 01/01/99  License ID 1435

                              Analysis prepared by:

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                                 LA MIRADA CA 90638
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 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK                                                           *
* MORENO VALLEY                                                           *
* 5-YEAR HYDROLOGY                                                        *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\HYDB5.DAT
  TIME/DATE OF STUDY: 12:47 05/08/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    5.00   1-HOUR INTENSITY(INCH/HOUR) =   0.724
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE   2000.00 TO NODE   2001.00 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 =   705.00
  UPSTREAM ELEVATION =   1757.36
  DOWNSTREAM ELEVATION =   1748.16
  ELEVATION DIFFERENCE =      9.20
  TC = 0.303*[(  705.00**3)/(     9.20)]**.2 =    9.948
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.778
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8666
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      7.86
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      7.86

****************************************************************************
  FLOW PROCESS FROM NODE   2001.00 TO NODE   2002.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1745.40  DOWNSTREAM(FEET) =  1745.00
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.00
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.86
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =  10.25
  LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2002.00 =   796.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2002.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.752
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8663
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    1.52
  TOTAL AREA(ACRES) =     6.10   TOTAL RUNOFF(CFS) =    9.38
  TC(MIN) =  10.25

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1744.84
  FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.38
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  10.31
```

```
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2003.00 =   818.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2003.00 TO NODE   2004.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.747
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5626
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.20
 TOTAL AREA(ACRES) =      6.30   TOTAL RUNOFF(CFS) =     9.57
 TC(MIN) =  10.31

****************************************************************************
 FLOW PROCESS FROM NODE   2004.00 TO NODE   2034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.36  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =   168.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.57
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =  10.57
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2034.00 =   986.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2010.00 TO NODE   2011.00 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 =   329.00
 UPSTREAM ELEVATION =   1762.74
 DOWNSTREAM ELEVATION =   1755.30
 ELEVATION DIFFERENCE =      7.44
 TC = 0.303*[(  329.00**3)/(     7.44)]**.2 =    6.570
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.188
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8709
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      1.72
 TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      1.72

****************************************************************************
 FLOW PROCESS FROM NODE   2011.00 TO NODE   2012.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1751.30  DOWNSTREAM(FEET) =  1750.00
FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   3.76
ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      1.72
PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   7.60
LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2012.00 =   562.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   2012.00 TO NODE   2012.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.034
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8694
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.35
TOTAL AREA(ACRES) =     1.10   TOTAL RUNOFF(CFS) =    2.07
TC(MIN) =   7.60

****************************************************************************
FLOW PROCESS FROM NODE   2012.00 TO NODE   2013.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1750.00  DOWNSTREAM(FEET) =  1749.50
FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   3.80
ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      2.07
PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   8.02
LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2013.00 =   658.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   2013.00 TO NODE   2014.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.980
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8689
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    2.24
TOTAL AREA(ACRES) =     2.40   TOTAL RUNOFF(CFS) =    4.31
TC(MIN) =   8.02

****************************************************************************
FLOW PROCESS FROM NODE   2013.00 TO NODE   2014.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.980
```

```
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5886
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.35
 TOTAL AREA(ACRES) =      2.70   TOTAL RUNOFF(CFS) =     4.66
 TC(MIN) =    8.02

****************************************************************************
 FLOW PROCESS FROM NODE    2014.00 TO NODE    2024.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1748.50  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.43
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.66
 PIPE TRAVEL TIME(MIN.) =    0.13    Tc(MIN.) =    8.15
 LONGEST FLOWPATH FROM NODE    2010.00 TO NODE    2024.00 =    738.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    2024.00 TO NODE    2024.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.15
 RAINFALL INTENSITY(INCH/HR) =    1.96
 TOTAL STREAM AREA(ACRES) =     2.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.66

****************************************************************************
 FLOW PROCESS FROM NODE    2020.00 TO NODE    2021.00 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 =   496.00
 UPSTREAM ELEVATION =   1765.66
 DOWNSTREAM ELEVATION =   1752.39
 ELEVATION DIFFERENCE =     13.27
 TC = 0.303*[(  496.00**3)/(    13.27)]**.2 =    7.487
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.050
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8696
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      9.09
 TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      9.09

****************************************************************************
 FLOW PROCESS FROM NODE    2021.00 TO NODE    2022.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1748.00  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   622.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.09
 PIPE TRAVEL TIME(MIN.) =   2.09    Tc(MIN.) =   9.58
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2022.00 =  1118.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2022.00 TO NODE   2022.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.812
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8670
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    3.70   SUBAREA RUNOFF(CFS) =    5.81
 TOTAL AREA(ACRES) =     8.80   TOTAL RUNOFF(CFS) =   14.90
 TC(MIN) =   9.58

****************************************************************************
 FLOW PROCESS FROM NODE   2022.00 TO NODE   2023.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.50  DOWNSTREAM(FEET) =  1745.30
 FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.90
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.63
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2023.00 =  1141.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2023.00 TO NODE   2023.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.807
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8670
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.47
 TOTAL AREA(ACRES) =     9.10   TOTAL RUNOFF(CFS) =   15.37
 TC(MIN) =   9.63

****************************************************************************
 FLOW PROCESS FROM NODE   2023.00 TO NODE   2024.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.30  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.012
```

```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.61
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     15.37
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.65
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2024.00 =  1152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2024.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.65
 RAINFALL INTENSITY(INCH/HR) =   1.81
 TOTAL STREAM AREA(ACRES) =    9.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.37

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         4.66      8.15         1.964          2.70
     2        15.37      9.65         1.806          9.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        17.65      8.15         1.964
     2        19.65      9.65         1.806

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     19.65   Tc(MIN.) =    9.65
 TOTAL AREA(ACRES) =     11.80
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2024.00 =  1152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2025.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.06
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     19.65
 PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =  10.81
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2025.00 =  1717.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2025.00 TO NODE   2025.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.705
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8658
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.60   SUBAREA RUNOFF(CFS) =    6.79
 TOTAL AREA(ACRES) =    16.40   TOTAL RUNOFF(CFS) =   26.45
 TC(MIN) =  10.81

****************************************************************************
 FLOW PROCESS FROM NODE   2025.00 TO NODE   2026.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1740.00  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =   218.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     26.45
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =  11.35
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2026.00 =  1935.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2026.00 TO NODE   2033.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  11.35
 RAINFALL INTENSITY(INCH/HR) =   1.66
 TOTAL STREAM AREA(ACRES) =   16.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.45

****************************************************************************
 FLOW PROCESS FROM NODE   2030.00 TO NODE   2031.00 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 =   334.00
 UPSTREAM ELEVATION =   1751.50
 DOWNSTREAM ELEVATION =   1746.64
 ELEVATION DIFFERENCE =      4.86
 TC = 0.303*[(  334.00**3)/(     4.86)]**.2 =    7.219
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.088
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8699
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      2.18
 TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      2.18

****************************************************************************
```

```
 FLOW PROCESS FROM NODE   2031.00 TO NODE   2032.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1742.64  DOWNSTREAM(FEET) =  1739.60
 FLOW LENGTH(FEET) =    13.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.60
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.18
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   7.23
 LONGEST FLOWPATH FROM NODE   2030.00 TO NODE   2032.00 =   347.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2032.00 TO NODE   2033.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   7.23
 RAINFALL INTENSITY(INCH/HR) =   2.09
 TOTAL STREAM AREA(ACRES) =    1.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.18

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        24.97      9.88         1.784         16.40
     1        26.45     11.35         1.665         16.40
     2         2.18      7.23         2.086          1.20

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        20.46      7.23         2.086
     2        26.83      9.88         1.784
     3        28.19     11.35         1.665

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     28.19   Tc(MIN.) =   11.35
 TOTAL AREA(ACRES) =     17.60
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2033.00 =  1935.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2033.00 TO NODE   2033.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.665
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5524
```

```
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     0.80   SUBAREA RUNOFF(CFS) =     0.74
  TOTAL AREA(ACRES) =     18.40   TOTAL RUNOFF(CFS) =    28.92
  TC(MIN) =  11.35

****************************************************************************
  FLOW PROCESS FROM NODE   2033.00 TO NODE   2034.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1739.60  DOWNSTREAM(FEET) =  1739.00
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     28.92
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  11.52
  LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2034.00 =  2018.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
      1        21.46      7.41        2.060        18.40
      2        27.64     10.06        1.769        18.40
      3        28.92     11.52        1.653        18.40
  LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2034.00 =  2018.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
      1         9.57     10.57        1.725         6.30
  LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2034.00 =   986.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF        Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1      28.17        7.41        2.060
      2      36.75       10.06        1.769
      3      36.54       10.57        1.725
      4      38.09       11.52        1.653

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     38.09   Tc(MIN.) =   11.52
  TOTAL AREA(ACRES) =     24.70

****************************************************************************
  FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2035.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1739.00  DOWNSTREAM(FEET) =  1730.00
 FLOW LENGTH(FEET) =   476.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.69
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     38.09
 PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =  12.14
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2035.00 =  2494.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2035.00 TO NODE   2035.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.609
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8645
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    6.50   SUBAREA RUNOFF(CFS) =    9.04
 TOTAL AREA(ACRES) =    31.20   TOTAL RUNOFF(CFS) =   47.13
 TC(MIN) =  12.14

****************************************************************************
 FLOW PROCESS FROM NODE   2035.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1730.00  DOWNSTREAM(FEET) =  1722.00
 FLOW LENGTH(FEET) =   485.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.71
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     47.13
 PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =  12.78
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2073.00 =  2979.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2040.00 TO NODE   2041.00 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 =   313.00
 UPSTREAM ELEVATION =   1756.60
 DOWNSTREAM ELEVATION =   1749.02
 ELEVATION DIFFERENCE =      7.58
 TC = 0.303*[(  313.00**3)/(     7.58)]**.2 =    6.353
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.226
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8712
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      2.13
 TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      2.13

****************************************************************************
 FLOW PROCESS FROM NODE   2041.00 TO NODE   2042.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1746.52  DOWNSTREAM(FEET) =  1745.90
 FLOW LENGTH(FEET) =   273.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.83
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.13
 PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =   7.96
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2042.00 =   586.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2042.00 TO NODE   2042.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.988
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8689
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.17
 TOTAL AREA(ACRES) =     1.20   TOTAL RUNOFF(CFS) =     2.31
 TC(MIN) =   7.96

****************************************************************************
 FLOW PROCESS FROM NODE   2042.00 TO NODE   2043.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.90  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.75
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.31
 PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =   9.16
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2043.00 =   783.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2043.00 TO NODE   2056.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
==========================================================================
  UPSTREAM NODE ELEVATION(FEET) =    1745.50
  DOWNSTREAM NODE ELEVATION(FEET) =    1741.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =    268.00
  "V" GUTTER WIDTH(FEET) =    3.00    GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.013    MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =    1.00
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.721
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8659
  SOIL CLASSIFICATION IS "B"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    3.06
  AVERAGE FLOW DEPTH(FEET) =    0.29    FLOOD WIDTH(FEET) =    14.10
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =    1.46    Tc(MIN.) =  10.62
  SUBAREA AREA(ACRES) =     2.00        SUBAREA RUNOFF(CFS) =     2.98
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =     3.20          PEAK FLOW RATE(CFS) =        5.29

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.32    FLOOD WIDTH(FEET) =    16.81
  FLOW VELOCITY(FEET/SEC.) =    3.18    DEPTH*VELOCITY(FT*FT/SEC) =    1.02
  LONGEST FLOWPATH FROM NODE    2040.00 TO NODE    2056.00 =  1051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    2056.00 TO NODE    2056.00 IS CODE =    1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  10.62
  RAINFALL INTENSITY(INCH/HR) =   1.72
  TOTAL STREAM AREA(ACRES) =     3.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.29

****************************************************************************
  FLOW PROCESS FROM NODE    2051.00 TO NODE    2051.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =     5.000
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.509
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8735
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       0.22
  TOTAL AREA(ACRES) =       0.10    TOTAL RUNOFF(CFS) =       0.22

****************************************************************************
  FLOW PROCESS FROM NODE    2051.00 TO NODE    2052.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  1744.70  DOWNSTREAM(FEET) =  1744.50
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.05
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.22
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   5.32
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2052.00 =   307.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2052.00 TO NODE   2052.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.433
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8729
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.21
 TOTAL AREA(ACRES) =     0.20   TOTAL RUNOFF(CFS) =    0.43
 TC(MIN) =   5.32

****************************************************************************
 FLOW PROCESS FROM NODE   2052.00 TO NODE   2053.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.50  DOWNSTREAM(FEET) =  1744.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.33
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.43
 PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   6.17
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2053.00 =   427.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2053.00 TO NODE   2053.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.257
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8715
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.59
 TOTAL AREA(ACRES) =     0.50   TOTAL RUNOFF(CFS) =    1.02
 TC(MIN) =   6.17

****************************************************************************
 FLOW PROCESS FROM NODE   2053.00 TO NODE   2054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.00  DOWNSTREAM(FEET) =  1743.00
```

```
 FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.38
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.02
 PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   7.00
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2054.00 =   594.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2054.00 TO NODE   2054.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.120
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8702
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.37
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =     1.39
 TC(MIN) =   7.00

****************************************************************************
 FLOW PROCESS FROM NODE   2054.00 TO NODE   2055.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1743.00  DOWNSTREAM(FEET) =  1742.60
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.59
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.39
 PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   8.06
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2055.00 =   759.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2055.00 TO NODE   2056.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1742.60
 DOWNSTREAM NODE ELEVATION(FEET) =   1741.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   168.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.834
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8673
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.74
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.17
 AVERAGE FLOW DEPTH(FEET) =   0.30   FLOOD WIDTH(FEET) =   14.26
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =   9.35
 SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =     2.70
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
```

```
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =     2.40          PEAK FLOW RATE(CFS) =       4.10

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.33   FLOOD WIDTH(FEET) =   17.61
 FLOW VELOCITY(FEET/SEC.) =   2.28   DEPTH*VELOCITY(FT*FT/SEC) =   0.75
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2056.00 =   927.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2056.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.35
 RAINFALL INTENSITY(INCH/HR) =   1.83
 TOTAL STREAM AREA(ACRES) =    2.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.10

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         5.29     10.62         1.721          3.20
     2         4.10      9.35         1.834          2.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         8.75      9.35         1.834
     2         9.13     10.62         1.721

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.13   Tc(MIN.) =   10.62
 TOTAL AREA(ACRES) =       5.60
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2056.00 =  1051.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2057.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1741.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1739.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.529
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8634
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     13.50
```

```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.36
 AVERAGE FLOW DEPTH(FEET) =   0.48   FLOOD WIDTH(FEET) =   33.10
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.83   Tc(MIN.) =  13.44
 SUBAREA AREA(ACRES) =    6.60       SUBAREA RUNOFF(CFS) =    8.72
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =   12.20         PEAK FLOW RATE(CFS) =      17.84

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.52   FLOOD WIDTH(FEET) =   37.09
 FLOW VELOCITY(FEET/SEC.) =   2.50   DEPTH*VELOCITY(FT*FT/SEC) =   1.31
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2057.00 =  1451.00 FEET.
 ** PEAK FLOW RATE TABLE **
 STREAM   RUNOFF       Tc
 NUMBER    (CFS)     (MIN.)
    1       17.93      12.15
    2       17.85      13.43
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =    17.93  Tc(MIN.) =  12.15

****************************************************************************
 FLOW PROCESS FROM NODE   2057.00 TO NODE   2058.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1739.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1737.94
 CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.516
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8632
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     22.32
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.71
 AVERAGE FLOW DEPTH(FEET) =   0.55   FLOOD WIDTH(FEET) =   39.96
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =  13.69
 SUBAREA AREA(ACRES) =    6.70       SUBAREA RUNOFF(CFS) =    8.77
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =   18.90         PEAK FLOW RATE(CFS) =      26.70

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.58   FLOOD WIDTH(FEET) =   43.00
 FLOW VELOCITY(FEET/SEC.) =   2.81   DEPTH*VELOCITY(FT*FT/SEC) =   1.64
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2058.00 =  1701.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2058.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1732.94  DOWNSTREAM(FEET) =  1723.20
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.012
```

```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.07
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     26.70
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  13.81
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2073.00 =  1836.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.81
 RAINFALL INTENSITY(INCH/HR) =   1.51
 TOTAL STREAM AREA(ACRES) =   18.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.70

****************************************************************************
 FLOW PROCESS FROM NODE   2070.00 TO NODE   2071.00 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 =   749.00
 UPSTREAM ELEVATION =   1751.30
 DOWNSTREAM ELEVATION =   1734.43
 ELEVATION DIFFERENCE =     16.87
 TC = 0.303*[(  749.00**3)/(    16.87)]**.2 =    9.138
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.855
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8675
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      6.44
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =      6.44

****************************************************************************
 FLOW PROCESS FROM NODE   2071.00 TO NODE   2072.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1734.43  DOWNSTREAM ELEVATION(FEET) = 1728.90
 STREET LENGTH(FEET) =   346.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
 **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.29
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) =  0.45
 HALFSTREET FLOOD WIDTH(FEET) =   14.51
 AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.61
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =  10.73
  5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.712
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8658
SOIL CLASSIFICATION IS "B"
SUBAREA AREA(ACRES) =    2.50      SUBAREA RUNOFF(CFS) =    3.71
TOTAL AREA(ACRES) =    6.50        PEAK FLOW RATE(CFS) =      10.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  15.80
FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.79
LONGEST FLOWPATH FROM NODE   2070.00 TO NODE   2072.00 =  1095.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   2072.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1725.70  DOWNSTREAM(FEET) =  1723.20
FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     10.14
PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =  12.03
LONGEST FLOWPATH FROM NODE   2070.00 TO NODE   2073.00 =  1545.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  12.03
RAINFALL INTENSITY(INCH/HR) =   1.62
TOTAL STREAM AREA(ACRES) =    6.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.14

** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY       AREA
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        26.70    13.81         1.509         18.90
    1        26.22    15.10         1.443         18.90
    2        10.14    12.03         1.617          6.50

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
```

```
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        33.41     12.03        1.617
      2        36.17     13.81        1.509
      3        35.27     15.10        1.443

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.17   Tc(MIN.) =   13.81
  TOTAL AREA(ACRES) =     25.40
  LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2073.00 =  1836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.509
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8631
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     1.43
  TOTAL AREA(ACRES) =    26.50   TOTAL RUNOFF(CFS) =    37.60
  TC(MIN) =  13.81

****************************************************************************
  FLOW PROCESS FROM NODE   2073.00 TO NODE   2074.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1723.20  DOWNSTREAM(FEET) =  1722.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.45
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     37.60
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  13.92
  LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2074.00 =  1916.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        34.95     12.15        1.609        26.50
      2        37.60     13.92        1.503        26.50
      3        36.64     15.21        1.438        26.50
  LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2074.00 =  1916.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        39.31      8.76        1.895        31.20
      2        46.41     11.32        1.667        31.20
```

```
     3        45.97     11.83        1.630        31.20
     4        47.13     12.78        1.569        31.20
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE   2074.00 =     0.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      64.51       8.76        1.895
      2      78.98      11.32        1.667
      3      80.01      11.83        1.630
      4      80.32      12.15        1.609
      5      81.64      12.78        1.569
      6      82.75      13.92        1.503
      7      79.83      15.21        1.438

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     82.75   Tc(MIN.) =   13.92
  TOTAL AREA(ACRES) =     57.70

****************************************************************************
  FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.503
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5303
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     4.70   SUBAREA RUNOFF(CFS) =     3.75
  TOTAL AREA(ACRES) =     62.40   TOTAL RUNOFF(CFS) =    86.50
  TC(MIN) =  13.92
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     62.40  TC(MIN.) =     13.92
  PEAK FLOW RATE(CFS)    =     86.50
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       69.67       8.76
  2       83.31      11.32
  3       84.21      11.83
  4       84.44      12.15
  5       85.62      12.78
  6       86.50      13.92
  7       83.35      15.21
============================================================================
============================================================================
  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 1982-99 Advanced Engineering Software (aes)
             Ver. 1.5A Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK                                                           *
* MORENO VALLEY                                                           *
* 2-YEAR HYDROLOGY                                                        *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\HYDA2.DAT
  TIME/DATE OF STUDY: 13:38 10/28/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =     2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =     2.00   1-HOUR INTENSITY(INCH/HOUR) =    0.554
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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   38.0      33.0    0.020/0.020/0.020   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.*

**************************************************************************
  FLOW PROCESS FROM NODE    1000.00 TO NODE    1001.00 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 =    659.00
  UPSTREAM ELEVATION =    1774.49
  DOWNSTREAM ELEVATION =    1770.07
  ELEVATION DIFFERENCE =       4.42
  TC = 0.303*[(  659.00**3)/(     4.42)]**.2 =    11.062
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.292
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8597
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =       2.33
  TOTAL AREA(ACRES) =       2.10   TOTAL RUNOFF(CFS) =       2.33

**************************************************************************
  FLOW PROCESS FROM NODE    1000.00 TO NODE    1001.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.292
```

```
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8597
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     1.22
 TOTAL AREA(ACRES) =      3.20   TOTAL RUNOFF(CFS) =     3.55
 TC(MIN) =  11.06

****************************************************************************
 FLOW PROCESS FROM NODE    1001.00 TO NODE    1002.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1766.07  DOWNSTREAM(FEET) =  1764.20
 FLOW LENGTH(FEET) =   403.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.17
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.55
 PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =  12.67
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1002.00 =  1062.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1002.00 TO NODE    1002.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.207
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8582
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     4.20   SUBAREA RUNOFF(CFS) =     4.35
 TOTAL AREA(ACRES) =      7.40   TOTAL RUNOFF(CFS) =     7.91
 TC(MIN) =  12.67

****************************************************************************
 FLOW PROCESS FROM NODE    1002.00 TO NODE    1003.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1764.20  DOWNSTREAM(FEET) =  1764.00
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.91
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  12.78
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1003.00 =  1098.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1003.00 TO NODE    1004.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.202
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4808
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.17
 TOTAL AREA(ACRES) =      7.70   TOTAL RUNOFF(CFS) =     8.08
 TC(MIN) =  12.78

****************************************************************************
 FLOW PROCESS FROM NODE    1004.00 TO NODE    1005.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1762.00  DOWNSTREAM(FEET) =  1761.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      8.08
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =  12.96
 LONGEST FLOWPATH FROM NODE    1000.00 TO NODE    1005.00 =  1178.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1005.00 TO NODE    1005.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.193
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8579
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =     1.13
  TOTAL AREA(ACRES) =      8.80   TOTAL RUNOFF(CFS) =     9.20
  TC(MIN) =  12.96

****************************************************************************
  FLOW PROCESS FROM NODE   1005.00 TO NODE   1020.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1761.00  DOWNSTREAM(FEET) =  1758.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.41
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.20
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  13.07
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1020.00 =  1248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1020.00 TO NODE   1020.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.07
  RAINFALL INTENSITY(INCH/HR) =   1.19
  TOTAL STREAM AREA(ACRES) =    8.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.20

****************************************************************************
  FLOW PROCESS FROM NODE   1010.00 TO NODE   1011.00 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 =   350.00
  UPSTREAM ELEVATION =   1777.00
  DOWNSTREAM ELEVATION =   1771.37
  ELEVATION DIFFERENCE =      5.63
  TC = 0.303*[(  350.00**3)/(     5.63)]**.2 =    7.210
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.601
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8644
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      4.70
  TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =      4.70

****************************************************************************
  FLOW PROCESS FROM NODE   1011.00 TO NODE   1012.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1767.37  DOWNSTREAM(FEET) =  1766.30
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.70
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   8.06
  LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1012.00 =   581.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1012.00 TO NODE   1012.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.513
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8632
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     2.20   SUBAREA RUNOFF(CFS) =     2.87
  TOTAL AREA(ACRES) =      5.60   TOTAL RUNOFF(CFS) =     7.58
  TC(MIN) =   8.06
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1766.30  DOWNSTREAM(FEET) =  1765.50
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.00
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.58
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   8.61
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1013.00 =   745.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.464
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8625
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.55   SUBAREA RUNOFF(CFS) =    3.22
 TOTAL AREA(ACRES) =     8.15   TOTAL RUNOFF(CFS) =   10.80
 TC(MIN) =   8.61

****************************************************************************
 FLOW PROCESS FROM NODE   1013.00 TO NODE   1014.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1765.50  DOWNSTREAM(FEET) =  1764.70
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.80
 PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   9.11
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1014.00 =   909.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1014.00 TO NODE   1014.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.424
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8619
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    2.64
 TOTAL AREA(ACRES) =    10.30   TOTAL RUNOFF(CFS) =   13.44
 TC(MIN) =   9.11

****************************************************************************
 FLOW PROCESS FROM NODE   1014.00 TO NODE   1015.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1764.70  DOWNSTREAM(FEET) =  1763.90
 FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.44
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   9.57
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1015.00 =  1073.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1015.00 TO NODE   1015.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.389
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8613
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    2.57
 TOTAL AREA(ACRES) =    12.45   TOTAL RUNOFF(CFS) =   16.01
 TC(MIN) =   9.57
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    1015.00 TO NODE    1016.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1763.90  DOWNSTREAM(FEET) =  1763.10
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     16.01
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =  10.02
  LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1016.00 =  1237.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    1016.00 TO NODE    1016.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.357
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8608
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    2.51
  TOTAL AREA(ACRES) =    14.60   TOTAL RUNOFF(CFS) =   18.52
  TC(MIN) =  10.02

****************************************************************************
  FLOW PROCESS FROM NODE    1016.00 TO NODE    1017.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1763.10  DOWNSTREAM(FEET) =  1762.30
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     18.52
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =  10.45
  LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1017.00 =  1401.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    1017.00 TO NODE    1017.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.329
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8603
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.15   SUBAREA RUNOFF(CFS) =    2.46
  TOTAL AREA(ACRES) =    16.75   TOTAL RUNOFF(CFS) =   20.98
  TC(MIN) =  10.45

****************************************************************************
  FLOW PROCESS FROM NODE    1017.00 TO NODE    1018.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1762.30  DOWNSTREAM(FEET) =  1761.50
  FLOW LENGTH(FEET) =   164.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.52
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     20.98
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =  10.87
  LONGEST FLOWPATH FROM NODE    1010.00 TO NODE    1018.00 =  1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    1018.00 TO NODE    1018.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.303
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8599
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    4.40   SUBAREA RUNOFF(CFS) =    4.93
  TOTAL AREA(ACRES) =    21.15   TOTAL RUNOFF(CFS) =   25.91
```

```
 TC(MIN) =  10.87

****************************************************************************
 FLOW PROCESS FROM NODE   1018.00 TO NODE   1019.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1761.50  DOWNSTREAM(FEET) =  1759.50
 FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     25.91
 PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =  12.38
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1019.00 =  2115.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1019.00 TO NODE   1019.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.221
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8584
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.90   SUBAREA RUNOFF(CFS) =    1.99
 TOTAL AREA(ACRES) =    23.05   TOTAL RUNOFF(CFS) =   27.90
 TC(MIN) =  12.38

****************************************************************************
 FLOW PROCESS FROM NODE   1019.00 TO NODE   1020.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1759.50  DOWNSTREAM(FEET) =  1758.50
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.23
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     27.90
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =  12.82
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1020.00 =  2305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1020.00 TO NODE   1020.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.82
 RAINFALL INTENSITY(INCH/HR) =   1.20
 TOTAL STREAM AREA(ACRES) =   23.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.90

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         9.20     13.07         1.189          8.80
     2        27.90     12.82         1.200         23.05

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        36.94     12.82         1.200
     2        36.84     13.07         1.189

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     36.94   Tc(MIN.) =   12.82
 TOTAL AREA(ACRES) =     31.85
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1020.00 =  2305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1020.00 TO NODE   1021.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1758.50  DOWNSTREAM(FEET) =  1756.00
 FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.77
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     36.94
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =  13.35
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1021.00 =  2585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1021.00 TO NODE   1021.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.176
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8576
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.80   SUBAREA RUNOFF(CFS) =    1.82
 TOTAL AREA(ACRES) =    33.65   TOTAL RUNOFF(CFS) =   38.75
 TC(MIN) =  13.35

****************************************************************************
 FLOW PROCESS FROM NODE   1021.00 TO NODE   1022.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1756.00  DOWNSTREAM(FEET) =  1755.00
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.98
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     38.75
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  13.52
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1022.00 =  2685.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1021.00 TO NODE   1022.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.169
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8575
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.10
 TOTAL AREA(ACRES) =    33.75   TOTAL RUNOFF(CFS) =   38.85
 TC(MIN) =  13.52

****************************************************************************
 FLOW PROCESS FROM NODE   1022.00 TO NODE   1023.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1755.00  DOWNSTREAM(FEET) =  1746.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.54
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     38.85
 PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =  14.02
 LONGEST FLOWPATH FROM NODE   1010.00 TO NODE   1023.00 =  3095.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1023.00 TO NODE   1042.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1030.00 TO NODE   1031.00 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 =   360.00
 UPSTREAM ELEVATION =   1767.50
 DOWNSTREAM ELEVATION =   1756.00
 ELEVATION DIFFERENCE =     11.50
 TC = 0.303*[(  360.00**3)/(    11.50)]**.2 =    6.357
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.705
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8657
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      2.80
 TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =      2.80

****************************************************************************
 FLOW PROCESS FROM NODE   1031.00 TO NODE   1032.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1752.00  DOWNSTREAM(FEET) =  1751.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.54
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.80
 PIPE TRAVEL TIME(MIN.) =   4.59    Tc(MIN.) =  10.95
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1032.00 =  1060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1032.00 TO NODE   1032.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.299
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8598
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.55   SUBAREA RUNOFF(CFS) =     0.61
 TOTAL AREA(ACRES) =      2.45   TOTAL RUNOFF(CFS) =     3.42
 TC(MIN) =  10.95

****************************************************************************
 FLOW PROCESS FROM NODE   1032.00 TO NODE   1033.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1751.00  DOWNSTREAM(FEET) =  1749.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.42
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =  11.48
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1033.00 =  1240.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1033.00 TO NODE   1033.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.268
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8593
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     1.80   SUBAREA RUNOFF(CFS) =     1.96
 TOTAL AREA(ACRES) =      4.25   TOTAL RUNOFF(CFS) =     5.38
 TC(MIN) =  11.48

****************************************************************************
 FLOW PROCESS FROM NODE   1033.00 TO NODE   1034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1749.00  DOWNSTREAM(FEET) =  1747.50
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.72
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.38
 PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =  12.57
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1034.00 =  1550.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    1034.00 TO NODE    1034.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.212
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8583
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     3.40   SUBAREA RUNOFF(CFS) =     3.54
 TOTAL AREA(ACRES) =      7.65   TOTAL RUNOFF(CFS) =     8.92
 TC(MIN) =  12.57

****************************************************************************
 FLOW PROCESS FROM NODE    1034.00 TO NODE    1041.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1747.50  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      8.92
 PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =  13.47
 LONGEST FLOWPATH FROM NODE    1030.00 TO NODE    1041.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    1041.00 TO NODE    1041.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.47
 RAINFALL INTENSITY(INCH/HR) =   1.17
 TOTAL STREAM AREA(ACRES) =    7.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.92

****************************************************************************
 FLOW PROCESS FROM NODE    1040.00 TO NODE    1041.00 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 =   522.00
 UPSTREAM ELEVATION =   1769.28
 DOWNSTREAM ELEVATION =   1764.93
 ELEVATION DIFFERENCE =      4.35
 TC = 0.303*[(  522.00**3)/(     4.35)]**.2 =    9.649
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.383
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8612
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      8.82
 TOTAL AREA(ACRES) =      7.40   TOTAL RUNOFF(CFS) =      8.82

****************************************************************************
 FLOW PROCESS FROM NODE    1041.00 TO NODE    1041.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.65
 RAINFALL INTENSITY(INCH/HR) =   1.38
 TOTAL STREAM AREA(ACRES) =    7.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.82

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1          8.92     13.47         1.171          7.65
    2          8.82      9.65         1.383          7.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        15.20      9.65        1.383
     2        16.38     13.47        1.171

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      16.38   Tc(MIN.) =   13.47
 TOTAL AREA(ACRES) =      15.05
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1041.00 =  1870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1041.00 TO NODE   1042.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.50  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.93
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.38
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  13.58
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1042.00 =  1920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        15.20      9.75        1.376        15.05
     2        16.38     13.58        1.166        15.05
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1042.00 =  1920.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        38.85     14.02        1.147        33.75
     2        38.74     14.27        1.137        33.75
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE   1042.00 =     0.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       42.23       9.75        1.376
     2       54.00      13.58        1.166
     3       54.97      14.02        1.147
     4       54.72      14.27        1.137

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      54.97   Tc(MIN.) =   14.02
 TOTAL AREA(ACRES) =      48.80

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.147
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4705
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     3.10   SUBAREA RUNOFF(CFS) =     1.67
 TOTAL AREA(ACRES) =     51.90   TOTAL RUNOFF(CFS) =   56.64
 TC(MIN) =  14.02

****************************************************************************
 FLOW PROCESS FROM NODE   1043.00 TO NODE   1054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1742.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.61
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     56.64
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =  14.21
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1054.00 =  2060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1054.00 TO NODE   1054.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  14.21
 RAINFALL INTENSITY(INCH/HR) =   1.14
 TOTAL STREAM AREA(ACRES) =   51.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     56.64

****************************************************************************
 FLOW PROCESS FROM NODE   1050.00 TO NODE   1051.00 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 =  1050.00
 UPSTREAM ELEVATION =   1768.50
 DOWNSTREAM ELEVATION =   1756.10
 ELEVATION DIFFERENCE =     12.40
 TC = 0.303*[( 1050.00**3)/(    12.40)]**.2 =   11.902
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.246
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8589
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      1.28
 TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      1.28

****************************************************************************
 FLOW PROCESS FROM NODE   1051.00 TO NODE   1052.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1756.10  DOWNSTREAM ELEVATION(FEET) = 1749.00
 STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.95
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =    8.96
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.96
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
 STREET FLOW TRAVEL TIME(MIN.) =   7.73   Tc(MIN.) =  19.63
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.970
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8533
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    1.32
 TOTAL AREA(ACRES) =    2.80       PEAK FLOW RATE(CFS) =       2.61

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.25
 FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1052.00 =  1960.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE   1052.00 TO NODE   1053.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1744.00
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.82
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.61
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  19.79
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1053.00 =  2015.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1053.00 TO NODE   1053.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.966
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8532
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.00   SUBAREA RUNOFF(CFS) =    3.30
 TOTAL AREA(ACRES) =     6.80   TOTAL RUNOFF(CFS) =    5.90
 TC(MIN) =  19.79

****************************************************************************
 FLOW PROCESS FROM NODE   1053.00 TO NODE   1054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.90
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =  20.19
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1054.00 =  2205.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1054.00 TO NODE   1054.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  20.19
 RAINFALL INTENSITY(INCH/HR) =   0.96
 TOTAL STREAM AREA(ACRES) =    6.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.90

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        44.41      9.95         1.362         51.90
     1        55.71     13.76         1.158         51.90
     1        56.64     14.21         1.140         51.90
     1        56.37     14.45         1.130         51.90
     2         5.90     20.19         0.956          6.80

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        47.32      9.95         1.362
     2        59.74     13.76         1.158
     3        60.80     14.21         1.140
     4        60.60     14.45         1.130
     5        53.60     20.19         0.956

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     60.80   Tc(MIN.) =   14.21
 TOTAL AREA(ACRES) =     58.70
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1054.00 =  2205.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   1054.00 TO NODE   1055.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1740.00  DOWNSTREAM(FEET) =  1737.50
 FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     60.80
 PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =  15.29
 LONGEST FLOWPATH FROM NODE   1050.00 TO NODE   1055.00 =  2725.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =     58.70  TC(MIN.) =     15.29
 PEAK FLOW RATE(CFS)    =     60.80
 *** PEAK FLOW RATE TABLE ***
        Q(CFS)    Tc(MIN.)
 1       47.32       11.10
 2       59.74       14.85
 3       60.80       15.29
 4       60.60       15.54
 5       53.60       21.32
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS

1
```

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-99 Advanced Engineering Software (aes)
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                              Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* PROLOGIS PARK                                                           *
* MORENO VALLEY                                                           *
* 2-YEAR HYDROLOGY                                                        *
 **************************************************************************

  FILE NAME: C:\XDRIVE\2818\HYDB2.DAT
  TIME/DATE OF STUDY: 12:46 05/08/2008
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.554
  SLOPE OF INTENSITY DURATION CURVE = 0.5004
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL 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.*

**************************************************************************
  FLOW PROCESS FROM NODE   2000.00 TO NODE   2001.00 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 =   705.00
  UPSTREAM ELEVATION =   1757.36
  DOWNSTREAM ELEVATION =   1748.16
  ELEVATION DIFFERENCE =      9.20
  TC = 0.303*[(  705.00**3)/(     9.20)]**.2 =    9.948
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.362
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8609
  SOIL CLASSIFICATION IS "B"
  SUBAREA RUNOFF(CFS) =      5.98
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      5.98

****************************************************************************
  FLOW PROCESS FROM NODE   2001.00 TO NODE   2002.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1745.40  DOWNSTREAM(FEET) =  1745.00
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.98
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =  10.28
  LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2002.00 =   796.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2002.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.341
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8605
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    1.15
  TOTAL AREA(ACRES) =     6.10   TOTAL RUNOFF(CFS) =    7.14
  TC(MIN) =  10.28

****************************************************************************
  FLOW PROCESS FROM NODE   2002.00 TO NODE   2003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1744.84
  FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.14
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  10.34
```

```
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2003.00 =   818.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2003.00 TO NODE   2004.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.337
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5045
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.13
 TOTAL AREA(ACRES) =      6.30   TOTAL RUNOFF(CFS) =     7.27
 TC(MIN) =  10.34

****************************************************************************
 FLOW PROCESS FROM NODE   2004.00 TO NODE   2034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.36  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =   168.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.36
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.27
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =  10.61
 LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2034.00 =   986.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2034.00 TO NODE   2034.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   2010.00 TO NODE   2011.00 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 =   329.00
 UPSTREAM ELEVATION =   1762.74
 DOWNSTREAM ELEVATION =   1755.30
 ELEVATION DIFFERENCE =      7.44
 TC = 0.303*[(  329.00**3)/(     7.44)]**.2 =    6.570
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.677
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8654
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      1.31
 TOTAL AREA(ACRES) =      0.90   TOTAL RUNOFF(CFS) =      1.31

****************************************************************************
 FLOW PROCESS FROM NODE   2011.00 TO NODE   2012.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1751.30  DOWNSTREAM(FEET) =  1750.00
  FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.51
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.31
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   7.68
  LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2012.00 =   562.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2012.00 TO NODE   2012.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.551
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8637
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =     1.10   TOTAL RUNOFF(CFS) =    1.57
  TC(MIN) =   7.68

****************************************************************************
  FLOW PROCESS FROM NODE   2012.00 TO NODE   2013.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1750.00  DOWNSTREAM(FEET) =  1749.50
  FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.59
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.57
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   8.12
  LONGEST FLOWPATH FROM NODE   2010.00 TO NODE   2013.00 =   658.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2013.00 TO NODE   2014.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.508
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8631
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    1.69
  TOTAL AREA(ACRES) =     2.40   TOTAL RUNOFF(CFS) =    3.27
  TC(MIN) =   8.12

****************************************************************************
  FLOW PROCESS FROM NODE   2013.00 TO NODE   2014.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.508
```

```
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5310
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.24
 TOTAL AREA(ACRES) =      2.70   TOTAL RUNOFF(CFS) =     3.51
 TC(MIN) =    8.12

****************************************************************************
 FLOW PROCESS FROM NODE    2014.00 TO NODE    2024.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1748.50  DOWNSTREAM(FEET) =  1745.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =    9.73
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.51
 PIPE TRAVEL TIME(MIN.) =    0.14    Tc(MIN.) =    8.26
 LONGEST FLOWPATH FROM NODE    2010.00 TO NODE    2024.00 =    738.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    2024.00 TO NODE    2024.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.26
 RAINFALL INTENSITY(INCH/HR) =    1.50
 TOTAL STREAM AREA(ACRES) =     2.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.51

****************************************************************************
 FLOW PROCESS FROM NODE    2020.00 TO NODE    2021.00 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 =    496.00
 UPSTREAM ELEVATION =    1765.66
 DOWNSTREAM ELEVATION =    1752.39
 ELEVATION DIFFERENCE =      13.27
 TC = 0.303*[(  496.00**3)/(    13.27)]**.2 =     7.487
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.571
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8640
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      6.92
 TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =      6.92

****************************************************************************
 FLOW PROCESS FROM NODE    2021.00 TO NODE    2022.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1748.00  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   622.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.92
 PIPE TRAVEL TIME(MIN.) =   2.29    Tc(MIN.) =   9.77
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2022.00 =  1118.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2022.00 TO NODE   2022.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.375
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8611
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    3.70   SUBAREA RUNOFF(CFS) =    4.38
 TOTAL AREA(ACRES) =     8.80   TOTAL RUNOFF(CFS) =   11.30
 TC(MIN) =   9.77

****************************************************************************
 FLOW PROCESS FROM NODE   2022.00 TO NODE   2023.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.50  DOWNSTREAM(FEET) =  1745.30
 FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.30
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.83
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2023.00 =  1141.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2023.00 TO NODE   2023.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.371
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8610
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.35
 TOTAL AREA(ACRES) =     9.10   TOTAL RUNOFF(CFS) =   11.65
 TC(MIN) =   9.83

****************************************************************************
 FLOW PROCESS FROM NODE   2023.00 TO NODE   2024.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.30  DOWNSTREAM(FEET) =  1745.00
```

```
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.98
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.65
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.84
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2024.00 =  1152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2024.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.84
 RAINFALL INTENSITY(INCH/HR) =   1.37
 TOTAL STREAM AREA(ACRES) =    9.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.65

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         3.51      8.26        1.495         2.70
     2        11.65      9.84        1.370         9.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        13.29      8.26        1.495
     2        14.87      9.84        1.370

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     14.87   Tc(MIN.) =    9.84
 TOTAL AREA(ACRES) =     11.80
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2024.00 =  1152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2024.00 TO NODE   2025.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.00  DOWNSTREAM(FEET) =  1740.00
 FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.44
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.87
 PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =  11.11
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2025.00 =  1717.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE   2025.00 TO NODE   2025.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.289
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8597
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    4.60   SUBAREA RUNOFF(CFS) =    5.10
 TOTAL AREA(ACRES) =    16.40   TOTAL RUNOFF(CFS) =   19.96
 TC(MIN) =  11.11

****************************************************************************
 FLOW PROCESS FROM NODE   2025.00 TO NODE   2026.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1740.00  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =   218.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.31
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     19.96
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =  11.68
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2026.00 =  1935.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2026.00 TO NODE   2033.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  11.68
 RAINFALL INTENSITY(INCH/HR) =   1.26
 TOTAL STREAM AREA(ACRES) =   16.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.96

****************************************************************************
 FLOW PROCESS FROM NODE   2030.00 TO NODE   2031.00 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 =   334.00
 UPSTREAM ELEVATION =   1751.50
 DOWNSTREAM ELEVATION =   1746.64
 ELEVATION DIFFERENCE =      4.86
 TC = 0.303*[(  334.00**3)/(     4.86)]**.2 =    7.219
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.600
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8644
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      1.66
 TOTAL AREA(ACRES) =      1.20   TOTAL RUNOFF(CFS) =      1.66
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   2031.00 TO NODE   2032.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1742.64  DOWNSTREAM(FEET) =  1739.60
 FLOW LENGTH(FEET) =    13.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.41
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.66
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   7.23
 LONGEST FLOWPATH FROM NODE   2030.00 TO NODE   2032.00 =   347.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2032.00 TO NODE   2033.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   7.23
 RAINFALL INTENSITY(INCH/HR) =   1.60
 TOTAL STREAM AREA(ACRES) =    1.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.66

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        18.80     10.13         1.350         16.40
     1        19.96     11.68         1.257         16.40
     2         1.66      7.23         1.598          1.20

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        15.09      7.23        1.598
     2        20.20     10.13        1.350
     3        21.27     11.68        1.257

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     21.27   Tc(MIN.) =   11.68
 TOTAL AREA(ACRES) =     17.60
 LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2033.00 =  1935.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2033.00 TO NODE   2033.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.257
```

```
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4909
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.80   SUBAREA RUNOFF(CFS) =     0.49
 TOTAL AREA(ACRES) =     18.40   TOTAL RUNOFF(CFS) =    21.76
 TC(MIN) =  11.68

****************************************************************************
 FLOW PROCESS FROM NODE    2033.00 TO NODE    2034.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1739.60  DOWNSTREAM(FEET) =  1739.00
 FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.74
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.76
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =  11.86
 LONGEST FLOWPATH FROM NODE    2020.00 TO NODE    2034.00 =  2018.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    2034.00 TO NODE    2034.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        15.79      7.43        1.577        18.40
     2        20.75     10.31        1.339        18.40
     3        21.76     11.86        1.248        18.40
 LONGEST FLOWPATH FROM NODE    2020.00 TO NODE    2034.00 =  2018.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1         7.27     10.61        1.319         6.30
 LONGEST FLOWPATH FROM NODE    2000.00 TO NODE    2034.00 =   986.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF        Tc       INTENSITY
 NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
     1       20.88        7.43        1.577
     2       27.81       10.31        1.339
     3       27.72       10.61        1.319
     4       28.64       11.86        1.248

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     28.64   Tc(MIN.) =   11.86
 TOTAL AREA(ACRES) =     24.70

****************************************************************************
 FLOW PROCESS FROM NODE    2034.00 TO NODE    2034.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    2034.00 TO NODE    2035.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1739.00  DOWNSTREAM(FEET) =  1730.00
  FLOW LENGTH(FEET) =   476.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     28.64
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =  12.54
  LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2035.00 =  2494.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    2035.00 TO NODE    2035.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.214
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8583
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    6.50   SUBAREA RUNOFF(CFS) =    6.77
  TOTAL AREA(ACRES) =    31.20   TOTAL RUNOFF(CFS) =   35.41
  TC(MIN) =  12.54

********************************************************************************
  FLOW PROCESS FROM NODE    2035.00 TO NODE    2073.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1730.00  DOWNSTREAM(FEET) =  1722.00
  FLOW LENGTH(FEET) =   485.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     35.41
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =  13.22
  LONGEST FLOWPATH FROM NODE   2020.00 TO NODE   2073.00 =  2979.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    2073.00 TO NODE    2073.00 IS CODE =  10
--------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    2040.00 TO NODE    2041.00 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 =   313.00
 UPSTREAM ELEVATION =   1756.60
 DOWNSTREAM ELEVATION =   1749.02
 ELEVATION DIFFERENCE =      7.58
 TC = 0.303*[(  313.00**3)/(     7.58)]**.2 =    6.353
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.705
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8657
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      1.62
 TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      1.62

****************************************************************************
 FLOW PROCESS FROM NODE   2041.00 TO NODE   2042.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1746.52  DOWNSTREAM(FEET) =  1745.90
 FLOW LENGTH(FEET) =   273.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.58
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.62
 PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =   8.12
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2042.00 =   586.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2042.00 TO NODE   2042.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.509
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8631
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.13
 TOTAL AREA(ACRES) =     1.20   TOTAL RUNOFF(CFS) =     1.75
 TC(MIN) =   8.12

****************************************************************************
 FLOW PROCESS FROM NODE   2042.00 TO NODE   2043.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1745.90  DOWNSTREAM(FEET) =  1745.50
 FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.59
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.75
 PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =   9.39
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2043.00 =   783.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2043.00 TO NODE   2056.00 IS CODE =   9
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1745.50
 DOWNSTREAM NODE ELEVATION(FEET) =   1741.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   268.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.304
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8599
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.87
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.02
 AVERAGE FLOW DEPTH(FEET) =   0.27   FLOOD WIDTH(FEET) =   11.86
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.48   Tc(MIN.) =  10.86
 SUBAREA AREA(ACRES) =    2.00       SUBAREA RUNOFF(CFS) =    2.24
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =    3.20         PEAK FLOW RATE(CFS) =       4.00

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.30   FLOOD WIDTH(FEET) =   14.42
 FLOW VELOCITY(FEET/SEC.) =   3.11   DEPTH*VELOCITY(FT*FT/SEC) =   0.92
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2056.00 =  1051.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2056.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  10.86
 RAINFALL INTENSITY(INCH/HR) =   1.30
 TOTAL STREAM AREA(ACRES) =    3.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.00

****************************************************************************
 FLOW PROCESS FROM NODE   2051.00 TO NODE   2051.00 IS CODE =  22
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
 USER SPECIFIED Tc(MIN.) =    5.000
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.922
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8683
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      0.17
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
 FLOW PROCESS FROM NODE   2051.00 TO NODE   2052.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.70  DOWNSTREAM(FEET) =  1744.50
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   1.89
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.17
 PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   5.34
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2052.00 =   307.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2052.00 TO NODE   2052.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.859
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8676
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.16
 TOTAL AREA(ACRES) =     0.20   TOTAL RUNOFF(CFS) =    0.33
 TC(MIN) =   5.34

****************************************************************************
 FLOW PROCESS FROM NODE   2052.00 TO NODE   2053.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1744.50  DOWNSTREAM(FEET) =  1744.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.16
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.33
 PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   6.27
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2053.00 =   427.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2053.00 TO NODE   2053.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.716
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8659
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.45
 TOTAL AREA(ACRES) =     0.50   TOTAL RUNOFF(CFS) =    0.77
 TC(MIN) =   6.27

****************************************************************************
 FLOW PROCESS FROM NODE   2053.00 TO NODE   2054.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  1744.00  DOWNSTREAM(FEET) =  1743.00
 FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.14
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.77
 PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   7.16
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2054.00 =   594.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2054.00 TO NODE   2054.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.606
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8645
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.28
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =     1.05
 TC(MIN) =   7.16

****************************************************************************
 FLOW PROCESS FROM NODE   2054.00 TO NODE   2055.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1743.00  DOWNSTREAM(FEET) =  1742.60
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.43
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.05
 PIPE TRAVEL TIME(MIN.) =   1.13    Tc(MIN.) =   8.29
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2055.00 =   759.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2055.00 TO NODE   2056.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1742.60
 DOWNSTREAM NODE ELEVATION(FEET) =   1741.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   168.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.385
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8612
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.07
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.09
 AVERAGE FLOW DEPTH(FEET) =   0.27   FLOOD WIDTH(FEET) =   12.18
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   9.63
 SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =     2.03
```

```
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =    2.40          PEAK FLOW RATE(CFS) =       3.08

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.30   FLOOD WIDTH(FEET) =   15.21
 FLOW VELOCITY(FEET/SEC.) =   2.19   DEPTH*VELOCITY(FT*FT/SEC) =   0.67
 LONGEST FLOWPATH FROM NODE   2051.00 TO NODE   2056.00 =   927.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2056.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.63
 RAINFALL INTENSITY(INCH/HR) =    1.39
 TOTAL STREAM AREA(ACRES) =    2.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.08

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.00    10.86        1.304          3.20
     2        3.08     9.63        1.385          2.40

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        6.62     9.63        1.385
     2        6.90    10.86        1.304

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      6.90   Tc(MIN.) =   10.86
 TOTAL AREA(ACRES) =      5.60
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2056.00 =  1051.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2056.00 TO NODE   2057.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1741.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1739.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.154
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8572
 SOIL CLASSIFICATION IS "B"
```

```
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.16
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.22
 AVERAGE FLOW DEPTH(FEET) =   0.45   FLOOD WIDTH(FEET) =   29.43
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.00   Tc(MIN.) =  13.87
 SUBAREA AREA(ACRES) =    6.60       SUBAREA RUNOFF(CFS) =    6.53
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =   12.20         PEAK FLOW RATE(CFS) =      13.42

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.48   FLOOD WIDTH(FEET) =   33.10
 FLOW VELOCITY(FEET/SEC.) =   2.34   DEPTH*VELOCITY(FT*FT/SEC) =   1.13
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2057.00 =  1451.00 FEET.
 ** PEAK FLOW RATE TABLE **
 STREAM   RUNOFF       Tc
 NUMBER    (CFS)     (MIN.)
    1       13.48      12.61
    2       13.43      13.83
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =    13.48  Tc(MIN.) =  12.61

****************************************************************************
 FLOW PROCESS FROM NODE   2057.00 TO NODE   2058.00 IS CODE =   9
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1739.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1737.94
 CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00
 "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.013   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
 MAXIMUM DEPTH(FEET) =   1.00
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.138
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8569
 SOIL CLASSIFICATION IS "B"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     16.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.54
 AVERAGE FLOW DEPTH(FEET) =   0.51   FLOOD WIDTH(FEET) =   35.65
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =  14.25
 SUBAREA AREA(ACRES) =    6.70       SUBAREA RUNOFF(CFS) =    6.53
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =   18.90         PEAK FLOW RATE(CFS) =      20.01

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.53   FLOOD WIDTH(FEET) =   38.21
 FLOW VELOCITY(FEET/SEC.) =   2.65   DEPTH*VELOCITY(FT*FT/SEC) =   1.42
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2058.00 =  1701.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2058.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1732.94  DOWNSTREAM(FEET) =  1723.20
```

```
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.08
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.01
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  14.37
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2073.00 =  1836.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  14.37
 RAINFALL INTENSITY(INCH/HR) =   1.13
 TOTAL STREAM AREA(ACRES) =   18.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.01

****************************************************************************
 FLOW PROCESS FROM NODE   2070.00 TO NODE   2071.00 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 =   749.00
 UPSTREAM ELEVATION =   1751.30
 DOWNSTREAM ELEVATION =   1734.43
 ELEVATION DIFFERENCE =     16.87
 TC = 0.303*[(  749.00**3)/(    16.87)]**.2 =    9.138
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.422
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8618
 SOIL CLASSIFICATION IS "B"
 SUBAREA RUNOFF(CFS) =      4.90
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =      4.90

****************************************************************************
 FLOW PROCESS FROM NODE   2071.00 TO NODE   2072.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1734.43  DOWNSTREAM ELEVATION(FEET) = 1728.90
 STREET LENGTH(FEET) =   346.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0149
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   12.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =  10.85
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.305
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8599
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =    2.50      SUBAREA RUNOFF(CFS) =    2.80
  TOTAL AREA(ACRES) =    6.50        PEAK FLOW RATE(CFS) =       7.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  14.06
  FLOW VELOCITY(FEET/SEC.) =  3.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE   2070.00 TO NODE   2072.00 =  1095.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2072.00 TO NODE   2073.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1725.70  DOWNSTREAM(FEET) =  1723.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.71
  PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =  12.26
  LONGEST FLOWPATH FROM NODE   2070.00 TO NODE   2073.00 =  1545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.26
  RAINFALL INTENSITY(INCH/HR) =   1.23
  TOTAL STREAM AREA(ACRES) =    6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.71

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1        20.01     14.37         1.133         18.90
      1        19.69     15.60         1.088         18.90
      2         7.71     12.26         1.227          6.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        24.77     12.26       1.227
     2        27.13     14.37       1.133
     3        26.52     15.60       1.088

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     27.13   Tc(MIN.) =   14.37
 TOTAL AREA(ACRES) =     25.40
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2073.00 =  1836.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2073.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.133
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8568
 SOIL CLASSIFICATION IS "B"
 SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    1.07
 TOTAL AREA(ACRES) =    26.50   TOTAL RUNOFF(CFS) =   28.19
 TC(MIN) =  14.37

****************************************************************************
 FLOW PROCESS FROM NODE   2073.00 TO NODE   2074.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1723.20  DOWNSTREAM(FEET) =  1722.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     28.19
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =  14.50
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2074.00 =  1916.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        25.93     12.38       1.221        26.50
     2        28.19     14.50       1.128        26.50
     3        27.55     15.73       1.083        26.50
 LONGEST FLOWPATH FROM NODE   2040.00 TO NODE   2074.00 =  1916.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        29.32      8.89       1.442        31.20
```

```
     2        35.06     11.67        1.258        31.20
     3        34.87     11.97        1.242        31.20
     4        35.41     13.22        1.182        31.20
  LONGEST FLOWPATH FROM NODE       0.00 TO NODE   2074.00 =      0.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF        Tc       INTENSITY
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
     1        47.92        8.89         1.442
     2        59.48       11.67         1.258
     3        59.93       11.97         1.242
     4        60.21       12.38         1.221
     5        61.11       13.22         1.182
     6        62.00       14.50         1.128
     7        60.01       15.73         1.083

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.00   Tc(MIN.) =   14.50
  TOTAL AREA(ACRES) =      57.70

****************************************************************************
  FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   2074.00 TO NODE   2074.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.128
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4667
  SOIL CLASSIFICATION IS "B"
  SUBAREA AREA(ACRES) =     4.70   SUBAREA RUNOFF(CFS) =     2.48
  TOTAL AREA(ACRES) =     62.40   TOTAL RUNOFF(CFS) =   64.48
  TC(MIN) =  14.50
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      62.40  TC(MIN.) =      14.50
  PEAK FLOW RATE(CFS)    =      64.48
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)
  1       51.46        8.89
  2       62.39       11.67
  3       62.78       11.97
  4       62.99       12.38
  5       63.76       13.22
  6       64.48       14.50
  7       62.34       15.73
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Technical Appendix D

Hydrologic Analysis
Proposed Condition – Flood Hydrograph

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
                Study date  05/12/08 File: 0727N10024100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 100-YEAR

-----------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            1.70                   99.79

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            4.25                  249.48

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    1.700(In)
Area Averaged 100-Year Rainfall =    4.250(In)

Point rain (area averaged) =    4.250(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    4.250(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    55.300            56.00          0.900
     3.400            86.00          0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  74.8      0.305     0.900        0.058       0.942      0.055
86.0  94.4      0.073     0.000        0.073       0.058      0.004
                                                  Sum (F) =    0.059
Area averaged mean soil loss (F) (In/Hr) =  0.059
Minimum soil loss rate ((In/Hr)) =  0.029
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-----------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000	Sum= 59.159

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.034	0.104	0.006	0.03
2	0.17	0.07	0.034	0.104	0.006	0.03
3	0.25	0.07	0.034	0.104	0.006	0.03
4	0.33	0.10	0.051	0.103	0.009	0.04
5	0.42	0.10	0.051	0.103	0.009	0.04
6	0.50	0.10	0.051	0.102	0.009	0.04
7	0.58	0.10	0.051	0.102	0.009	0.04
8	0.67	0.10	0.051	0.102	0.009	0.04
9	0.75	0.10	0.051	0.101	0.009	0.04
10	0.83	0.13	0.068	0.101	0.012	0.06
11	0.92	0.13	0.068	0.100	0.012	0.06
12	1.00	0.13	0.068	0.100	0.012	0.06
13	1.08	0.10	0.051	0.100	0.009	0.04
14	1.17	0.10	0.051	0.099	0.009	0.04
15	1.25	0.10	0.051	0.099	0.009	0.04
16	1.33	0.10	0.051	0.098	0.009	0.04
17	1.42	0.10	0.051	0.098	0.009	0.04
18	1.50	0.10	0.051	0.098	0.009	0.04
19	1.58	0.10	0.051	0.097	0.009	0.04
20	1.67	0.10	0.051	0.097	0.009	0.04
21	1.75	0.10	0.051	0.096	0.009	0.04
22	1.83	0.13	0.068	0.096	0.012	0.06
23	1.92	0.13	0.068	0.096	0.012	0.06
24	2.00	0.13	0.068	0.095	0.012	0.06
25	2.08	0.13	0.068	0.095	0.012	0.06
26	2.17	0.13	0.068	0.095	0.012	0.06
27	2.25	0.13	0.068	0.094	0.012	0.06
28	2.33	0.13	0.068	0.094	0.012	0.06
29	2.42	0.13	0.068	0.093	0.012	0.06
30	2.50	0.13	0.068	0.093	0.012	0.06
31	2.58	0.17	0.085	0.093	0.015	0.07
32	2.67	0.17	0.085	0.092	0.015	0.07
33	2.75	0.17	0.085	0.092	0.015	0.07
34	2.83	0.17	0.085	0.091	0.015	0.07
35	2.92	0.17	0.085	0.091	0.015	0.07
36	3.00	0.17	0.085	0.091	0.015	0.07
37	3.08	0.17	0.085	0.090	0.015	0.07
38	3.17	0.17	0.085	0.090	0.015	0.07
39	3.25	0.17	0.085	0.090	0.015	0.07
40	3.33	0.17	0.085	0.089	0.015	0.07
41	3.42	0.17	0.085	0.089	0.015	0.07
42	3.50	0.17	0.085	0.088	0.015	0.07
43	3.58	0.17	0.085	0.088	0.015	0.07
44	3.67	0.17	0.085	0.088	0.015	0.07
45	3.75	0.17	0.085	0.087	0.015	0.07
46	3.83	0.20	0.102	0.087	---	0.01
47	3.92	0.20	0.102	0.087	---	0.02
48	4.00	0.20	0.102	0.086	---	0.02
49	4.08	0.20	0.102	0.086	---	0.02
50	4.17	0.20	0.102	0.086	---	0.02
51	4.25	0.20	0.102	0.085	---	0.02
52	4.33	0.23	0.119	0.085	---	0.03
53	4.42	0.23	0.119	0.084	---	0.03
54	4.50	0.23	0.119	0.084	---	0.03
55	4.58	0.23	0.119	0.084	---	0.04
56	4.67	0.23	0.119	0.083	---	0.04
57	4.75	0.23	0.119	0.083	---	0.04
58	4.83	0.27	0.136	0.083	---	0.05
59	4.92	0.27	0.136	0.082	---	0.05
60	5.00	0.27	0.136	0.082	---	0.05
61	5.08	0.20	0.102	0.082	---	0.02

62	5.17	0.20	0.102	0.081	---	0.02
63	5.25	0.20	0.102	0.081	---	0.02
64	5.33	0.23	0.119	0.081	---	0.04
65	5.42	0.23	0.119	0.080	---	0.04
66	5.50	0.23	0.119	0.080	---	0.04
67	5.58	0.27	0.136	0.079	---	0.06
68	5.67	0.27	0.136	0.079	---	0.06
69	5.75	0.27	0.136	0.079	---	0.06
70	5.83	0.27	0.136	0.078	---	0.06
71	5.92	0.27	0.136	0.078	---	0.06
72	6.00	0.27	0.136	0.078	---	0.06
73	6.08	0.30	0.153	0.077	---	0.08
74	6.17	0.30	0.153	0.077	---	0.08
75	6.25	0.30	0.153	0.077	---	0.08
76	6.33	0.30	0.153	0.076	---	0.08
77	6.42	0.30	0.153	0.076	---	0.08
78	6.50	0.30	0.153	0.076	---	0.08
79	6.58	0.33	0.170	0.075	---	0.09
80	6.67	0.33	0.170	0.075	---	0.10
81	6.75	0.33	0.170	0.075	---	0.10
82	6.83	0.33	0.170	0.074	---	0.10
83	6.92	0.33	0.170	0.074	---	0.10
84	7.00	0.33	0.170	0.074	---	0.10
85	7.08	0.33	0.170	0.073	---	0.10
86	7.17	0.33	0.170	0.073	---	0.10
87	7.25	0.33	0.170	0.073	---	0.10
88	7.33	0.37	0.187	0.072	---	0.11
89	7.42	0.37	0.187	0.072	---	0.12
90	7.50	0.37	0.187	0.072	---	0.12
91	7.58	0.40	0.204	0.071	---	0.13
92	7.67	0.40	0.204	0.071	---	0.13
93	7.75	0.40	0.204	0.071	---	0.13
94	7.83	0.43	0.221	0.070	---	0.15
95	7.92	0.43	0.221	0.070	---	0.15
96	8.00	0.43	0.221	0.070	---	0.15
97	8.08	0.50	0.255	0.069	---	0.19
98	8.17	0.50	0.255	0.069	---	0.19
99	8.25	0.50	0.255	0.069	---	0.19
100	8.33	0.50	0.255	0.068	---	0.19
101	8.42	0.50	0.255	0.068	---	0.19
102	8.50	0.50	0.255	0.068	---	0.19
103	8.58	0.53	0.272	0.067	---	0.20
104	8.67	0.53	0.272	0.067	---	0.20
105	8.75	0.53	0.272	0.067	---	0.21
106	8.83	0.57	0.289	0.066	---	0.22
107	8.92	0.57	0.289	0.066	---	0.22
108	9.00	0.57	0.289	0.066	---	0.22
109	9.08	0.63	0.323	0.066	---	0.26
110	9.17	0.63	0.323	0.065	---	0.26
111	9.25	0.63	0.323	0.065	---	0.26
112	9.33	0.67	0.340	0.065	---	0.28
113	9.42	0.67	0.340	0.064	---	0.28
114	9.50	0.67	0.340	0.064	---	0.28
115	9.58	0.70	0.357	0.064	---	0.29
116	9.67	0.70	0.357	0.063	---	0.29
117	9.75	0.70	0.357	0.063	---	0.29
118	9.83	0.73	0.374	0.063	---	0.31
119	9.92	0.73	0.374	0.062	---	0.31
120	10.00	0.73	0.374	0.062	---	0.31
121	10.08	0.50	0.255	0.062	---	0.19
122	10.17	0.50	0.255	0.062	---	0.19
123	10.25	0.50	0.255	0.061	---	0.19
124	10.33	0.50	0.255	0.061	---	0.19
125	10.42	0.50	0.255	0.061	---	0.19
126	10.50	0.50	0.255	0.060	---	0.19
127	10.58	0.67	0.340	0.060	---	0.28
128	10.67	0.67	0.340	0.060	---	0.28
129	10.75	0.67	0.340	0.060	---	0.28
130	10.83	0.67	0.340	0.059	---	0.28
131	10.92	0.67	0.340	0.059	---	0.28
132	11.00	0.67	0.340	0.059	---	0.28
133	11.08	0.63	0.323	0.058	---	0.26
134	11.17	0.63	0.323	0.058	---	0.26
135	11.25	0.63	0.323	0.058	---	0.27
136	11.33	0.63	0.323	0.057	---	0.27
137	11.42	0.63	0.323	0.057	---	0.27
138	11.50	0.63	0.323	0.057	---	0.27
139	11.58	0.57	0.289	0.057	---	0.23
140	11.67	0.57	0.289	0.056	---	0.23
141	11.75	0.57	0.289	0.056	---	0.23
142	11.83	0.60	0.306	0.056	---	0.25
143	11.92	0.60	0.306	0.056	---	0.25
144	12.00	0.60	0.306	0.055	---	0.25
145	12.08	0.83	0.425	0.055	---	0.37
146	12.17	0.83	0.425	0.055	---	0.37

147	12.25	0.83	0.425	0.054	---	0.37
148	12.33	0.87	0.442	0.054	---	0.39
149	12.42	0.87	0.442	0.054	---	0.39
150	12.50	0.87	0.442	0.054	---	0.39
151	12.58	0.93	0.476	0.053	---	0.42
152	12.67	0.93	0.476	0.053	---	0.42
153	12.75	0.93	0.476	0.053	---	0.42
154	12.83	0.97	0.493	0.053	---	0.44
155	12.92	0.97	0.493	0.052	---	0.44
156	13.00	0.97	0.493	0.052	---	0.44
157	13.08	1.13	0.578	0.052	---	0.53
158	13.17	1.13	0.578	0.051	---	0.53
159	13.25	1.13	0.578	0.051	---	0.53
160	13.33	1.13	0.578	0.051	---	0.53
161	13.42	1.13	0.578	0.051	---	0.53
162	13.50	1.13	0.578	0.050	---	0.53
163	13.58	0.77	0.391	0.050	---	0.34
164	13.67	0.77	0.391	0.050	---	0.34
165	13.75	0.77	0.391	0.050	---	0.34
166	13.83	0.77	0.391	0.049	---	0.34
167	13.92	0.77	0.391	0.049	---	0.34
168	14.00	0.77	0.391	0.049	---	0.34
169	14.08	0.90	0.459	0.049	---	0.41
170	14.17	0.90	0.459	0.048	---	0.41
171	14.25	0.90	0.459	0.048	---	0.41
172	14.33	0.87	0.442	0.048	---	0.39
173	14.42	0.87	0.442	0.048	---	0.39
174	14.50	0.87	0.442	0.047	---	0.39
175	14.58	0.87	0.442	0.047	---	0.39
176	14.67	0.87	0.442	0.047	---	0.40
177	14.75	0.87	0.442	0.047	---	0.40
178	14.83	0.83	0.425	0.046	---	0.38
179	14.92	0.83	0.425	0.046	---	0.38
180	15.00	0.83	0.425	0.046	---	0.38
181	15.08	0.80	0.408	0.046	---	0.36
182	15.17	0.80	0.408	0.046	---	0.36
183	15.25	0.80	0.408	0.045	---	0.36
184	15.33	0.77	0.391	0.045	---	0.35
185	15.42	0.77	0.391	0.045	---	0.35
186	15.50	0.77	0.391	0.045	---	0.35
187	15.58	0.63	0.323	0.044	---	0.28
188	15.67	0.63	0.323	0.044	---	0.28
189	15.75	0.63	0.323	0.044	---	0.28
190	15.83	0.63	0.323	0.044	---	0.28
191	15.92	0.63	0.323	0.043	---	0.28
192	16.00	0.63	0.323	0.043	---	0.28
193	16.08	0.13	0.068	0.043	---	0.02
194	16.17	0.13	0.068	0.043	---	0.03
195	16.25	0.13	0.068	0.043	---	0.03
196	16.33	0.13	0.068	0.042	---	0.03
197	16.42	0.13	0.068	0.042	---	0.03
198	16.50	0.13	0.068	0.042	---	0.03
199	16.58	0.10	0.051	0.042	---	0.01
200	16.67	0.10	0.051	0.042	---	0.01
201	16.75	0.10	0.051	0.041	---	0.01
202	16.83	0.10	0.051	0.041	---	0.01
203	16.92	0.10	0.051	0.041	---	0.01
204	17.00	0.10	0.051	0.041	---	0.01
205	17.08	0.17	0.085	0.040	---	0.04
206	17.17	0.17	0.085	0.040	---	0.04
207	17.25	0.17	0.085	0.040	---	0.04
208	17.33	0.17	0.085	0.040	---	0.05
209	17.42	0.17	0.085	0.040	---	0.05
210	17.50	0.17	0.085	0.039	---	0.05
211	17.58	0.17	0.085	0.039	---	0.05
212	17.67	0.17	0.085	0.039	---	0.05
213	17.75	0.17	0.085	0.039	---	0.05
214	17.83	0.13	0.068	0.039	---	0.03
215	17.92	0.13	0.068	0.038	---	0.03
216	18.00	0.13	0.068	0.038	---	0.03
217	18.08	0.13	0.068	0.038	---	0.03
218	18.17	0.13	0.068	0.038	---	0.03
219	18.25	0.13	0.068	0.038	---	0.03
220	18.33	0.13	0.068	0.038	---	0.03
221	18.42	0.13	0.068	0.037	---	0.03
222	18.50	0.13	0.068	0.037	---	0.03
223	18.58	0.10	0.051	0.037	---	0.01
224	18.67	0.10	0.051	0.037	---	0.01
225	18.75	0.10	0.051	0.037	---	0.01
226	18.83	0.07	0.034	0.036	0.006	0.03
227	18.92	0.07	0.034	0.036	0.006	0.03
228	19.00	0.07	0.034	0.036	0.006	0.03
229	19.08	0.10	0.051	0.036	---	0.02
230	19.17	0.10	0.051	0.036	---	0.02
231	19.25	0.10	0.051	0.036	---	0.02

232	19.33	0.13	0.068	0.035	---	0.03
233	19.42	0.13	0.068	0.035	---	0.03
234	19.50	0.13	0.068	0.035	---	0.03
235	19.58	0.10	0.051	0.035	---	0.02
236	19.67	0.10	0.051	0.035	---	0.02
237	19.75	0.10	0.051	0.035	---	0.02
238	19.83	0.07	0.034	0.034	0.006	0.03
239	19.92	0.07	0.034	0.034	0.006	0.03
240	20.00	0.07	0.034	0.034	0.006	0.03
241	20.08	0.10	0.051	0.034	---	0.02
242	20.17	0.10	0.051	0.034	---	0.02
243	20.25	0.10	0.051	0.034	---	0.02
244	20.33	0.10	0.051	0.034	---	0.02
245	20.42	0.10	0.051	0.033	---	0.02
246	20.50	0.10	0.051	0.033	---	0.02
247	20.58	0.10	0.051	0.033	---	0.02
248	20.67	0.10	0.051	0.033	---	0.02
249	20.75	0.10	0.051	0.033	---	0.02
250	20.83	0.07	0.034	0.033	---	0.00
251	20.92	0.07	0.034	0.033	---	0.00
252	21.00	0.07	0.034	0.032	---	0.00
253	21.08	0.10	0.051	0.032	---	0.02
254	21.17	0.10	0.051	0.032	---	0.02
255	21.25	0.10	0.051	0.032	---	0.02
256	21.33	0.07	0.034	0.032	---	0.00
257	21.42	0.07	0.034	0.032	---	0.00
258	21.50	0.07	0.034	0.032	---	0.00
259	21.58	0.10	0.051	0.032	---	0.02
260	21.67	0.10	0.051	0.032	---	0.02
261	21.75	0.10	0.051	0.031	---	0.02
262	21.83	0.07	0.034	0.031	---	0.00
263	21.92	0.07	0.034	0.031	---	0.00
264	22.00	0.07	0.034	0.031	---	0.00
265	22.08	0.10	0.051	0.031	---	0.02
266	22.17	0.10	0.051	0.031	---	0.02
267	22.25	0.10	0.051	0.031	---	0.02
268	22.33	0.07	0.034	0.031	---	0.00
269	22.42	0.07	0.034	0.031	---	0.00
270	22.50	0.07	0.034	0.031	---	0.00
271	22.58	0.07	0.034	0.030	---	0.00
272	22.67	0.07	0.034	0.030	---	0.00
273	22.75	0.07	0.034	0.030	---	0.00
274	22.83	0.07	0.034	0.030	---	0.00
275	22.92	0.07	0.034	0.030	---	0.00
276	23.00	0.07	0.034	0.030	---	0.00
277	23.08	0.07	0.034	0.030	---	0.00
278	23.17	0.07	0.034	0.030	---	0.00
279	23.25	0.07	0.034	0.030	---	0.00
280	23.33	0.07	0.034	0.030	---	0.00
281	23.42	0.07	0.034	0.030	---	0.00
282	23.50	0.07	0.034	0.030	---	0.00
283	23.58	0.07	0.034	0.030	---	0.00
284	23.67	0.07	0.034	0.030	---	0.00
285	23.75	0.07	0.034	0.030	---	0.00
286	23.83	0.07	0.034	0.029	---	0.00
287	23.92	0.07	0.034	0.029	---	0.00
288	24.00	0.07	0.034	0.029	---	0.00
	Sum =	100.0			Sum =	38.0

Flood volume = Effective rainfall 3.17(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 15.5(Ac.Ft)
Total soil loss = 1.08(In)
Total soil loss = 5.304(Ac.Ft)
Total rainfall = 4.25(In)
Flood volume = 674430.3 Cubic Feet
Total soil loss = 231060.1 Cubic Feet

Peak flow rate of this hydrograph = 30.916(CFS)

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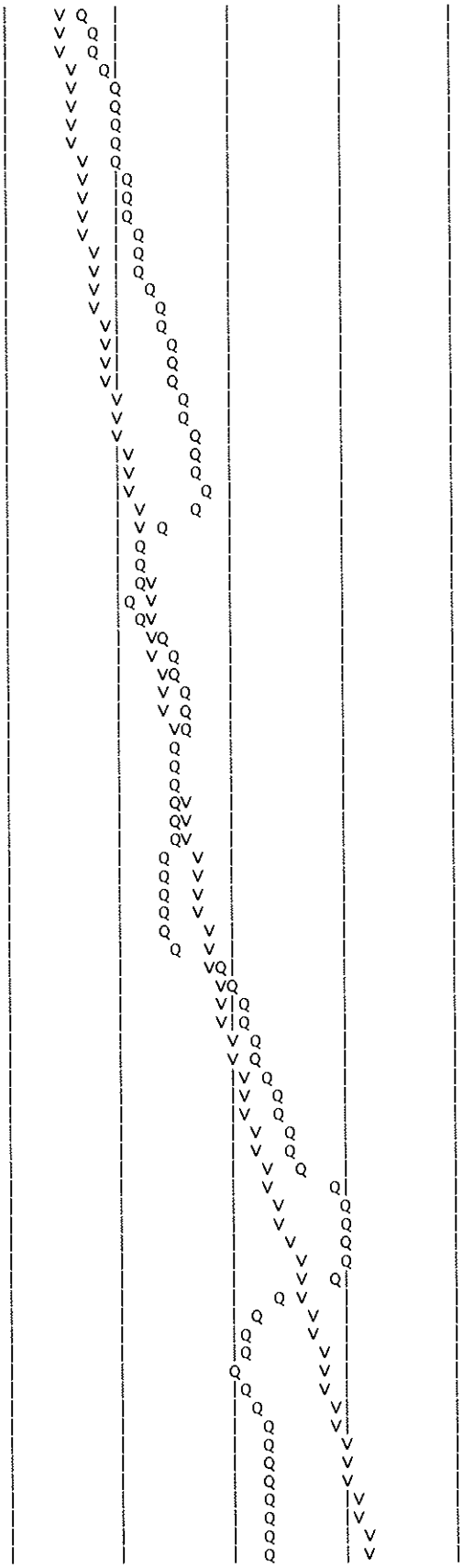
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0016	0.24	Q				
0+10	0.0085	0.99	Q				
0+15	0.0174	1.30	VQ				
0+20	0.0281	1.55	VQ				
0+25	0.0419	2.01	V Q				
0+30	0.0572	2.21	V Q				
0+35	0.0731	2.31	V Q				
0+40	0.0895	2.38	V Q				

0+45	0.1061	2.42	V Q				
0+50	0.1238	2.57	V Q				
0+55	0.1441	2.96	V Q				
1+ 0	0.1656	3.12	V Q				
1+ 5	0.1868	3.07	V Q				
1+10	0.2056	2.74	V Q				
1+15	0.2236	2.60	V Q				
1+20	0.2412	2.56	V Q				
1+25	0.2586	2.53	V Q				
1+30	0.2759	2.51	V Q				
1+35	0.2931	2.50	V Q				
1+40	0.3103	2.49	V Q				
1+45	0.3274	2.48	V Q				
1+50	0.3452	2.59	V Q				
1+55	0.3657	2.97	V Q				
2+ 0	0.3872	3.13	V Q				
2+ 5	0.4092	3.19	V Q				
2+10	0.4314	3.23	V Q				
2+15	0.4539	3.26	V Q				
2+20	0.4764	3.27	V Q				
2+25	0.4990	3.29	V Q				
2+30	0.5217	3.29	V Q				
2+35	0.5453	3.42	V Q				
2+40	0.5714	3.80	V Q				
2+45	0.5986	3.95	V Q				
2+50	0.6263	4.02	V Q				
2+55	0.6542	4.06	V Q				
3+ 0	0.6823	4.08	V Q				
3+ 5	0.7105	4.10	V Q				
3+10	0.7388	4.11	V Q				
3+15	0.7672	4.12	V Q				
3+20	0.7956	4.13	V Q				
3+25	0.8240	4.13	V Q				
3+30	0.8524	4.13	V Q				
3+35	0.8808	4.13	V Q				
3+40	0.9092	4.13	V Q				
3+45	0.9376	4.13	V Q				
3+50	0.9628	3.66	VQ				
3+55	0.9779	2.19	Q				
4+ 0	0.9888	1.59	QV				
4+ 5	0.9981	1.35	QV				
4+10	1.0064	1.21	QV				
4+15	1.0142	1.13	QV				
4+20	1.0227	1.23	QV				
4+25	1.0342	1.66	QV				
4+30	1.0469	1.84	QV				
4+35	1.0601	1.92	QV				
4+40	1.0738	1.99	QV				
4+45	1.0878	2.04	Q				
4+50	1.1031	2.23	Q				
4+55	1.1218	2.72	Q				
5+ 0	1.1421	2.94	Q				
5+ 5	1.1611	2.76	Q				
5+10	1.1743	1.91	Q V				
5+15	1.1852	1.58	Q V				
5+20	1.1963	1.61	Q V				
5+25	1.2101	2.01	QV				
5+30	1.2251	2.17	QV				
5+35	1.2414	2.38	QV				
5+40	1.2613	2.88	QV				
5+45	1.2826	3.10	Q				
5+50	1.3047	3.21	Q				
5+55	1.3274	3.29	Q				
6+ 0	1.3504	3.35	Q				
6+ 5	1.3749	3.54	Q				
6+10	1.4027	4.04	VQ				
6+15	1.4320	4.26	VQ				
6+20	1.4621	4.37	VQ				
6+25	1.4926	4.44	VQ				
6+30	1.5235	4.49	VQ				
6+35	1.5557	4.67	Q				
6+40	1.5913	5.17	VQ				
6+45	1.6284	5.39	VQ				
6+50	1.6662	5.50	VQ				
6+55	1.7045	5.56	VQ				
7+ 0	1.7432	5.61	VQ				
7+ 5	1.7821	5.65	VQ				
7+10	1.8213	5.69	VQ				
7+15	1.8607	5.72	VQ				
7+20	1.9013	5.89	VQ				
7+25	1.9451	6.37	VQ				
7+30	1.9905	6.58	VQ				
7+35	2.0375	6.82	VQ				
7+40	2.0881	7.35	V Q				
7+45	2.1404	7.59	V Q				

7+50	2.1945	7.86	
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8+20	2.5897	10.71	
8+25	2.6644	10.84	
8+30	2.7396	10.93	
8+35	2.8164	11.15	
8+40	2.8967	11.65	
8+45	2.9785	11.88	
8+50	3.0621	12.14	
8+55	3.1493	12.67	
9+ 0	3.2382	12.91	
9+ 5	3.3299	13.32	
9+10	3.4285	14.31	
9+15	3.5301	14.75	
9+20	3.6342	15.11	
9+25	3.7422	15.69	
9+30	3.8522	15.97	
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10+ 0	4.5656	18.15	
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11+ 0	5.7476	16.35	
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11+15	6.0791	15.83	
11+20	6.1880	15.82	
11+25	6.2967	15.78	
11+30	6.4053	15.77	
11+35	6.5119	15.48	
11+40	6.6122	14.56	
11+45	6.7099	14.19	
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12+ 0	7.0091	14.71	
12+ 5	7.1178	15.77	
12+10	7.2488	19.02	
12+15	7.3891	20.38	
12+20	7.5345	21.11	
12+25	7.6855	21.93	
12+30	7.8395	22.36	
12+35	7.9972	22.90	
12+40	8.1624	23.99	
12+45	8.3310	24.48	
12+50	8.5024	24.88	
12+55	8.6778	25.47	
13+ 0	8.8551	25.74	
13+ 5	9.0383	26.61	
13+10	9.2381	29.00	
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14+15	11.5088	23.53	
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14+25	11.8326	23.38	
14+30	11.9932	23.32	
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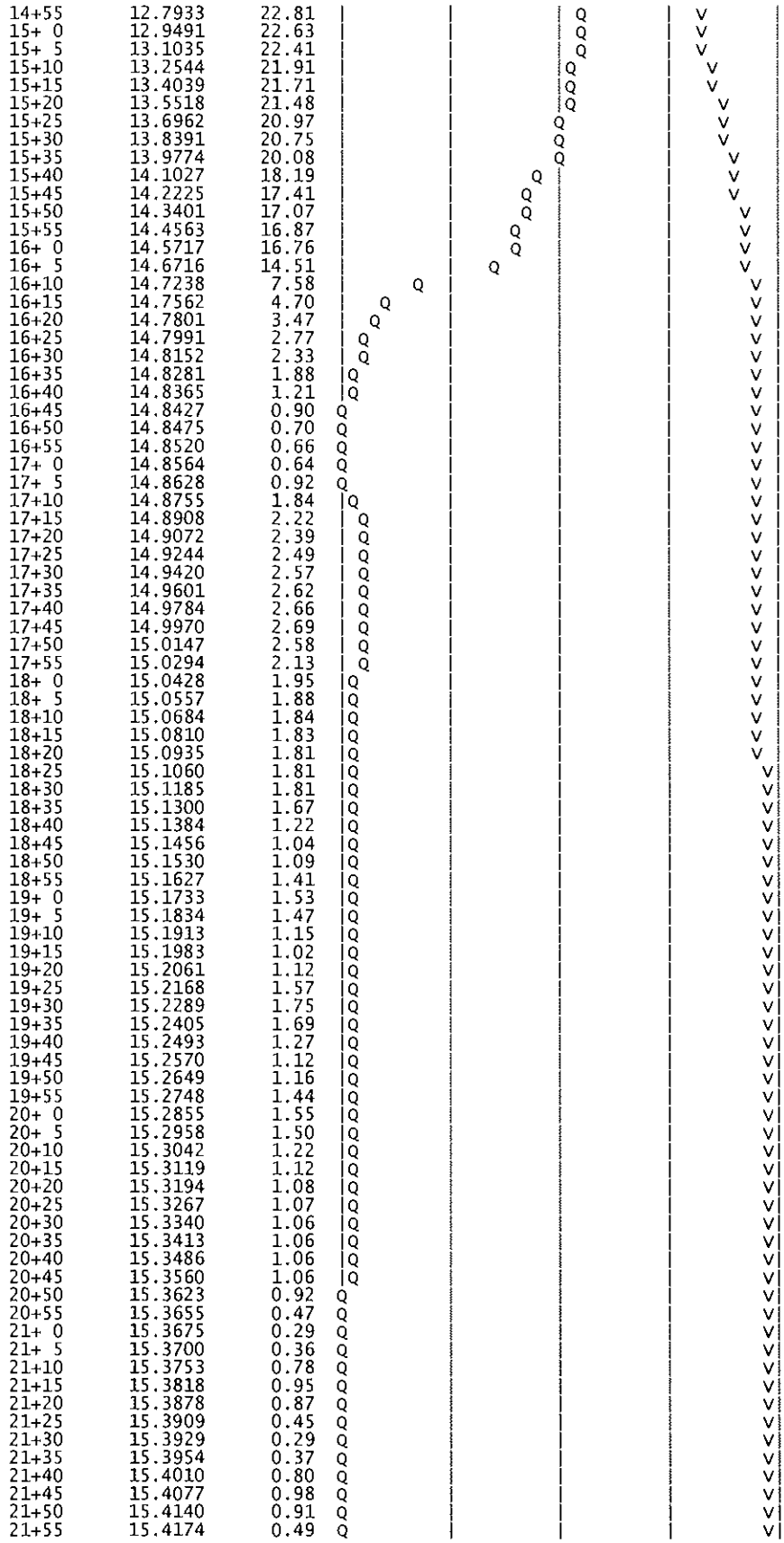

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15+ 5	13.1035	22.41	
15+10	13.2544	21.91	
15+15	13.4039	21.71	
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15+30	13.8391	20.75	
15+35	13.9774	20.08	
15+40	14.1027	18.19	
15+45	14.2225	17.41	
15+50	14.3401	17.07	
15+55	14.4563	16.87	
16+ 0	14.5717	16.76	
16+ 5	14.6716	14.51	
16+10	14.7238	7.58	
16+15	14.7562	4.70	
16+20	14.7801	3.47	
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16+30	14.8152	2.33	
16+35	14.8281	1.88	
16+40	14.8365	1.21	
16+45	14.8427	0.90	
16+50	14.8475	0.70	
16+55	14.8520	0.66	
17+ 0	14.8564	0.64	
17+ 5	14.8628	0.92	
17+10	14.8755	1.84	
17+15	14.8908	2.22	
17+20	14.9072	2.39	
17+25	14.9244	2.49	
17+30	14.9420	2.57	
17+35	14.9601	2.62	
17+40	14.9784	2.66	
17+45	14.9970	2.69	
17+50	15.0147	2.58	
17+55	15.0294	2.13	
18+ 0	15.0428	1.95	
18+ 5	15.0557	1.88	
18+10	15.0684	1.84	
18+15	15.0810	1.83	
18+20	15.0935	1.81	
18+25	15.1060	1.81	
18+30	15.1185	1.81	
18+35	15.1300	1.67	
18+40	15.1384	1.22	
18+45	15.1456	1.04	
18+50	15.1530	1.09	
18+55	15.1627	1.41	
19+ 0	15.1733	1.53	
19+ 5	15.1834	1.47	
19+10	15.1913	1.15	
19+15	15.1983	1.02	
19+20	15.2061	1.12	
19+25	15.2168	1.57	
19+30	15.2289	1.75	
19+35	15.2405	1.69	
19+40	15.2493	1.27	
19+45	15.2570	1.12	
19+50	15.2649	1.16	
19+55	15.2748	1.44	
20+ 0	15.2855	1.55	
20+ 5	15.2958	1.50	
20+10	15.3042	1.22	
20+15	15.3119	1.12	
20+20	15.3194	1.08	
20+25	15.3267	1.07	
20+30	15.3340	1.06	
20+35	15.3413	1.06	
20+40	15.3486	1.06	
20+45	15.3560	1.06	
20+50	15.3623	0.92	
20+55	15.3655	0.47	
21+ 0	15.3675	0.29	
21+ 5	15.3700	0.36	
21+10	15.3753	0.78	
21+15	15.3818	0.95	
21+20	15.3878	0.87	
21+25	15.3909	0.45	
21+30	15.3929	0.29	
21+35	15.3954	0.37	
21+40	15.4010	0.80	
21+45	15.4077	0.98	
21+50	15.4140	0.91	
21+55	15.4174	0.49	

22+ 0	15.4196	0.33	Q	|	|	|	V|
22+ 5	15.4225	0.41	Q	|	|	|	V|
22+10	15.4283	0.84	Q	|	|	|	V|
22+15	15.4353	1.02	|Q	|	|	|	V|
22+20	15.4418	0.95	Q	|	|	|	V|
22+25	15.4454	0.53	Q	|	|	|	V|
22+30	15.4479	0.36	Q	|	|	|	V|
22+35	15.4500	0.30	Q	|	|	|	V|
22+40	15.4519	0.27	Q	|	|	|	V|
22+45	15.4537	0.26	Q	|	|	|	V|
22+50	15.4554	0.25	Q	|	|	|	V|
22+55	15.4571	0.24	Q	|	|	|	V|
23+ 0	15.4587	0.24	Q	|	|	|	V|
23+ 5	15.4603	0.23	Q	|	|	|	V|
23+10	15.4619	0.24	Q	|	|	|	V|
23+15	15.4636	0.24	Q	|	|	|	V|
23+20	15.4653	0.24	Q	|	|	|	V|
23+25	15.4670	0.25	Q	|	|	|	V|
23+30	15.4687	0.25	Q	|	|	|	V|
23+35	15.4704	0.25	Q	|	|	|	V|
23+40	15.4722	0.26	Q	|	|	|	V|
23+45	15.4740	0.26	Q	|	|	|	V|
23+50	15.4758	0.26	Q	|	|	|	V|
23+55	15.4776	0.27	Q	|	|	|	V|
24+ 0	15.4795	0.27	Q	|	|	|	V|
24+ 5	15.4811	0.23	Q	|	|	|	V|
24+10	15.4818	0.11	Q	|	|	|	V|
24+15	15.4822	0.06	Q	|	|	|	V|
24+20	15.4824	0.04	Q	|	|	|	V|
24+25	15.4826	0.02	Q	|	|	|	V|
24+30	15.4827	0.01	Q	|	|	|	V|
24+35	15.4827	0.01	Q	|	|	|	V|
24+40	15.4828	0.00	Q	|	|	|	V|
24+45	15.4828	0.00	Q	|	|	|	V|

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727S10024100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 100-YEAR

-----------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            1.70                  106.08

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            4.25                  265.20

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    1.700(In)
Area Averaged 100-Year Rainfall =    4.250(In)

Point rain (area averaged) =    4.250(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    4.249(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    56.400           56.00         0.900
     6.000           86.00         0.000
 Total Area Entered =     62.40(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  74.8      0.305     0.900        0.058       0.904      0.052
86.0  94.4      0.073     0.000        0.073       0.096      0.007
                                                  Sum (F) =   0.059
Area averaged mean soil loss (F) (In/Hr) =  0.059
Minimum soil loss rate ((In/Hr)) =  0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-----------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000 Sum=	62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.034	0.105	0.006	0.03
2	0.17	0.07	0.034	0.105	0.006	0.03
3	0.25	0.07	0.034	0.105	0.006	0.03
4	0.33	0.10	0.051	0.104	0.009	0.04
5	0.42	0.10	0.051	0.104	0.009	0.04
6	0.50	0.10	0.051	0.103	0.009	0.04
7	0.58	0.10	0.051	0.103	0.009	0.04
8	0.67	0.10	0.051	0.103	0.009	0.04
9	0.75	0.10	0.051	0.102	0.009	0.04
10	0.83	0.13	0.068	0.102	0.012	0.06
11	0.92	0.13	0.068	0.101	0.012	0.06
12	1.00	0.13	0.068	0.101	0.012	0.06
13	1.08	0.10	0.051	0.101	0.009	0.04
14	1.17	0.10	0.051	0.100	0.009	0.04
15	1.25	0.10	0.051	0.100	0.009	0.04
16	1.33	0.10	0.051	0.099	0.009	0.04
17	1.42	0.10	0.051	0.099	0.009	0.04
18	1.50	0.10	0.051	0.099	0.009	0.04
19	1.58	0.10	0.051	0.098	0.009	0.04
20	1.67	0.10	0.051	0.098	0.009	0.04
21	1.75	0.10	0.051	0.097	0.009	0.04
22	1.83	0.13	0.068	0.097	0.012	0.06
23	1.92	0.13	0.068	0.097	0.012	0.06
24	2.00	0.13	0.068	0.096	0.012	0.06
25	2.08	0.13	0.068	0.096	0.012	0.06
26	2.17	0.13	0.068	0.095	0.012	0.06
27	2.25	0.13	0.068	0.095	0.012	0.06
28	2.33	0.13	0.068	0.095	0.012	0.06
29	2.42	0.13	0.068	0.094	0.012	0.06
30	2.50	0.13	0.068	0.094	0.012	0.06
31	2.58	0.17	0.085	0.093	0.015	0.07
32	2.67	0.17	0.085	0.093	0.015	0.07
33	2.75	0.17	0.085	0.093	0.015	0.07
34	2.83	0.17	0.085	0.092	0.015	0.07
35	2.92	0.17	0.085	0.092	0.015	0.07
36	3.00	0.17	0.085	0.092	0.015	0.07
37	3.08	0.17	0.085	0.091	0.015	0.07
38	3.17	0.17	0.085	0.091	0.015	0.07
39	3.25	0.17	0.085	0.090	0.015	0.07
40	3.33	0.17	0.085	0.090	0.015	0.07
41	3.42	0.17	0.085	0.090	0.015	0.07
42	3.50	0.17	0.085	0.089	0.015	0.07
43	3.58	0.17	0.085	0.089	0.015	0.07
44	3.67	0.17	0.085	0.089	0.015	0.07
45	3.75	0.17	0.085	0.088	0.015	0.07
46	3.83	0.20	0.102	0.088	---	0.01
47	3.92	0.20	0.102	0.087	---	0.01
48	4.00	0.20	0.102	0.087	---	0.01
49	4.08	0.20	0.102	0.087	---	0.02
50	4.17	0.20	0.102	0.086	---	0.02
51	4.25	0.20	0.102	0.086	---	0.02
52	4.33	0.23	0.119	0.086	---	0.03
53	4.42	0.23	0.119	0.085	---	0.03
54	4.50	0.23	0.119	0.085	---	0.03
55	4.58	0.23	0.119	0.085	---	0.03
56	4.67	0.23	0.119	0.084	---	0.03
57	4.75	0.23	0.119	0.084	---	0.04
58	4.83	0.27	0.136	0.083	---	0.05
59	4.92	0.27	0.136	0.083	---	0.05
60	5.00	0.27	0.136	0.083	---	0.05
61	5.08	0.20	0.102	0.082	---	0.02
62	5.17	0.20	0.102	0.082	---	0.02
63	5.25	0.20	0.102	0.082	---	0.02

64	5.33	0.23	0.119	0.081	---	0.04
65	5.42	0.23	0.119	0.081	---	0.04
66	5.50	0.23	0.119	0.081	---	0.04
67	5.58	0.27	0.136	0.080	---	0.06
68	5.67	0.27	0.136	0.080	---	0.06
69	5.75	0.27	0.136	0.080	---	0.06
70	5.83	0.27	0.136	0.079	---	0.06
71	5.92	0.27	0.136	0.079	---	0.06
72	6.00	0.27	0.136	0.078	---	0.06
73	6.08	0.30	0.153	0.078	---	0.07
74	6.17	0.30	0.153	0.078	---	0.08
75	6.25	0.30	0.153	0.077	---	0.08
76	6.33	0.30	0.153	0.077	---	0.08
77	6.42	0.30	0.153	0.077	---	0.08
78	6.50	0.30	0.153	0.076	---	0.08
79	6.58	0.33	0.170	0.076	---	0.09
80	6.67	0.33	0.170	0.076	---	0.09
81	6.75	0.33	0.170	0.075	---	0.09
82	6.83	0.33	0.170	0.075	---	0.09
83	6.92	0.33	0.170	0.075	---	0.10
84	7.00	0.33	0.170	0.074	---	0.10
85	7.08	0.33	0.170	0.074	---	0.10
86	7.17	0.33	0.170	0.074	---	0.10
87	7.25	0.33	0.170	0.073	---	0.10
88	7.33	0.37	0.187	0.073	---	0.11
89	7.42	0.37	0.187	0.073	---	0.11
90	7.50	0.37	0.187	0.072	---	0.11
91	7.58	0.40	0.204	0.072	---	0.13
92	7.67	0.40	0.204	0.072	---	0.13
93	7.75	0.40	0.204	0.071	---	0.13
94	7.83	0.43	0.221	0.071	---	0.15
95	7.92	0.43	0.221	0.071	---	0.15
96	8.00	0.43	0.221	0.070	---	0.15
97	8.08	0.50	0.255	0.070	---	0.18
98	8.17	0.50	0.255	0.070	---	0.19
99	8.25	0.50	0.255	0.069	---	0.19
100	8.33	0.50	0.255	0.069	---	0.19
101	8.42	0.50	0.255	0.069	---	0.19
102	8.50	0.50	0.255	0.068	---	0.19
103	8.58	0.53	0.272	0.068	---	0.20
104	8.67	0.53	0.272	0.068	---	0.20
105	8.75	0.53	0.272	0.067	---	0.20
106	8.83	0.57	0.289	0.067	---	0.22
107	8.92	0.57	0.289	0.067	---	0.22
108	9.00	0.57	0.289	0.066	---	0.22
109	9.08	0.63	0.323	0.066	---	0.26
110	9.17	0.63	0.323	0.066	---	0.26
111	9.25	0.63	0.323	0.066	---	0.26
112	9.33	0.67	0.340	0.065	---	0.27
113	9.42	0.67	0.340	0.065	---	0.28
114	9.50	0.67	0.340	0.065	---	0.28
115	9.58	0.70	0.357	0.064	---	0.29
116	9.67	0.70	0.357	0.064	---	0.29
117	9.75	0.70	0.357	0.064	---	0.29
118	9.83	0.73	0.374	0.063	---	0.31
119	9.92	0.73	0.374	0.063	---	0.31
120	10.00	0.73	0.374	0.063	---	0.31
121	10.08	0.50	0.255	0.062	---	0.19
122	10.17	0.50	0.255	0.062	---	0.19
123	10.25	0.50	0.255	0.062	---	0.19
124	10.33	0.50	0.255	0.062	---	0.19
125	10.42	0.50	0.255	0.061	---	0.19
126	10.50	0.50	0.255	0.061	---	0.19
127	10.58	0.67	0.340	0.061	---	0.28
128	10.67	0.67	0.340	0.060	---	0.28
129	10.75	0.67	0.340	0.060	---	0.28
130	10.83	0.67	0.340	0.060	---	0.28
131	10.92	0.67	0.340	0.059	---	0.28
132	11.00	0.67	0.340	0.059	---	0.28
133	11.08	0.63	0.323	0.059	---	0.26
134	11.17	0.63	0.323	0.059	---	0.26
135	11.25	0.63	0.323	0.058	---	0.26
136	11.33	0.63	0.323	0.058	---	0.26
137	11.42	0.63	0.323	0.058	---	0.27
138	11.50	0.63	0.323	0.057	---	0.27
139	11.58	0.57	0.289	0.057	---	0.23
140	11.67	0.57	0.289	0.057	---	0.23
141	11.75	0.57	0.289	0.057	---	0.23
142	11.83	0.60	0.306	0.056	---	0.25
143	11.92	0.60	0.306	0.056	---	0.25
144	12.00	0.60	0.306	0.056	---	0.25
145	12.08	0.83	0.425	0.055	---	0.37
146	12.17	0.83	0.425	0.055	---	0.37
147	12.25	0.83	0.425	0.055	---	0.37
148	12.33	0.87	0.442	0.055	---	0.39

149	12.42	0.87	0.442	0.054	---	0.39
150	12.50	0.87	0.442	0.054	---	0.39
151	12.58	0.93	0.476	0.054	---	0.42
152	12.67	0.93	0.476	0.054	---	0.42
153	12.75	0.93	0.476	0.053	---	0.42
154	12.83	0.97	0.493	0.053	---	0.44
155	12.92	0.97	0.493	0.053	---	0.44
156	13.00	0.97	0.493	0.052	---	0.44
157	13.08	1.13	0.578	0.052	---	0.53
158	13.17	1.13	0.578	0.052	---	0.53
159	13.25	1.13	0.578	0.052	---	0.53
160	13.33	1.13	0.578	0.051	---	0.53
161	13.42	1.13	0.578	0.051	---	0.53
162	13.50	1.13	0.578	0.051	---	0.53
163	13.58	0.77	0.391	0.051	---	0.34
164	13.67	0.77	0.391	0.050	---	0.34
165	13.75	0.77	0.391	0.050	---	0.34
166	13.83	0.77	0.391	0.050	---	0.34
167	13.92	0.77	0.391	0.050	---	0.34
168	14.00	0.77	0.391	0.049	---	0.34
169	14.08	0.90	0.459	0.049	---	0.41
170	14.17	0.90	0.459	0.049	---	0.41
171	14.25	0.90	0.459	0.049	---	0.41
172	14.33	0.87	0.442	0.048	---	0.39
173	14.42	0.87	0.442	0.048	---	0.39
174	14.50	0.87	0.442	0.048	---	0.39
175	14.58	0.87	0.442	0.048	---	0.39
176	14.67	0.87	0.442	0.047	---	0.39
177	14.75	0.87	0.442	0.047	---	0.39
178	14.83	0.83	0.425	0.047	---	0.38
179	14.92	0.83	0.425	0.047	---	0.38
180	15.00	0.83	0.425	0.046	---	0.38
181	15.08	0.80	0.408	0.046	---	0.36
182	15.17	0.80	0.408	0.046	---	0.36
183	15.25	0.80	0.408	0.046	---	0.36
184	15.33	0.77	0.391	0.045	---	0.35
185	15.42	0.77	0.391	0.045	---	0.35
186	15.50	0.77	0.391	0.045	---	0.35
187	15.58	0.63	0.323	0.045	---	0.28
188	15.67	0.63	0.323	0.045	---	0.28
189	15.75	0.63	0.323	0.044	---	0.28
190	15.83	0.63	0.323	0.044	---	0.28
191	15.92	0.63	0.323	0.044	---	0.28
192	16.00	0.63	0.323	0.044	---	0.28
193	16.08	0.13	0.068	0.043	---	0.02
194	16.17	0.13	0.068	0.043	---	0.02
195	16.25	0.13	0.068	0.043	---	0.03
196	16.33	0.13	0.068	0.043	---	0.03
197	16.42	0.13	0.068	0.043	---	0.03
198	16.50	0.13	0.068	0.042	---	0.03
199	16.58	0.10	0.051	0.042	---	0.01
200	16.67	0.10	0.051	0.042	---	0.01
201	16.75	0.10	0.051	0.042	---	0.01
202	16.83	0.10	0.051	0.041	---	0.01
203	16.92	0.10	0.051	0.041	---	0.01
204	17.00	0.10	0.051	0.041	---	0.01
205	17.08	0.17	0.085	0.041	---	0.04
206	17.17	0.17	0.085	0.041	---	0.04
207	17.25	0.17	0.085	0.040	---	0.04
208	17.33	0.17	0.085	0.040	---	0.04
209	17.42	0.17	0.085	0.040	---	0.04
210	17.50	0.17	0.085	0.040	---	0.05
211	17.58	0.17	0.085	0.040	---	0.05
212	17.67	0.17	0.085	0.039	---	0.05
213	17.75	0.17	0.085	0.039	---	0.05
214	17.83	0.13	0.068	0.039	---	0.03
215	17.92	0.13	0.068	0.039	---	0.03
216	18.00	0.13	0.068	0.039	---	0.03
217	18.08	0.13	0.068	0.038	---	0.03
218	18.17	0.13	0.068	0.038	---	0.03
219	18.25	0.13	0.068	0.038	---	0.03
220	18.33	0.13	0.068	0.038	---	0.03
221	18.42	0.13	0.068	0.038	---	0.03
222	18.50	0.13	0.068	0.038	---	0.03
223	18.58	0.10	0.051	0.037	---	0.01
224	18.67	0.10	0.051	0.037	---	0.01
225	18.75	0.10	0.051	0.037	---	0.01
226	18.83	0.07	0.034	0.037	0.006	0.03
227	18.92	0.07	0.034	0.037	0.006	0.03
228	19.00	0.07	0.034	0.036	0.006	0.03
229	19.08	0.10	0.051	0.036	---	0.01
230	19.17	0.10	0.051	0.036	---	0.01
231	19.25	0.10	0.051	0.036	---	0.02
232	19.33	0.13	0.068	0.036	---	0.03
233	19.42	0.13	0.068	0.036	---	0.03

234	19.50	0.13	0.068	0.035	---	0.03
235	19.58	0.10	0.051	0.035	---	0.02
236	19.67	0.10	0.051	0.035	---	0.02
237	19.75	0.10	0.051	0.035	---	0.02
238	19.83	0.07	0.034	0.035	0.006	0.03
239	19.92	0.07	0.034	0.035	0.006	0.03
240	20.00	0.07	0.034	0.035	0.006	0.03
241	20.08	0.10	0.051	0.034	---	0.02
242	20.17	0.10	0.051	0.034	---	0.02
243	20.25	0.10	0.051	0.034	---	0.02
244	20.33	0.10	0.051	0.034	---	0.02
245	20.42	0.10	0.051	0.034	---	0.02
246	20.50	0.10	0.051	0.034	---	0.02
247	20.58	0.10	0.051	0.033	---	0.02
248	20.67	0.10	0.051	0.033	---	0.02
249	20.75	0.10	0.051	0.033	---	0.02
250	20.83	0.07	0.034	0.033	---	0.00
251	20.92	0.07	0.034	0.033	---	0.00
252	21.00	0.07	0.034	0.033	---	0.00
253	21.08	0.10	0.051	0.033	---	0.02
254	21.17	0.10	0.051	0.033	---	0.02
255	21.25	0.10	0.051	0.032	---	0.02
256	21.33	0.07	0.034	0.032	---	0.00
257	21.42	0.07	0.034	0.032	---	0.00
258	21.50	0.07	0.034	0.032	---	0.00
259	21.58	0.10	0.051	0.032	---	0.02
260	21.67	0.10	0.051	0.032	---	0.02
261	21.75	0.10	0.051	0.032	---	0.02
262	21.83	0.07	0.034	0.032	---	0.00
263	21.92	0.07	0.034	0.031	---	0.00
264	22.00	0.07	0.034	0.031	---	0.00
265	22.08	0.10	0.051	0.031	---	0.02
266	22.17	0.10	0.051	0.031	---	0.02
267	22.25	0.10	0.051	0.031	---	0.02
268	22.33	0.07	0.034	0.031	---	0.00
269	22.42	0.07	0.034	0.031	---	0.00
270	22.50	0.07	0.034	0.031	---	0.00
271	22.58	0.07	0.034	0.031	---	0.00
272	22.67	0.07	0.034	0.031	---	0.00
273	22.75	0.07	0.034	0.031	---	0.00
274	22.83	0.07	0.034	0.030	---	0.00
275	22.92	0.07	0.034	0.030	---	0.00
276	23.00	0.07	0.034	0.030	---	0.00
277	23.08	0.07	0.034	0.030	---	0.00
278	23.17	0.07	0.034	0.030	---	0.00
279	23.25	0.07	0.034	0.030	---	0.00
280	23.33	0.07	0.034	0.030	---	0.00
281	23.42	0.07	0.034	0.030	---	0.00
282	23.50	0.07	0.034	0.030	---	0.00
283	23.58	0.07	0.034	0.030	---	0.00
284	23.67	0.07	0.034	0.030	---	0.00
285	23.75	0.07	0.034	0.030	---	0.00
286	23.83	0.07	0.034	0.030	---	0.00
287	23.92	0.07	0.034	0.030	---	0.00
288	24.00	0.07	0.034	0.030	---	0.00
Sum =		100.0			Sum =	37.9

Flood volume = Effective rainfall 3.16(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 16.4(Ac.Ft)
Total soil loss = 1.09(In)
Total soil loss = 5.691(Ac.Ft)
Total rainfall = 4.25(In)
Flood volume = 714679.8 Cubic Feet
Total soil loss = 247878.9 Cubic Feet

Peak flow rate of this hydrograph = 32.988(CFS)

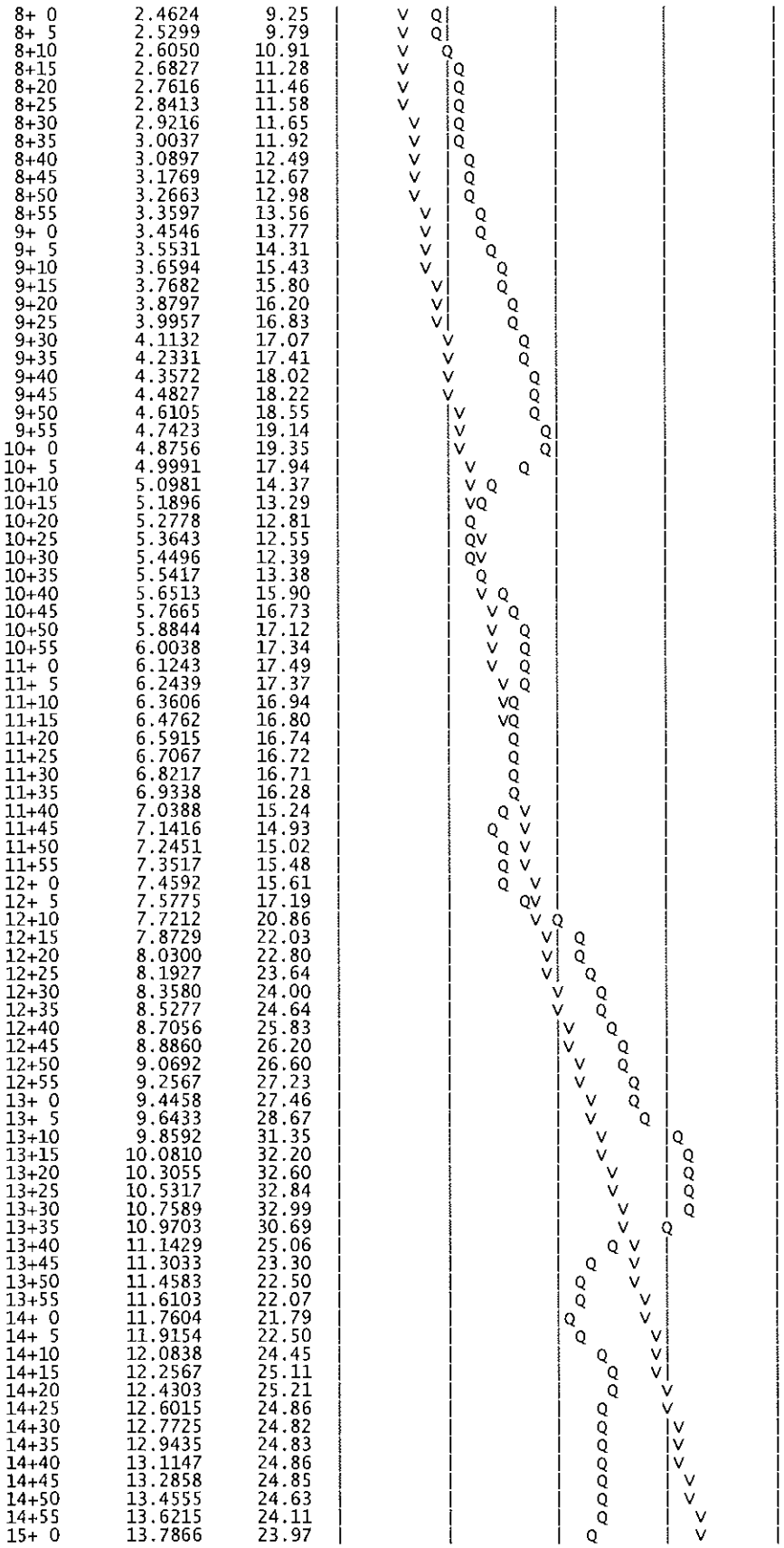
++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0025	0.36	Q	|	|	|	|
0+10	0.0108	1.21	VQ	|	|	|	|
0+15	0.0209	1.47	VQ	|	|	|	|
0+20	0.0332	1.77	VQ	|	|	|	|
0+25	0.0488	2.27	V Q	|	|	|	|
0+30	0.0656	2.44	V Q	|	|	|	|
0+35	0.0830	2.53	V Q	|	|	|	|
0+40	0.1008	2.59	V Q	|	|	|	|
0+45	0.1188	2.61	V Q	|	|	|	|
0+50	0.1380	2.80	V Q	|	|	|	|

0+55	0.1603	3.24	V Q				
1+ 0	0.1835	3.37	V Q				
1+ 5	0.2059	3.25	V Q				
1+10	0.2256	2.86	V Q				
1+15	0.2445	2.75	V Q				
1+20	0.2631	2.70	V Q				
1+25	0.2815	2.68	V Q				
1+30	0.2998	2.66	V Q				
1+35	0.3180	2.64	V Q				
1+40	0.3361	2.63	V Q				
1+45	0.3542	2.63	V Q				
1+50	0.3736	2.81	V Q				
1+55	0.3959	3.24	V Q				
2+ 0	0.4191	3.37	V Q				
2+ 5	0.4427	3.43	V Q				
2+10	0.4665	3.46	V Q				
2+15	0.4905	3.48	V Q				
2+20	0.5146	3.50	V Q				
2+25	0.5388	3.51	V Q				
2+30	0.5629	3.51	V Q				
2+35	0.5883	3.69	V Q				
2+40	0.6166	4.11	V Q				
2+45	0.6459	4.25	V Q				
2+50	0.6755	4.31	V Q				
2+55	0.7054	4.34	V Q				
3+ 0	0.7354	4.36	V Q				
3+ 5	0.7656	4.37	V Q				
3+10	0.7958	4.38	V Q				
3+15	0.8260	4.38	V Q				
3+20	0.8562	4.38	V Q				
3+25	0.8864	4.38	V Q				
3+30	0.9166	4.38	V Q				
3+35	0.9468	4.38	V Q				
3+40	0.9770	4.38	V Q				
3+45	1.0072	4.38	V Q				
3+50	1.0325	3.68	VQ				
3+55	1.0461	1.98	QV				
4+ 0	1.0562	1.47	QV				
4+ 5	1.0648	1.25	QV				
4+10	1.0726	1.14	QV				
4+15	1.0800	1.07	QV				
4+20	1.0887	1.26	QV				
4+25	1.1008	1.76	QV				
4+30	1.1142	1.94	QV				
4+35	1.1282	2.04	Q				
4+40	1.1427	2.10	Q				
4+45	1.1575	2.15	Q				
4+50	1.1741	2.41	Q				
4+55	1.1945	2.96	Q				
5+ 0	1.2162	3.15	VQ				
5+ 5	1.2355	2.81	QV				
5+10	1.2482	1.83	Q V				
5+15	1.2589	1.56	Q V				
5+20	1.2704	1.67	Q V				
5+25	1.2851	2.14	QV				
5+30	1.3008	2.27	QV				
5+35	1.3184	2.55	QV				
5+40	1.3398	3.11	Q				
5+45	1.3627	3.32	Q				
5+50	1.3863	3.43	Q				
5+55	1.4105	3.51	Q				
6+ 0	1.4350	3.56	Q				
6+ 5	1.4613	3.81	Q				
6+10	1.4914	4.37	VQ				
6+15	1.5227	4.55	VQ				
6+20	1.5547	4.65	VQ				
6+25	1.5872	4.71	VQ				
6+30	1.6199	4.76	VQ				
6+35	1.6545	5.01	VQ				
6+40	1.6928	5.57	VQ				
6+45	1.7324	5.75	VQ				
6+50	1.7727	5.85	VQ				
6+55	1.8134	5.91	VQ				
7+ 0	1.8544	5.96	VQ				
7+ 5	1.8957	5.99	VQ				
7+10	1.9372	6.03	V Q				
7+15	1.9789	6.05	V Q				
7+20	2.0222	6.29	V Q				
7+25	2.0693	6.83	VQ				
7+30	2.1176	7.01	V Q				
7+35	2.1680	7.32	V Q				
7+40	2.2225	7.91	V Q				
7+45	2.2784	8.12	V Q				
7+50	2.3365	8.44	V Q				
7+55	2.3988	9.04	V Q				



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8+ 5	2.5299	9.79	
8+10	2.6050	10.91	
8+15	2.6827	11.28	
8+20	2.7616	11.46	
8+25	2.8413	11.58	
8+30	2.9216	11.65	
8+35	3.0037	11.92	
8+40	3.0897	12.49	
8+45	3.1769	12.67	
8+50	3.2663	12.98	
8+55	3.3597	13.56	
9+ 0	3.4546	13.77	
9+ 5	3.5531	14.31	
9+10	3.6594	15.43	
9+15	3.7682	15.80	
9+20	3.8797	16.20	
9+25	3.9957	16.83	
9+30	4.1132	17.07	
9+35	4.2331	17.41	
9+40	4.3572	18.02	
9+45	4.4827	18.22	
9+50	4.6105	18.55	
9+55	4.7423	19.14	
10+ 0	4.8756	19.35	
10+ 5	4.9991	17.94	
10+10	5.0981	14.37	
10+15	5.1896	13.29	
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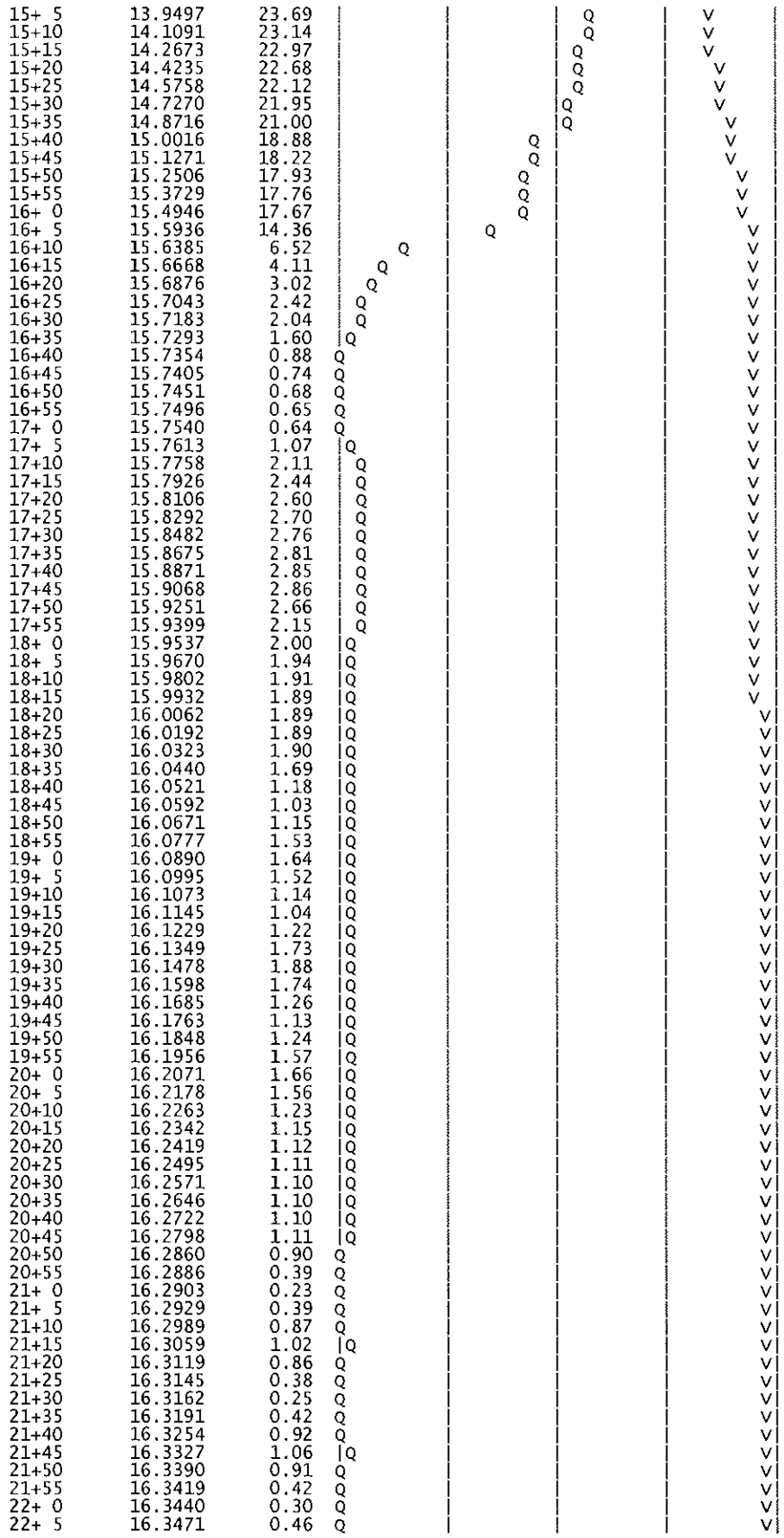
10+25	5.3643	12.55	
10+30	5.4496	12.39	
10+35	5.5417	13.38	
10+40	5.6513	15.90	
10+45	5.7665	16.73	
10+50	5.8844	17.12	
10+55	6.0038	17.34	
11+ 0	6.1243	17.49	
11+ 5	6.2439	17.37	
11+10	6.3606	16.94	
11+15	6.4762	16.80	
11+20	6.5915	16.74	
11+25	6.7067	16.72	
11+30	6.8217	16.71	
11+35	6.9338	16.28	
11+40	7.0388	15.24	
11+45	7.1416	14.93	
11+50	7.2451	15.02	
11+55	7.3517	15.48	
12+ 0	7.4592	15.61	
12+ 5	7.5775	17.19	
12+10	7.7212	20.86	
12+15	7.8729	22.03	
12+20	8.0300	22.80	
12+25	8.1927	23.64	
12+30	8.3580	24.00	
12+35	8.5277	24.64	
12+40	8.7056	25.83	
12+45	8.8860	26.20	
12+50	9.0692	26.60	
12+55	9.2567	27.23	
13+ 0	9.4458	27.46	
13+ 5	9.6433	28.67	
13+10	9.8592	31.35	
13+15	10.0810	32.20	
13+20	10.3055	32.60	
13+25	10.5317	32.84	
13+30	10.7589	32.99	
13+35	10.9703	30.69	
13+40	11.1429	25.06	
13+45	11.3033	23.30	
13+50	11.4583	22.50	
13+55	11.6103	22.07	
14+ 0	11.7604	21.79	
14+ 5	11.9154	22.50	
14+10	12.0838	24.45	
14+15	12.2567	25.11	
14+20	12.4303	25.21	
14+25	12.6015	24.86	
14+30	12.7725	24.82	
14+35	12.9435	24.83	
14+40	13.1147	24.86	
14+45	13.2858	24.85	
14+50	13.4555	24.63	
14+55	13.6215	24.11	
15+ 0	13.7866	23.97	



15+ 5	13.9497	23.69	
15+10	14.1091	23.14	
15+15	14.2673	22.97	
15+20	14.4235	22.68	
15+25	14.5758	22.12	
15+30	14.7270	21.95	
15+35	14.8716	21.00	
15+40	15.0016	18.88	
15+45	15.1271	18.22	
15+50	15.2506	17.93	
15+55	15.3729	17.76	
16+ 0	15.4946	17.67	
16+ 5	15.5936	14.36	
16+10	15.6385	6.52	
16+15	15.6668	4.11	
16+20	15.6876	3.02	
16+25	15.7043	2.42	
16+30	15.7183	2.04	
16+35	15.7293	1.60	
16+40	15.7354	0.88	
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16+50	15.7451	0.68	
16+55	15.7496	0.65	
17+ 0	15.7540	0.64	
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17+15	15.7926	2.44	
17+20	15.8106	2.60	
17+25	15.8292	2.70	
17+30	15.8482	2.76	
17+35	15.8675	2.81	
17+40	15.8871	2.85	
17+45	15.9068	2.86	
17+50	15.9251	2.66	
17+55	15.9399	2.15	
18+ 0	15.9537	2.00	
18+ 5	15.9670	1.94	
18+10	15.9802	1.91	
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18+25	16.0192	1.89	
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18+35	16.0440	1.69	
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18+45	16.0592	1.03	
18+50	16.0671	1.15	
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19+ 0	16.0890	1.64	
19+ 5	16.0995	1.52	
19+10	16.1073	1.14	
19+15	16.1145	1.04	
19+20	16.1229	1.22	
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19+35	16.1598	1.74	
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20+ 5	16.2178	1.56	
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20+55	16.2886	0.39	
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21+ 5	16.2929	0.39	
21+10	16.2989	0.87	
21+15	16.3059	1.02	
21+20	16.3119	0.86	
21+25	16.3145	0.38	
21+30	16.3162	0.25	
21+35	16.3191	0.42	
21+40	16.3254	0.92	
21+45	16.3327	1.06	
21+50	16.3390	0.91	
21+55	16.3419	0.42	
22+ 0	16.3440	0.30	
22+ 5	16.3471	0.46	

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22+10      16.3538      0.96  Q          |          |          |          V|
22+15      16.3614      1.10  |Q         |          |          |          V|
22+20      16.3679      0.95  Q          |          |          |          V|
22+25      16.3711      0.46  Q          |          |          |          V|
22+30      16.3734      0.33  Q          |          |          |          V|
22+35      16.3753      0.28  Q          |          |          |          V|
22+40      16.3771      0.26  Q          |          |          |          V|
22+45      16.3788      0.24  Q          |          |          |          V|
22+50      16.3803      0.23  Q          |          |          |          V|
22+55      16.3819      0.22  Q          |          |          |          V|
23+ 0      16.3834      0.23  Q          |          |          |          V|
23+ 5      16.3850      0.23  Q          |          |          |          V|
23+10      16.3866      0.23  Q          |          |          |          V|
23+15      16.3882      0.24  Q          |          |          |          V|
23+20      16.3899      0.24  Q          |          |          |          V|
23+25      16.3916      0.25  Q          |          |          |          V|
23+30      16.3933      0.25  Q          |          |          |          V|
23+35      16.3951      0.25  Q          |          |          |          V|
23+40      16.3969      0.26  Q          |          |          |          V|
23+45      16.3987      0.26  Q          |          |          |          V|
23+50      16.4005      0.26  Q          |          |          |          V|
23+55      16.4023      0.26  Q          |          |          |          V|
24+ 0      16.4041      0.27  Q          |          |          |          V|
24+ 5      16.4056      0.21  Q          |          |          |          V|
24+10      16.4062      0.08  Q          |          |          |          V|
24+15      16.4065      0.04  Q          |          |          |          V|
24+20      16.4066      0.02  Q          |          |          |          V|
24+25      16.4067      0.01  Q          |          |          |          V|
24+30      16.4068      0.01  Q          |          |          |          V|
24+35      16.4068      0.00  Q          |          |          |           V
-------------------------------------------------------------------------------
```

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
                Study date  05/12/08 File: 0727N1006100.out

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------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



------------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 100-YEAR

------------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            1.10                  64.57

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            2.50                 146.75

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    1.100(In)
Area Averaged 100-Year Rainfall =    2.500(In)

Point rain (area averaged) =    2.500(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    2.499(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    55.300            56.00          0.900
     3.400            86.00          0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
56.0  74.8      0.305     0.900        0.058        0.942      0.055
86.0  94.4      0.073     0.000        0.073        0.058      0.004
                                                   Sum (F) =    0.059
Area averaged mean soil loss (F) (In/Hr) =  0.059
Minimum soil loss rate ((In/Hr)) =  0.029
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
------------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000	Sum= 59.159

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	0.059	---	0.09
2	0.17	0.60	0.180	0.059	---	0.12
3	0.25	0.60	0.180	0.059	---	0.12
4	0.33	0.60	0.180	0.059	---	0.12
5	0.42	0.60	0.180	0.059	---	0.12
6	0.50	0.70	0.210	0.059	---	0.15
7	0.58	0.70	0.210	0.059	---	0.15
8	0.67	0.70	0.210	0.059	---	0.15
9	0.75	0.70	0.210	0.059	---	0.15
10	0.83	0.70	0.210	0.059	---	0.15
11	0.92	0.70	0.210	0.059	---	0.15
12	1.00	0.80	0.240	0.059	---	0.18
13	1.08	0.80	0.240	0.059	---	0.18
14	1.17	0.80	0.240	0.059	---	0.18
15	1.25	0.80	0.240	0.059	---	0.18
16	1.33	0.80	0.240	0.059	---	0.18
17	1.42	0.80	0.240	0.059	---	0.18
18	1.50	0.80	0.240	0.059	---	0.18
19	1.58	0.80	0.240	0.059	---	0.18
20	1.67	0.80	0.240	0.059	---	0.18
21	1.75	0.80	0.240	0.059	---	0.18
22	1.83	0.80	0.240	0.059	---	0.18
23	1.92	0.80	0.240	0.059	---	0.18
24	2.00	0.90	0.270	0.059	---	0.21
25	2.08	0.80	0.240	0.059	---	0.18
26	2.17	0.90	0.270	0.059	---	0.21
27	2.25	0.90	0.270	0.059	---	0.21
28	2.33	0.90	0.270	0.059	---	0.21
29	2.42	0.90	0.270	0.059	---	0.21
30	2.50	0.90	0.270	0.059	---	0.21
31	2.58	0.90	0.270	0.059	---	0.21
32	2.67	0.90	0.270	0.059	---	0.21
33	2.75	1.00	0.300	0.059	---	0.24
34	2.83	1.00	0.300	0.059	---	0.24
35	2.92	1.00	0.300	0.059	---	0.24
36	3.00	1.00	0.300	0.059	---	0.24
37	3.08	1.00	0.300	0.059	---	0.24
38	3.17	1.10	0.330	0.059	---	0.27
39	3.25	1.10	0.330	0.059	---	0.27
40	3.33	1.10	0.330	0.059	---	0.27
41	3.42	1.20	0.360	0.059	---	0.30
42	3.50	1.30	0.390	0.059	---	0.33
43	3.58	1.40	0.420	0.059	---	0.36
44	3.67	1.40	0.420	0.059	---	0.36
45	3.75	1.50	0.450	0.059	---	0.39
46	3.83	1.50	0.450	0.059	---	0.39
47	3.92	1.60	0.480	0.059	---	0.42
48	4.00	1.60	0.480	0.059	---	0.42
49	4.08	1.70	0.510	0.059	---	0.45
50	4.17	1.80	0.540	0.059	---	0.48
51	4.25	1.90	0.570	0.059	---	0.51
52	4.33	2.00	0.600	0.059	---	0.54
53	4.42	2.10	0.630	0.059	---	0.57
54	4.50	2.10	0.630	0.059	---	0.57
55	4.58	2.20	0.660	0.059	---	0.60
56	4.67	2.30	0.690	0.059	---	0.63
57	4.75	2.40	0.720	0.059	---	0.66
58	4.83	2.40	0.720	0.059	---	0.66
59	4.92	2.50	0.750	0.059	---	0.69
60	5.00	2.60	0.780	0.059	---	0.72
61	5.08	3.10	0.930	0.059	---	0.87

62	5.17	3.60	1.080	0.059	---	1.02
63	5.25	3.90	1.170	0.059	---	1.11
64	5.33	4.20	1.260	0.059	---	1.20
65	5.42	4.70	1.410	0.059	---	1.35
66	5.50	5.60	1.680	0.059	---	1.62
67	5.58	1.90	0.570	0.059	---	0.51
68	5.67	0.90	0.270	0.059	---	0.21
69	5.75	0.60	0.180	0.059	---	0.12
70	5.83	0.50	0.150	0.059	---	0.09
71	5.92	0.30	0.090	0.059	---	0.03
72	6.00	0.20	0.060	0.059	---	0.00
Sum =		100.0			Sum =	25.8

Flood volume = Effective rainfall 2.15(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 10.5(Ac.Ft)
Total soil loss = 0.35(In)
Total soil loss = 1.728(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 457324.7 Cubic Feet
Total soil loss = 75270.3 Cubic Feet

Peak flow rate of this hydrograph = 76.264(CFS)

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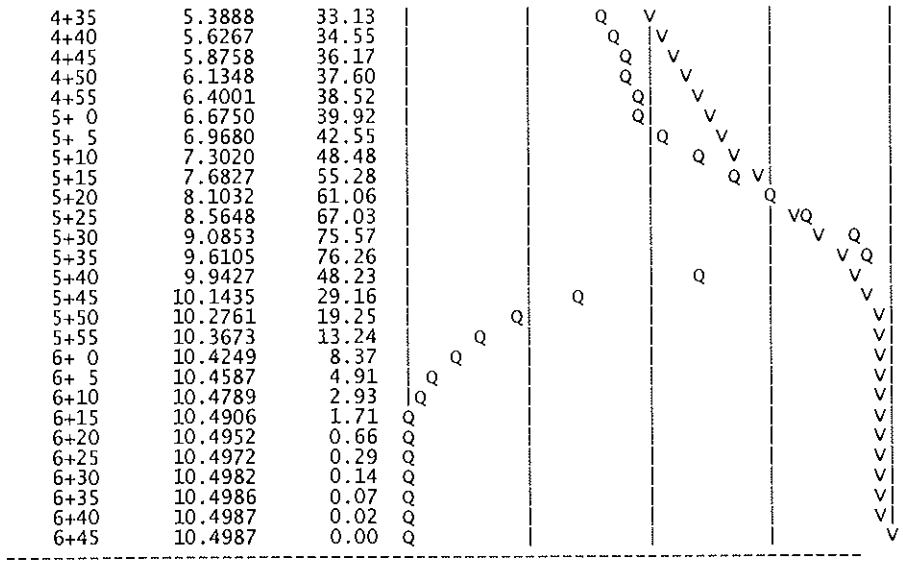
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 20.0 40.0 60.0 80.0
0+ 5	0.0053	0.78	Q
0+10	0.0294	3.49	VQ
0+15	0.0660	5.32	V Q
0+20	0.1079	6.09	V Q
0+25	0.1526	6.48	V Q
0+30	0.2007	6.98	V Q
0+35	0.2555	7.96	V Q
0+40	0.3135	8.41	V Q
0+45	0.3729	8.63	V Q
0+50	0.4334	8.78	V Q
0+55	0.4943	8.85	V Q
1+ 0	0.5572	9.14	V Q
1+ 5	0.6259	9.98	V Q
1+10	0.6971	10.33	V Q
1+15	0.7693	10.48	V Q
1+20	0.8421	10.57	V Q
1+25	0.9152	10.62	V Q
1+30	0.9886	10.66	V Q
1+35	1.0622	10.69	VQ
1+40	1.1359	10.70	VQ
1+45	1.2097	10.72	VQ
1+50	1.2836	10.72	VQ
1+55	1.3574	10.72	Q
2+ 0	1.4329	10.97	Q
2+ 5	1.5123	11.53	Q
2+10	1.5902	11.31	QV
2+15	1.6724	11.93	QV
2+20	1.7564	12.20	Q
2+25	1.8412	12.31	QV
2+30	1.9265	12.38	QV
2+35	2.0120	12.42	QV
2+40	2.0978	12.45	QV
2+45	2.1855	12.73	Q V
2+50	2.2787	13.54	Q V
2+55	2.3744	13.89	Q V
3+ 0	2.4711	14.04	Q V
3+ 5	2.5683	14.12	Q V
3+10	2.6677	14.43	Q V
3+15	2.7729	15.28	Q V
3+20	2.8806	15.64	Q V
3+25	2.9912	16.05	Q V
3+30	3.1097	17.22	Q V
3+35	3.2383	18.67	Q V
3+40	3.3760	19.99	Q V
3+45	3.5195	20.84	Q V
3+50	3.6706	21.94	Q V
3+55	3.8271	22.72	Q V
4+ 0	3.9910	23.79	Q V
4+ 5	4.1601	24.55	Q V
4+10	4.3382	25.87	Q V
4+15	4.5270	27.42	Q V
4+20	4.7271	29.06	Q V
4+25	4.9388	30.74	Q V
4+30	5.1606	32.20	Q V



4+35	5.3888	33.13	
4+40	5.6267	34.55	
4+45	5.8758	36.17	
4+50	6.1348	37.60	
4+55	6.4001	38.52	
5+ 0	6.6750	39.92	
5+ 5	6.9680	42.55	
5+10	7.3020	48.48	
5+15	7.6827	55.28	
5+20	8.1032	61.06	
5+25	8.5648	67.03	
5+30	9.0853	75.57	
5+35	9.6105	76.26	
5+40	9.9427	48.23	
5+45	10.1435	29.16	
5+50	10.2761	19.25	
5+55	10.3673	13.24	
6+ 0	10.4249	8.37	
6+ 5	10.4587	4.91	
6+10	10.4789	2.93	
6+15	10.4906	1.71	
6+20	10.4952	0.66	
6+25	10.4972	0.29	
6+30	10.4982	0.14	
6+35	10.4986	0.07	
6+40	10.4987	0.02	
6+45	10.4987	0.00	

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
                Study date  05/12/08 File: 0727S1006100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 100-YEAR

-----------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      62.40            1.10                  68.64

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      62.40            2.50                 156.00

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    1.100(In)
Area Averaged 100-Year Rainfall =    2.500(In)

Point rain (area averaged) =    2.500(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    2.499(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    56.400           56.00          0.900
     6.000           86.00          0.000
 Total Area Entered =     62.40(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  74.8      0.305     0.900        0.058       0.904      0.052
86.0  94.4      0.073     0.000        0.073       0.096      0.007
                                                  Sum (F) =    0.059
Area averaged mean soil loss (F) (In/Hr) =  0.059
Minimum soil loss rate ((In/Hr)) =  0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-----------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000 Sum=	62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	0.059	---	0.09
2	0.17	0.60	0.180	0.059	---	0.12
3	0.25	0.60	0.180	0.059	---	0.12
4	0.33	0.60	0.180	0.059	---	0.12
5	0.42	0.60	0.180	0.059	---	0.12
6	0.50	0.70	0.210	0.059	---	0.15
7	0.58	0.70	0.210	0.059	---	0.15
8	0.67	0.70	0.210	0.059	---	0.15
9	0.75	0.70	0.210	0.059	---	0.15
10	0.83	0.70	0.210	0.059	---	0.15
11	0.92	0.70	0.210	0.059	---	0.15
12	1.00	0.80	0.240	0.059	---	0.18
13	1.08	0.80	0.240	0.059	---	0.18
14	1.17	0.80	0.240	0.059	---	0.18
15	1.25	0.80	0.240	0.059	---	0.18
16	1.33	0.80	0.240	0.059	---	0.18
17	1.42	0.80	0.240	0.059	---	0.18
18	1.50	0.80	0.240	0.059	---	0.18
19	1.58	0.80	0.240	0.059	---	0.18
20	1.67	0.80	0.240	0.059	---	0.18
21	1.75	0.80	0.240	0.059	---	0.18
22	1.83	0.80	0.240	0.059	---	0.18
23	1.92	0.80	0.240	0.059	---	0.18
24	2.00	0.90	0.270	0.059	---	0.21
25	2.08	0.80	0.240	0.059	---	0.18
26	2.17	0.90	0.270	0.059	---	0.21
27	2.25	0.90	0.270	0.059	---	0.21
28	2.33	0.90	0.270	0.059	---	0.21
29	2.42	0.90	0.270	0.059	---	0.21
30	2.50	0.90	0.270	0.059	---	0.21
31	2.58	0.90	0.270	0.059	---	0.21
32	2.67	0.90	0.270	0.059	---	0.21
33	2.75	1.00	0.300	0.059	---	0.24
34	2.83	1.00	0.300	0.059	---	0.24
35	2.92	1.00	0.300	0.059	---	0.24
36	3.00	1.00	0.300	0.059	---	0.24
37	3.08	1.00	0.300	0.059	---	0.24
38	3.17	1.10	0.330	0.059	---	0.27
39	3.25	1.10	0.330	0.059	---	0.27
40	3.33	1.10	0.330	0.059	---	0.27
41	3.42	1.20	0.360	0.059	---	0.30
42	3.50	1.30	0.390	0.059	---	0.33
43	3.58	1.40	0.420	0.059	---	0.36
44	3.67	1.40	0.420	0.059	---	0.36
45	3.75	1.50	0.450	0.059	---	0.39
46	3.83	1.50	0.450	0.059	---	0.39
47	3.92	1.60	0.480	0.059	---	0.42
48	4.00	1.60	0.480	0.059	---	0.42
49	4.08	1.70	0.510	0.059	---	0.45
50	4.17	1.80	0.540	0.059	---	0.48
51	4.25	1.90	0.570	0.059	---	0.51
52	4.33	2.00	0.600	0.059	---	0.54
53	4.42	2.10	0.630	0.059	---	0.57
54	4.50	2.10	0.630	0.059	---	0.57
55	4.58	2.20	0.660	0.059	---	0.60
56	4.67	2.30	0.690	0.059	---	0.63
57	4.75	2.40	0.720	0.059	---	0.66
58	4.83	2.40	0.720	0.059	---	0.66
59	4.92	2.50	0.750	0.059	---	0.69
60	5.00	2.60	0.780	0.059	---	0.72
61	5.08	3.10	0.930	0.059	---	0.87
62	5.17	3.60	1.080	0.059	---	1.02
63	5.25	3.90	1.170	0.059	---	1.11

64	5.33	4.20	1.260	0.059	---	1.20
65	5.42	4.70	1.410	0.059	---	1.35
66	5.50	5.60	1.680	0.059	---	1.62
67	5.58	1.90	0.570	0.059	---	0.51
68	5.67	0.90	0.270	0.059	---	0.21
69	5.75	0.60	0.180	0.059	---	0.12
70	5.83	0.50	0.150	0.059	---	0.09
71	5.92	0.30	0.090	0.059	---	0.03
72	6.00	0.20	0.060	0.059	---	0.00
Sum =		100.0			Sum =	25.7

Flood volume = Effective rainfall 2.14(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 11.1(Ac.Ft)
Total soil loss = 0.36(In)
Total soil loss = 1.855(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 485375.7 Cubic Feet
Total soil loss = 80782.8 Cubic Feet

Peak flow rate of this hydrograph = 83.285(CFS)

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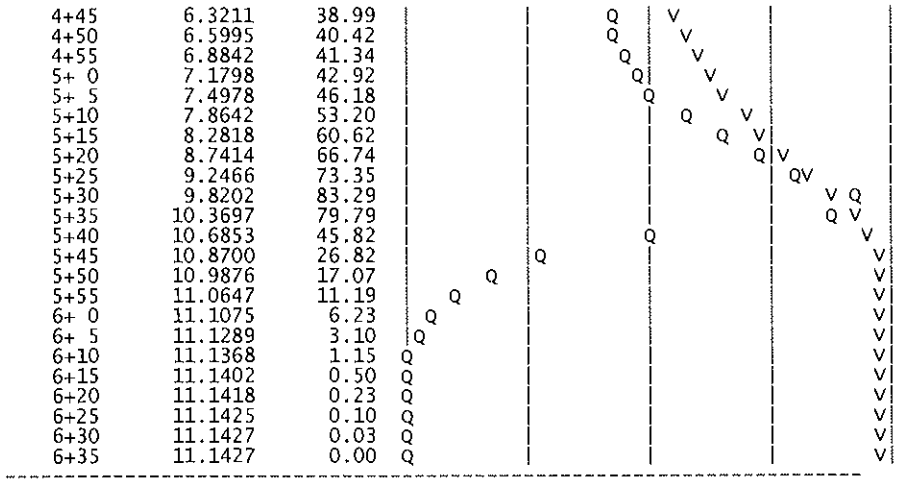
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	22.5	45.0	67.5	90.0
0+ 5	0.0080	1.16	Q				
0+10	0.0377	4.31	VQ				
0+15	0.0796	6.09	V Q				
0+20	0.1262	6.77	V Q				
0+25	0.1752	7.11	V Q				
0+30	0.2283	7.71	V Q				
0+35	0.2886	8.76	V Q				
0+40	0.3516	9.15	V Q				
0+45	0.4157	9.30	V Q				
0+50	0.4802	9.37	V Q				
0+55	0.5451	9.42	V Q				
1+ 0	0.6128	9.83	V Q				
1+ 5	0.6869	10.77	V Q				
1+10	0.7631	11.06	V Q				
1+15	0.8401	11.19	VQ				
1+20	0.9177	11.26	V Q				
1+25	0.9955	11.31	V Q				
1+30	1.0736	11.33	V Q				
1+35	1.1518	11.36	VQ				
1+40	1.2300	11.36	VQ				
1+45	1.3083	11.36	VQ				
1+50	1.3865	11.36	VQ				
1+55	1.4647	11.36	Q				
2+ 0	1.5456	11.74	Q				
2+ 5	1.6301	12.28	Q				
2+10	1.7129	12.03	QV				
2+15	1.8010	12.79	QV				
2+20	1.8906	13.02	QV				
2+25	1.9810	13.12	Q V				
2+30	2.0717	13.17	Q V				
2+35	2.1628	13.22	Q V				
2+40	2.2538	13.22	Q V				
2+45	2.3477	13.63	Q V				
2+50	2.4478	14.55	Q V				
2+55	2.5500	14.83	Q V				
3+ 0	2.6530	14.96	Q V				
3+ 5	2.7566	15.03	Q V				
3+10	2.8631	15.46	Q V				
3+15	2.9761	16.41	Q V				
3+20	3.0912	16.72	Q V				
3+25	3.2099	17.23	Q V				
3+30	3.3380	18.61	Q V				
3+35	3.4774	20.24	Q V				
3+40	3.6262	21.60	Q V				
3+45	3.7811	22.49	Q V				
3+50	3.9440	23.66	Q V				
3+55	4.1126	24.48	Q V				
4+ 0	4.2890	25.62	Q V				
4+ 5	4.4710	26.42	Q V				
4+10	4.6632	27.92	Q V				
4+15	4.8671	29.60	Q V				
4+20	5.0833	31.39	Q V				
4+25	5.3120	33.21	Q V				
4+30	5.5508	34.68	Q V				
4+35	5.7962	35.63	Q V				
4+40	6.0526	37.23	Q V				


4+45 6.3211 38.99
4+50 6.5995 40.42
4+55 6.8842 41.34
5+ 0 7.1798 42.92
5+ 5 7.4978 46.18
5+10 7.8642 53.20
5+15 8.2818 60.62
5+20 8.7414 66.74
5+25 9.2466 73.35
5+30 9.8202 83.29
5+35 10.3697 79.79
5+40 10.6853 45.82
5+45 10.8700 26.82
5+50 10.9876 17.07
5+55 11.0647 11.19
6+ 0 11.1075 6.23
6+ 5 11.1289 3.10
6+10 11.1368 1.15
6+15 11.1402 0.50
6+20 11.1418 0.23
6+25 11.1425 0.10
6+30 11.1427 0.03
6+35 11.1427 0.00

U n i t   H y d r o g r a p h   A n a l y s i s

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Study date 05/12/08 File: 0727N1003100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 100-YEAR

Drainage Area = 58.70(Ac.) = 0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 58.70(Ac.) = 0.092 Sq. Mi.
Length along longest watercourse = 3750.00(Ft.)
Length along longest watercourse measured to centroid = 1875.00(Ft.)
Length along longest watercourse = 0.710 Mi.
Length along longest watercourse measured to centroid = 0.355 Mi.
Difference in elevation = 39.50(Ft.)
Slope along watercourse = 55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.39 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	0.80	46.96

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	1.85	108.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 1.850(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.850(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
55.300	56.00	0.900
3.400	86.00	0.000

Total Area Entered = 58.70(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	74.8	0.305	0.900	0.058	0.942	0.055
86.0	94.4	0.073	0.000	0.073	0.058	0.004
					Sum (F) =	0.059

Area averaged mean soil loss (F) (In/Hr) = 0.059
Minimum soil loss rate ((In/Hr)) = 0.029
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000 Sum=	59.159

Unit Time	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.289	0.059	---	0.23
2	0.17	1.30	0.289	0.059	---	0.23
3	0.25	1.10	0.244	0.059	---	0.19
4	0.33	1.50	0.333	0.059	---	0.27
5	0.42	1.50	0.333	0.059	---	0.27
6	0.50	1.80	0.399	0.059	---	0.34
7	0.58	1.50	0.333	0.059	---	0.27
8	0.67	1.80	0.399	0.059	---	0.34
9	0.75	1.80	0.399	0.059	---	0.34
10	0.83	1.50	0.333	0.059	---	0.27
11	0.92	1.60	0.355	0.059	---	0.30
12	1.00	1.80	0.399	0.059	---	0.34
13	1.08	2.20	0.488	0.059	---	0.43
14	1.17	2.20	0.488	0.059	---	0.43
15	1.25	2.20	0.488	0.059	---	0.43
16	1.33	2.00	0.444	0.059	---	0.39
17	1.42	2.60	0.577	0.059	---	0.52
18	1.50	2.70	0.599	0.059	---	0.54
19	1.58	2.40	0.533	0.059	---	0.47
20	1.67	2.70	0.599	0.059	---	0.54
21	1.75	3.30	0.732	0.059	---	0.67
22	1.83	3.10	0.688	0.059	---	0.63
23	1.92	2.90	0.644	0.059	---	0.58
24	2.00	3.00	0.666	0.059	---	0.61
25	2.08	3.10	0.688	0.059	---	0.63
26	2.17	4.20	0.932	0.059	---	0.87
27	2.25	5.00	1.110	0.059	---	1.05
28	2.33	3.50	0.777	0.059	---	0.72
29	2.42	6.80	1.509	0.059	---	1.45
30	2.50	7.30	1.620	0.059	---	1.56
31	2.58	8.20	1.820	0.059	---	1.76
32	2.67	5.90	1.309	0.059	---	1.25
33	2.75	2.00	0.444	0.059	---	0.39
34	2.83	1.80	0.399	0.059	---	0.34
35	2.92	1.80	0.399	0.059	---	0.34
36	3.00	0.60	0.133	0.059	---	0.07
Sum =		100.0			Sum =	20.1

Flood volume = Effective rainfall 1.67(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 8.2(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.864(Ac.Ft)
Total rainfall = 1.85(In)
Flood volume = 356463.5 Cubic Feet
Total soil loss = 37635.2 Cubic Feet

Peak flow rate of this hydrograph = 88.664(CFS)

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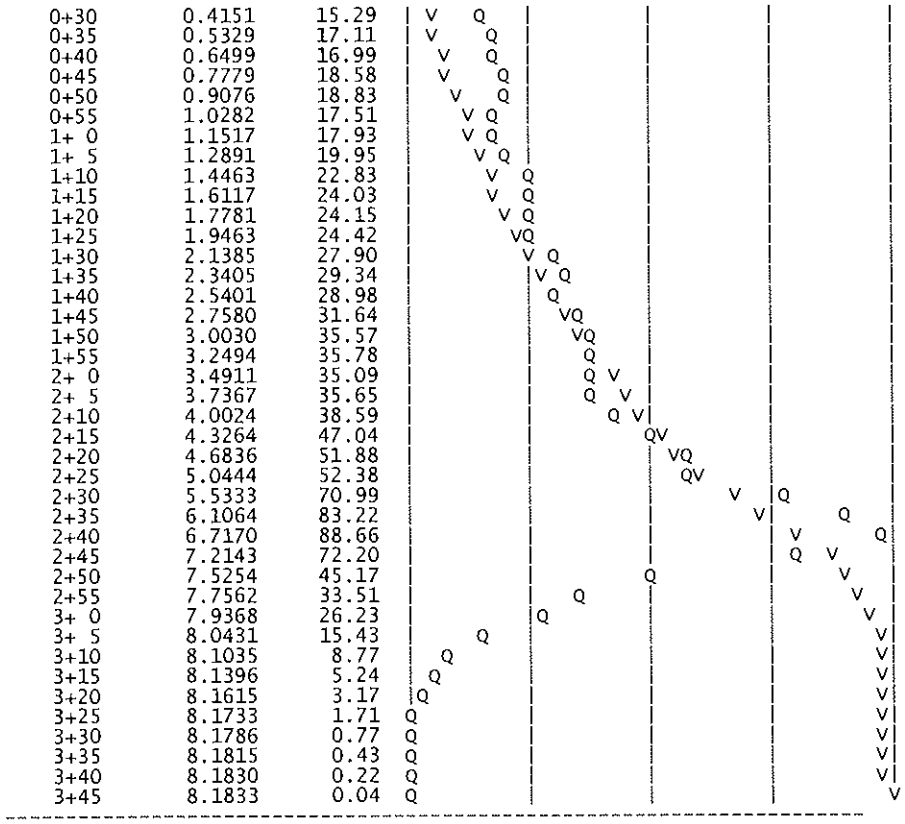
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	22.5	45.0	67.5	90.0
0+ 5	0.0135	1.96	Q	|	|	|	|
0+10	0.0696	8.16	V Q	|	|	|	|
0+15	0.1409	10.34	V Q	|	|	|	|
0+20	0.2166	10.99	|V Q	|	|	|	|
0+25	0.3098	13.54	|V Q	|	|	|	|



0+30	0.4151	15.29	
0+35	0.5329	17.11	
0+40	0.6499	16.99	
0+45	0.7779	18.58	
0+50	0.9076	18.83	
0+55	1.0282	17.51	
1+ 0	1.1517	17.93	
1+ 5	1.2891	19.95	
1+10	1.4463	22.83	
1+15	1.6117	24.03	
1+20	1.7781	24.15	
1+25	1.9463	24.42	
1+30	2.1385	27.90	
1+35	2.3405	29.34	
1+40	2.5401	28.98	
1+45	2.7580	31.64	
1+50	3.0030	35.57	
1+55	3.2494	35.78	
2+ 0	3.4911	35.09	
2+ 5	3.7367	35.65	
2+10	4.0024	38.59	
2+15	4.3264	47.04	
2+20	4.6836	51.88	
2+25	5.0444	52.38	
2+30	5.5333	70.99	
2+35	6.1064	83.22	
2+40	6.7170	88.66	
2+45	7.2143	72.20	
2+50	7.5254	45.17	
2+55	7.7562	33.51	
3+ 0	7.9368	26.23	
3+ 5	8.0431	15.43	
3+10	8.1035	8.77	
3+15	8.1396	5.24	
3+20	8.1615	3.17	
3+25	8.1733	1.71	
3+30	8.1786	0.77	
3+35	8.1815	0.43	
3+40	8.1830	0.22	
3+45	8.1833	0.04	

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727s1003100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

--------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



--------------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 100-YEAR

--------------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      62.40             0.80                 49.92

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      62.40             1.85                115.44

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.800(In)
Area Averaged 100-Year Rainfall =    1.850(In)

Point rain (area averaged) =    1.850(In)
Areal adjustment factor =   99.97 %
Adjusted average point rain =    1.849(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    56.400           56.00          0.900
     6.000           86.00          0.000
 Total Area Entered =     62.40(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
56.0  74.8      0.305     0.900        0.058        0.904      0.052
86.0  94.4      0.073     0.000        0.073        0.096      0.007
                                                  Sum (F) =    0.059
Area averaged mean soil loss (F) (In/Hr) =  0.059
Minimum soil loss rate ((In/Hr)) =  0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
--------------------------------------------------------------------------
```

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000 Sum=	62.888

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.289	0.059	---	0.23
2	0.17	1.30	0.289	0.059	---	0.23
3	0.25	1.10	0.244	0.059	---	0.18
4	0.33	1.50	0.333	0.059	---	0.27
5	0.42	1.50	0.333	0.059	---	0.27
6	0.50	1.80	0.399	0.059	---	0.34
7	0.58	1.50	0.333	0.059	---	0.27
8	0.67	1.80	0.399	0.059	---	0.34
9	0.75	1.80	0.399	0.059	---	0.34
10	0.83	1.50	0.333	0.059	---	0.27
11	0.92	1.60	0.355	0.059	---	0.30
12	1.00	1.80	0.399	0.059	---	0.34
13	1.08	2.20	0.488	0.059	---	0.43
14	1.17	2.20	0.488	0.059	---	0.43
15	1.25	2.20	0.488	0.059	---	0.43
16	1.33	2.00	0.444	0.059	---	0.38
17	1.42	2.60	0.577	0.059	---	0.52
18	1.50	2.70	0.599	0.059	---	0.54
19	1.58	2.40	0.533	0.059	---	0.47
20	1.67	2.70	0.599	0.059	---	0.54
21	1.75	3.30	0.732	0.059	---	0.67
22	1.83	3.10	0.688	0.059	---	0.63
23	1.92	2.90	0.644	0.059	---	0.58
24	2.00	3.00	0.666	0.059	---	0.61
25	2.08	3.10	0.688	0.059	---	0.63
26	2.17	4.20	0.932	0.059	---	0.87
27	2.25	5.00	1.110	0.059	---	1.05
28	2.33	3.50	0.777	0.059	---	0.72
29	2.42	6.80	1.509	0.059	---	1.45
30	2.50	7.30	1.620	0.059	---	1.56
31	2.58	8.20	1.820	0.059	---	1.76
32	2.67	5.90	1.309	0.059	---	1.25
33	2.75	2.00	0.444	0.059	---	0.38
34	2.83	1.80	0.399	0.059	---	0.34
35	2.92	1.80	0.399	0.059	---	0.34
36	3.00	0.60	0.133	0.059	---	0.07
Sum =		100.0			Sum =	20.1

Flood volume = Effective rainfall 1.67(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 8.7(Ac.Ft)
Total soil loss = 0.18(In)
Total soil loss = 0.927(Ac.Ft)
Total rainfall = 1.85(In)
Flood volume = 378541.4 Cubic Feet
Total soil loss = 40391.4 Cubic Feet

Peak flow rate of this hydrograph = 95.639(CFS)

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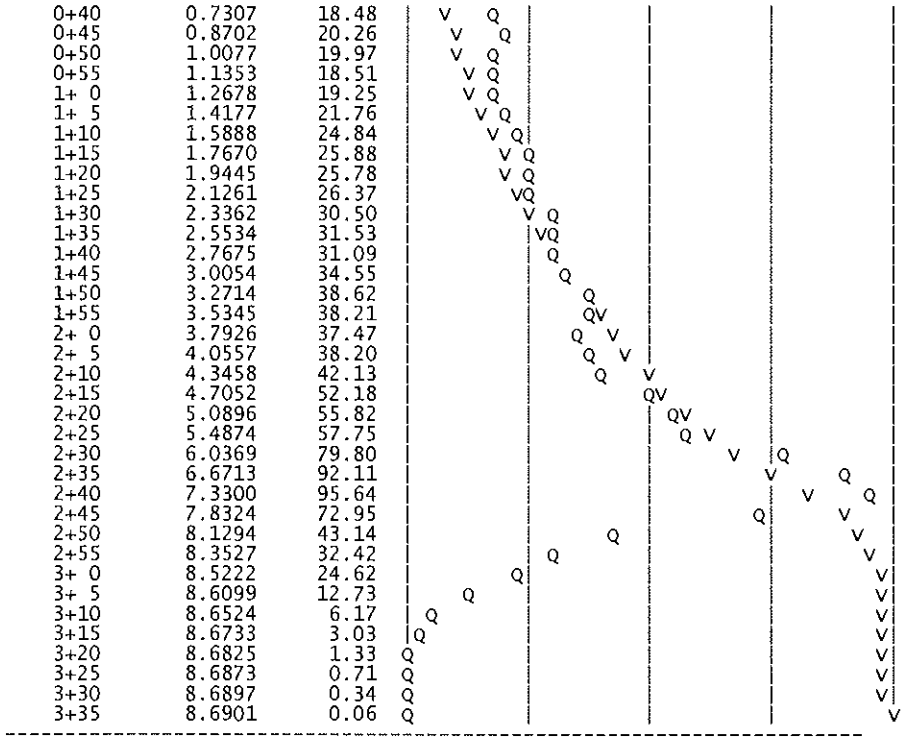
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	25.0	50.0	75.0	100.0
0+ 5	0.0202	2.93	VQ				
0+10	0.0886	9.94	V Q				
0+15	0.1682	11.55	V Q				
0+20	0.2530	12.32	|V Q				
0+25	0.3574	15.16	|V Q				
0+30	0.4746	17.02	| V Q				
0+35	0.6034	18.70	| V Q				


0+40 0.7307 18.48
0+45 0.8702 20.26
0+50 1.0077 19.97
0+55 1.1353 18.51
1+ 0 1.2678 19.25
1+ 5 1.4177 21.76
1+10 1.5888 24.84
1+15 1.7670 25.88
1+20 1.9445 25.78
1+25 2.1261 26.37
1+30 2.3362 30.50
1+35 2.5534 31.53
1+40 2.7675 31.09
1+45 3.0054 34.55
1+50 3.2714 38.62
1+55 3.5345 38.21
2+ 0 3.7926 37.47
2+ 5 4.0557 38.20
2+10 4.3458 42.13
2+15 4.7052 52.18
2+20 5.0896 55.82
2+25 5.4874 57.75
2+30 6.0369 79.80
2+35 6.6713 92.11
2+40 7.3300 95.64
2+45 7.8324 72.95
2+50 8.1294 43.14
2+55 8.3527 32.42
3+ 0 8.5222 24.62
3+ 5 8.6099 12.73
3+10 8.6524 6.17
3+15 8.6733 3.03
3+20 8.6825 1.33
3+25 8.6873 0.71
3+30 8.6897 0.34
3+35 8.6901 0.06

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727N1001100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 100-YEAR

Drainage Area = 58.70(Ac.) = 0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 58.70(Ac.) = 0.092 Sq. Mi.
Length along longest watercourse = 3750.00(Ft.)
Length along longest watercourse measured to centroid = 1875.00(Ft.)
Length along longest watercourse = 0.710 Mi.
Length along longest watercourse measured to centroid = 0.355 Mi.
Difference in elevation = 39.50(Ft.)
Slope along watercourse = 55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.39 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	0.48	28.18

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	1.20	70.44

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 1.199(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
55.300	56.00	0.900
3.400	86.00	0.000

Total Area Entered = 58.70(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	74.8	0.305	0.900	0.058	0.942	0.055
86.0	94.4	0.073	0.000	0.073	0.058	0.004
					Sum (F) =	0.059

Area averaged mean soil loss (F) (In/Hr) = 0.059
Minimum soil loss rate ((In/Hr)) = 0.029
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
		Sum = 100.000	Sum=	59.159

Unit Time		Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	4.20	0.604	0.059	---	0.55
2	0.17	4.30	0.619	0.059	---	0.56
3	0.25	5.00	0.720	0.059	---	0.66
4	0.33	5.00	0.720	0.059	---	0.66
5	0.42	5.80	0.835	0.059	---	0.78
6	0.50	6.50	0.936	0.059	---	0.88
7	0.58	7.40	1.065	0.059	---	1.01
8	0.67	8.60	1.238	0.059	---	1.18
9	0.75	12.30	1.770	0.059	---	1.71
10	0.83	29.10	4.188	0.059	---	4.13
11	0.92	6.80	0.979	0.059	---	0.92
12	1.00	5.00	0.720	0.059	---	0.66
Sum =		100.0			Sum =	13.7

Flood volume = Effective rainfall 1.14(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 5.6(Ac.Ft)
Total soil loss = 0.06(In)
Total soil loss = 0.288(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 243016.1 Cubic Feet
Total soil loss = 12545.1 Cubic Feet

Peak flow rate of this hydrograph = 150.620(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0320	4.65	Q				
0+10	0.1663	19.50					
0+15	0.3512	26.84					
0+20	0.5737	32.31					
0+25	0.8218	36.02					
0+30	1.1074	41.47					
0+35	1.4350	47.57					
0+40	1.8129	54.87					
0+45	2.2727	66.76					
0+50	2.9967	105.13					
0+55	4.0341	150.62					
1+ 0	4.6696	92.28					
1+ 5	5.0646	57.36					
1+10	5.2687	29.63					
1+15	5.3868	17.15					
1+20	5.4648	11.32					
1+25	5.5156	7.38					
1+30	5.5486	4.79					
1+35	5.5707	3.21					
1+40	5.5765	0.84					
1+45	5.5789	0.34					

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727S1001100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 100-YEAR

Drainage Area = 62.40(Ac.) = 0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 62.40(Ac.) = 0.098 Sq. Mi.
Length along longest watercourse = 3060.00(Ft.)
Length along longest watercourse measured to centroid = 1530.00(Ft.)
Length along longest watercourse = 0.580 Mi.
Length along longest watercourse measured to centroid = 0.290 Mi.
Difference in elevation = 43.66(Ft.)
Slope along watercourse = 75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.080 Hr.
Lag time = 4.82 Min.
25% of lag time = 1.21 Min.
40% of lag time = 1.93 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	0.48	29.95

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	1.20	74.88

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 1.200(In)
Areal adjustment factor = 99.94 %
Adjusted average point rain = 1.199(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
56.400	56.00	0.900
6.000	86.00	0.000

Total Area Entered = 62.40(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	74.8	0.305	0.900	0.058	0.904	0.052
86.0	94.4	0.073	0.000	0.073	0.096	0.007
					Sum (F) =	0.059

Area averaged mean soil loss (F) (In/Hr) = 0.059
Minimum soil loss rate ((In/Hr)) = 0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000	Sum= 62.888

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.604	0.059	---	0.55
2	0.17	4.30	0.619	0.059	---	0.56
3	0.25	5.00	0.720	0.059	---	0.66
4	0.33	5.00	0.720	0.059	---	0.66
5	0.42	5.80	0.835	0.059	---	0.78
6	0.50	6.50	0.935	0.059	---	0.88
7	0.58	7.40	1.065	0.059	---	1.01
8	0.67	8.60	1.238	0.059	---	1.18
9	0.75	12.30	1.770	0.059	---	1.71
10	0.83	29.10	4.188	0.059	---	4.13
11	0.92	6.80	0.979	0.059	---	0.92
12	1.00	5.00	0.720	0.059	---	0.66
Sum =		100.0			Sum =	13.7

Flood volume = Effective rainfall 1.14(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 5.9(Ac.Ft)
Total soil loss = 0.06(In)
Total soil loss = 0.309(Ac.Ft)
Total rainfall = 1.20(In)
Flood volume = 258196.9 Cubic Feet
Total soil loss = 13463.8 Cubic Feet

Peak flow rate of this hydrograph = 164.487(CFS)

1-HOUR STORM Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0480	6.97	VQ				
0+10	0.2121	23.83	V Q				
0+15	0.4238	30.74	V Q				
0+20	0.6739	36.32	V Q				
0+25	0.9502	40.12	V Q				
0+30	1.2688	46.25	VQ				
0+35	1.6328	52.86	QV				
0+40	2.0536	61.09	QV				
0+45	2.5717	75.24	Q V				
0+50	3.4336	125.15			V Q		
0+55	4.5665	164.49				V Q	
1+ 0	5.1798	89.06		Q		V	
1+ 5	5.5544	54.39	Q			V	
1+10	5.7250	24.78	Q			V	
1+15	5.8216	14.03	Q			V	
1+20	5.8785	8.26	Q			V	
1+25	5.9144	5.20	Q			V	
1+30	5.9237	1.36	Q			V	
1+35	5.9274	0.53	Q				V

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 58.70(Ac.) = 0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 58.70(Ac.) = 0.092 Sq. Mi.
Length along longest watercourse = 3750.00(Ft.)
Length along longest watercourse measured to centroid = 1875.00(Ft.)
Length along longest watercourse = 0.710 Mi.
Length along longest watercourse measured to centroid = 0.355 Mi.
Difference in elevation = 39.50(Ft.)
Slope along watercourse = 55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.39 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	1.70	99.79

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	4.25	249.48

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 4.250(In)

Point rain (area averaged) = 2.749(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.749(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
55.300	56.00	0.900
3.400	86.00	0.000

Total Area Entered = 58.70(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.900	0.097	0.942	0.091
86.0	86.0	0.176	0.000	0.176	0.058	0.010
					Sum (F) =	0.102

Area averaged mean soil loss (F) (In/Hr) = 0.102
Minimum soil loss rate ((In/Hr)) = 0.051
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000	Sum= 59.159

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.022	0.180	0.004	0.02
2	0.17	0.07	0.022	0.179	0.004	0.02
3	0.25	0.07	0.022	0.179	0.004	0.02
4	0.33	0.10	0.033	0.178	0.006	0.03
5	0.42	0.10	0.033	0.177	0.006	0.03
6	0.50	0.10	0.033	0.177	0.006	0.03
7	0.58	0.10	0.033	0.176	0.006	0.03
8	0.67	0.10	0.033	0.175	0.006	0.03
9	0.75	0.10	0.033	0.175	0.006	0.03
10	0.83	0.13	0.044	0.174	0.008	0.04
11	0.92	0.13	0.044	0.173	0.008	0.04
12	1.00	0.13	0.044	0.173	0.008	0.04
13	1.08	0.10	0.033	0.172	0.006	0.03
14	1.17	0.10	0.033	0.171	0.006	0.03
15	1.25	0.10	0.033	0.170	0.006	0.03
16	1.33	0.10	0.033	0.170	0.006	0.03
17	1.42	0.10	0.033	0.169	0.006	0.03
18	1.50	0.10	0.033	0.168	0.006	0.03
19	1.58	0.10	0.033	0.168	0.006	0.03
20	1.67	0.10	0.033	0.167	0.006	0.03
21	1.75	0.10	0.033	0.166	0.006	0.03
22	1.83	0.13	0.044	0.166	0.008	0.04
23	1.92	0.13	0.044	0.165	0.008	0.04
24	2.00	0.13	0.044	0.164	0.008	0.04
25	2.08	0.13	0.044	0.164	0.008	0.04
26	2.17	0.13	0.044	0.163	0.008	0.04
27	2.25	0.13	0.044	0.162	0.008	0.04
28	2.33	0.13	0.044	0.162	0.008	0.04
29	2.42	0.13	0.044	0.161	0.008	0.04
30	2.50	0.13	0.044	0.160	0.008	0.04
31	2.58	0.17	0.055	0.160	0.010	0.05
32	2.67	0.17	0.055	0.159	0.010	0.05
33	2.75	0.17	0.055	0.158	0.010	0.05
34	2.83	0.17	0.055	0.158	0.010	0.05
35	2.92	0.17	0.055	0.157	0.010	0.05
36	3.00	0.17	0.055	0.157	0.010	0.05
37	3.08	0.17	0.055	0.156	0.010	0.05
38	3.17	0.17	0.055	0.155	0.010	0.05
39	3.25	0.17	0.055	0.155	0.010	0.05
40	3.33	0.17	0.055	0.154	0.010	0.05
41	3.42	0.17	0.055	0.153	0.010	0.05
42	3.50	0.17	0.055	0.153	0.010	0.05
43	3.58	0.17	0.055	0.152	0.010	0.05
44	3.67	0.17	0.055	0.151	0.010	0.05
45	3.75	0.17	0.055	0.151	0.010	0.05
46	3.83	0.20	0.066	0.150	0.012	0.05
47	3.92	0.20	0.066	0.149	0.012	0.05
48	4.00	0.20	0.066	0.149	0.012	0.05
49	4.08	0.20	0.066	0.148	0.012	0.05
50	4.17	0.20	0.066	0.148	0.012	0.05
51	4.25	0.20	0.066	0.147	0.012	0.05
52	4.33	0.23	0.077	0.146	0.014	0.06
53	4.42	0.23	0.077	0.146	0.014	0.06
54	4.50	0.23	0.077	0.145	0.014	0.06
55	4.58	0.23	0.077	0.144	0.014	0.06
56	4.67	0.23	0.077	0.144	0.014	0.06
57	4.75	0.23	0.077	0.143	0.014	0.06
58	4.83	0.27	0.088	0.143	0.016	0.07
59	4.92	0.27	0.088	0.142	0.016	0.07
60	5.00	0.27	0.088	0.141	0.016	0.07
61	5.08	0.20	0.066	0.141	0.012	0.05

62	5.17	0.20	0.066	0.140	0.012	0.05
63	5.25	0.20	0.066	0.140	0.012	0.05
64	5.33	0.23	0.077	0.139	0.014	0.06
65	5.42	0.23	0.077	0.138	0.014	0.06
66	5.50	0.23	0.077	0.138	0.014	0.06
67	5.58	0.27	0.088	0.137	0.016	0.07
68	5.67	0.27	0.088	0.137	0.016	0.07
69	5.75	0.27	0.088	0.136	0.016	0.07
70	5.83	0.27	0.088	0.135	0.016	0.07
71	5.92	0.27	0.088	0.135	0.016	0.07
72	6.00	0.27	0.088	0.134	0.016	0.07
73	6.08	0.30	0.099	0.134	0.018	0.08
74	6.17	0.30	0.099	0.133	0.018	0.08
75	6.25	0.30	0.099	0.132	0.018	0.08
76	6.33	0.30	0.099	0.132	0.018	0.08
77	6.42	0.30	0.099	0.131	0.018	0.08
78	6.50	0.30	0.099	0.131	0.018	0.08
79	6.58	0.33	0.110	0.130	0.020	0.09
80	6.67	0.33	0.110	0.129	0.020	0.09
81	6.75	0.33	0.110	0.129	0.020	0.09
82	6.83	0.33	0.110	0.128	0.020	0.09
83	6.92	0.33	0.110	0.128	0.020	0.09
84	7.00	0.33	0.110	0.127	0.020	0.09
85	7.08	0.33	0.110	0.126	0.020	0.09
86	7.17	0.33	0.110	0.126	0.020	0.09
87	7.25	0.33	0.110	0.125	0.020	0.09
88	7.33	0.37	0.121	0.125	0.022	0.10
89	7.42	0.37	0.121	0.124	0.022	0.10
90	7.50	0.37	0.121	0.124	0.022	0.10
91	7.58	0.40	0.132	0.123	---	0.01
92	7.67	0.40	0.132	0.122	---	0.01
93	7.75	0.40	0.132	0.122	---	0.01
94	7.83	0.43	0.143	0.121	---	0.02
95	7.92	0.43	0.143	0.121	---	0.02
96	8.00	0.43	0.143	0.120	---	0.02
97	8.08	0.50	0.165	0.120	---	0.05
98	8.17	0.50	0.165	0.119	---	0.05
99	8.25	0.50	0.165	0.119	---	0.05
100	8.33	0.50	0.165	0.118	---	0.05
101	8.42	0.50	0.165	0.117	---	0.05
102	8.50	0.50	0.165	0.117	---	0.05
103	8.58	0.53	0.176	0.116	---	0.06
104	8.67	0.53	0.176	0.116	---	0.06
105	8.75	0.53	0.176	0.115	---	0.06
106	8.83	0.57	0.187	0.115	---	0.07
107	8.92	0.57	0.187	0.114	---	0.07
108	9.00	0.57	0.187	0.114	---	0.07
109	9.08	0.63	0.209	0.113	---	0.10
110	9.17	0.63	0.209	0.113	---	0.10
111	9.25	0.63	0.209	0.112	---	0.10
112	9.33	0.67	0.220	0.112	---	0.11
113	9.42	0.67	0.220	0.111	---	0.11
114	9.50	0.67	0.220	0.110	---	0.11
115	9.58	0.70	0.231	0.110	---	0.12
116	9.67	0.70	0.231	0.109	---	0.12
117	9.75	0.70	0.231	0.109	---	0.12
118	9.83	0.73	0.242	0.108	---	0.13
119	9.92	0.73	0.242	0.108	---	0.13
120	10.00	0.73	0.242	0.107	---	0.13
121	10.08	0.50	0.165	0.107	---	0.06
122	10.17	0.50	0.165	0.106	---	0.06
123	10.25	0.50	0.165	0.106	---	0.06
124	10.33	0.50	0.165	0.105	---	0.06
125	10.42	0.50	0.165	0.105	---	0.06
126	10.50	0.50	0.165	0.104	---	0.06
127	10.58	0.67	0.220	0.104	---	0.12
128	10.67	0.67	0.220	0.103	---	0.12
129	10.75	0.67	0.220	0.103	---	0.12
130	10.83	0.67	0.220	0.102	---	0.12
131	10.92	0.67	0.220	0.102	---	0.12
132	11.00	0.67	0.220	0.101	---	0.12
133	11.08	0.63	0.209	0.101	---	0.11
134	11.17	0.63	0.209	0.100	---	0.11
135	11.25	0.63	0.209	0.100	---	0.11
136	11.33	0.63	0.209	0.099	---	0.11
137	11.42	0.63	0.209	0.099	---	0.11
138	11.50	0.63	0.209	0.098	---	0.11
139	11.58	0.57	0.187	0.098	---	0.09
140	11.67	0.57	0.187	0.097	---	0.09
141	11.75	0.57	0.187	0.097	---	0.09
142	11.83	0.60	0.198	0.096	---	0.10
143	11.92	0.60	0.198	0.096	---	0.10
144	12.00	0.60	0.198	0.095	---	0.10
145	12.08	0.83	0.275	0.095	---	0.18
146	12.17	0.83	0.275	0.094	---	0.18

147	12.25	0.83	0.275	0.094	---	0.18
148	12.33	0.87	0.286	0.093	---	0.19
149	12.42	0.87	0.286	0.093	---	0.19
150	12.50	0.87	0.286	0.092	---	0.19
151	12.58	0.93	0.308	0.092	---	0.22
152	12.67	0.93	0.308	0.092	---	0.22
153	12.75	0.93	0.308	0.091	---	0.22
154	12.83	0.97	0.319	0.091	---	0.23
155	12.92	0.97	0.319	0.090	---	0.23
156	13.00	0.97	0.319	0.090	---	0.23
157	13.08	1.13	0.374	0.089	---	0.28
158	13.17	1.13	0.374	0.089	---	0.29
159	13.25	1.13	0.374	0.088	---	0.29
160	13.33	1.13	0.374	0.088	---	0.29
161	13.42	1.13	0.374	0.087	---	0.29
162	13.50	1.13	0.374	0.087	---	0.29
163	13.58	0.77	0.253	0.087	---	0.17
164	13.67	0.77	0.253	0.086	---	0.17
165	13.75	0.77	0.253	0.086	---	0.17
166	13.83	0.77	0.253	0.085	---	0.17
167	13.92	0.77	0.253	0.085	---	0.17
168	14.00	0.77	0.253	0.084	---	0.17
169	14.08	0.90	0.297	0.084	---	0.21
170	14.17	0.90	0.297	0.084	---	0.21
171	14.25	0.90	0.297	0.083	---	0.21
172	14.33	0.87	0.286	0.083	---	0.20
173	14.42	0.87	0.286	0.082	---	0.20
174	14.50	0.87	0.286	0.082	---	0.20
175	14.58	0.87	0.286	0.081	---	0.20
176	14.67	0.87	0.286	0.081	---	0.20
177	14.75	0.87	0.286	0.081	---	0.21
178	14.83	0.83	0.275	0.080	---	0.19
179	14.92	0.83	0.275	0.080	---	0.20
180	15.00	0.83	0.275	0.079	---	0.20
181	15.08	0.80	0.264	0.079	---	0.18
182	15.17	0.80	0.264	0.079	---	0.19
183	15.25	0.80	0.264	0.078	---	0.19
184	15.33	0.77	0.253	0.078	---	0.18
185	15.42	0.77	0.253	0.077	---	0.18
186	15.50	0.77	0.253	0.077	---	0.18
187	15.58	0.63	0.209	0.077	---	0.13
188	15.67	0.63	0.209	0.076	---	0.13
189	15.75	0.63	0.209	0.076	---	0.13
190	15.83	0.63	0.209	0.075	---	0.13
191	15.92	0.63	0.209	0.075	---	0.13
192	16.00	0.63	0.209	0.075	---	0.13
193	16.08	0.13	0.044	0.074	0.008	0.04
194	16.17	0.13	0.044	0.074	0.008	0.04
195	16.25	0.13	0.044	0.073	0.008	0.04
196	16.33	0.13	0.044	0.073	0.008	0.04
197	16.42	0.13	0.044	0.073	0.008	0.04
198	16.50	0.13	0.044	0.072	0.008	0.04
199	16.58	0.10	0.033	0.072	0.006	0.03
200	16.67	0.10	0.033	0.072	0.006	0.03
201	16.75	0.10	0.033	0.071	0.006	0.03
202	16.83	0.10	0.033	0.071	0.006	0.03
203	16.92	0.10	0.033	0.071	0.006	0.03
204	17.00	0.10	0.033	0.070	0.006	0.03
205	17.08	0.17	0.055	0.070	0.010	0.05
206	17.17	0.17	0.055	0.069	0.010	0.05
207	17.25	0.17	0.055	0.069	0.010	0.05
208	17.33	0.17	0.055	0.069	0.010	0.05
209	17.42	0.17	0.055	0.068	0.010	0.05
210	17.50	0.17	0.055	0.068	0.010	0.05
211	17.58	0.17	0.055	0.068	0.010	0.05
212	17.67	0.17	0.055	0.067	0.010	0.05
213	17.75	0.17	0.055	0.067	0.010	0.05
214	17.83	0.13	0.044	0.067	0.008	0.04
215	17.92	0.13	0.044	0.066	0.008	0.04
216	18.00	0.13	0.044	0.066	0.008	0.04
217	18.08	0.13	0.044	0.066	0.008	0.04
218	18.17	0.13	0.044	0.065	0.008	0.04
219	18.25	0.13	0.044	0.065	0.008	0.04
220	18.33	0.13	0.044	0.065	0.008	0.04
221	18.42	0.13	0.044	0.064	0.008	0.04
222	18.50	0.13	0.044	0.064	0.008	0.04
223	18.58	0.10	0.033	0.064	0.006	0.03
224	18.67	0.10	0.033	0.064	0.006	0.03
225	18.75	0.10	0.033	0.063	0.006	0.03
226	18.83	0.07	0.022	0.063	0.004	0.02
227	18.92	0.07	0.022	0.063	0.004	0.02
228	19.00	0.07	0.022	0.062	0.004	0.02
229	19.08	0.10	0.033	0.062	0.006	0.03
230	19.17	0.10	0.033	0.062	0.006	0.03
231	19.25	0.10	0.033	0.061	0.006	0.03

232	19.33	0.13	0.044	0.061	0.008	0.04
233	19.42	0.13	0.044	0.061	0.008	0.04
234	19.50	0.13	0.044	0.061	0.008	0.04
235	19.58	0.10	0.033	0.060	0.006	0.03
236	19.67	0.10	0.033	0.060	0.006	0.03
237	19.75	0.10	0.033	0.060	0.006	0.03
238	19.83	0.07	0.022	0.060	0.004	0.02
239	19.92	0.07	0.022	0.059	0.004	0.02
240	20.00	0.07	0.022	0.059	0.004	0.02
241	20.08	0.10	0.033	0.059	0.006	0.03
242	20.17	0.10	0.033	0.058	0.006	0.03
243	20.25	0.10	0.033	0.058	0.006	0.03
244	20.33	0.10	0.033	0.058	0.006	0.03
245	20.42	0.10	0.033	0.058	0.006	0.03
246	20.50	0.10	0.033	0.057	0.006	0.03
247	20.58	0.10	0.033	0.057	0.006	0.03
248	20.67	0.10	0.033	0.057	0.006	0.03
249	20.75	0.10	0.033	0.057	0.006	0.03
250	20.83	0.07	0.022	0.057	0.004	0.02
251	20.92	0.07	0.022	0.056	0.004	0.02
252	21.00	0.07	0.022	0.056	0.004	0.02
253	21.08	0.10	0.033	0.056	0.006	0.03
254	21.17	0.10	0.033	0.056	0.006	0.03
255	21.25	0.10	0.033	0.055	0.006	0.03
256	21.33	0.07	0.022	0.055	0.004	0.02
257	21.42	0.07	0.022	0.055	0.004	0.02
258	21.50	0.07	0.022	0.055	0.004	0.02
259	21.58	0.10	0.033	0.055	0.006	0.03
260	21.67	0.10	0.033	0.054	0.006	0.03
261	21.75	0.10	0.033	0.054	0.006	0.03
262	21.83	0.07	0.022	0.054	0.004	0.02
263	21.92	0.07	0.022	0.054	0.004	0.02
264	22.00	0.07	0.022	0.054	0.004	0.02
265	22.08	0.10	0.033	0.053	0.006	0.03
266	22.17	0.10	0.033	0.053	0.006	0.03
267	22.25	0.10	0.033	0.053	0.006	0.03
268	22.33	0.07	0.022	0.053	0.004	0.02
269	22.42	0.07	0.022	0.053	0.004	0.02
270	22.50	0.07	0.022	0.053	0.004	0.02
271	22.58	0.07	0.022	0.052	0.004	0.02
272	22.67	0.07	0.022	0.052	0.004	0.02
273	22.75	0.07	0.022	0.052	0.004	0.02
274	22.83	0.07	0.022	0.052	0.004	0.02
275	22.92	0.07	0.022	0.052	0.004	0.02
276	23.00	0.07	0.022	0.052	0.004	0.02
277	23.08	0.07	0.022	0.052	0.004	0.02
278	23.17	0.07	0.022	0.052	0.004	0.02
279	23.25	0.07	0.022	0.051	0.004	0.02
280	23.33	0.07	0.022	0.051	0.004	0.02
281	23.42	0.07	0.022	0.051	0.004	0.02
282	23.50	0.07	0.022	0.051	0.004	0.02
283	23.58	0.07	0.022	0.051	0.004	0.02
284	23.67	0.07	0.022	0.051	0.004	0.02
285	23.75	0.07	0.022	0.051	0.004	0.02
286	23.83	0.07	0.022	0.051	0.004	0.02
287	23.92	0.07	0.022	0.051	0.004	0.02
288	24.00	0.07	0.022	0.051	0.004	0.02
	Sum =	100.0			Sum =	21.4

Flood volume = Effective rainfall 1.79(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 8.7(Ac.Ft)
Total soil loss = 0.96(In)
Total soil loss = 4.714(Ac.Ft)
Total rainfall = 2.75(In)
Flood volume = 380378.1 Cubic Feet
Total soil loss = 205333.7 Cubic Feet

Peak flow rate of this hydrograph = 16.748(CFS)

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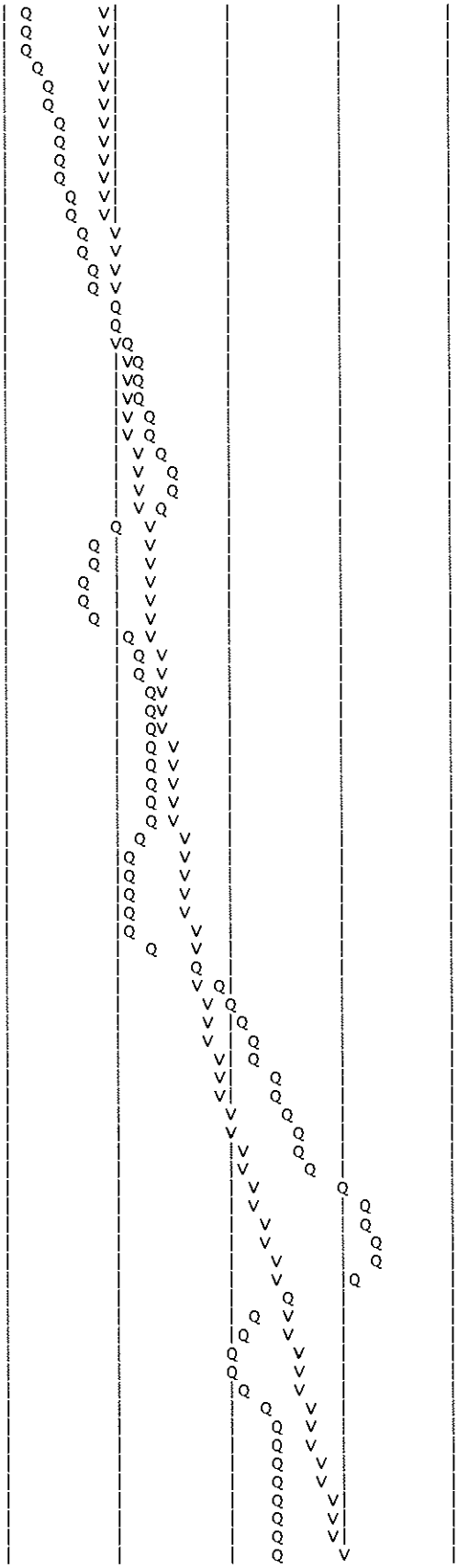
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0011	0.15	Q				
0+10	0.0055	0.64	VQ				
0+15	0.0113	0.84	VQ				
0+20	0.0182	1.00	V Q				
0+25	0.0271	1.30	V Q				
0+30	0.0370	1.43	V Q				
0+35	0.0473	1.50	V Q				
0+40	0.0579	1.54	V Q				

0+45	0.0686	1.56	V Q	|	|	|	|
0+50	0.0801	1.66	V Q	|	|	|	|
0+55	0.0932	1.91	V Q	|	|	|	|
1+ 0	0.1071	2.02	V Q	|	|	|	|
1+ 5	0.1208	1.99	V Q	|	|	|	|
1+10	0.1330	1.77	V Q	|	|	|	|
1+15	0.1446	1.68	V Q	|	|	|	|
1+20	0.1560	1.65	V Q	|	|	|	|
1+25	0.1673	1.64	V Q	|	|	|	|
1+30	0.1785	1.62	V Q	|	|	|	|
1+35	0.1896	1.62	V Q	|	|	|	|
1+40	0.2007	1.61	V Q	|	|	|	|
1+45	0.2118	1.61	V Q	|	|	|	|
1+50	0.2233	1.68	|V Q	|	|	|	|
1+55	0.2365	1.92	|V Q	|	|	|	|
2+ 0	0.2505	2.02	|V Q	|	|	|	|
2+ 5	0.2647	2.06	|V Q	|	|	|	|
2+10	0.2791	2.09	|V Q	|	|	|	|
2+15	0.2936	2.11	|V Q	|	|	|	|
2+20	0.3082	2.12	|V Q	|	|	|	|
2+25	0.3228	2.12	|V Q	|	|	|	|
2+30	0.3375	2.13	|V Q	|	|	|	|
2+35	0.3527	2.21	|V Q	|	|	|	|
2+40	0.3696	2.45	|V Q	|	|	|	|
2+45	0.3872	2.56	|V Q	|	|	|	|
2+50	0.4051	2.60	|V Q	|	|	|	|
2+55	0.4232	2.62	|V Q	|	|	|	|
3+ 0	0.4413	2.64	| V Q	|	|	|	|
3+ 5	0.4596	2.65	| V Q	|	|	|	|
3+10	0.4779	2.66	| V Q	|	|	|	|
3+15	0.4963	2.66	| V Q	|	|	|	|
3+20	0.5146	2.67	| V Q	|	|	|	|
3+25	0.5330	2.67	| V Q	|	|	|	|
3+30	0.5514	2.67	| V Q	|	|	|	|
3+35	0.5698	2.67	| V Q	|	|	|	|
3+40	0.5881	2.67	| V Q	|	|	|	|
3+45	0.6065	2.67	| V Q	|	|	|	|
3+50	0.6254	2.75	| V Q	|	|	|	|
3+55	0.6460	2.99	| V Q	|	|	|	|
4+ 0	0.6673	3.09	| V Q	|	|	|	|
4+ 5	0.6888	3.13	| V Q	|	|	|	|
4+10	0.7106	3.16	| V Q	|	|	|	|
4+15	0.7324	3.17	| V Q	|	|	|	|
4+20	0.7549	3.26	| V Q	|	|	|	|
4+25	0.7791	3.51	| V Q	|	|	|	|
4+30	0.8040	3.62	| V Q	|	|	|	|
4+35	0.8293	3.67	| V Q	|	|	|	|
4+40	0.8547	3.69	| V Q	|	|	|	|
4+45	0.8802	3.71	| V Q	|	|	|	|
4+50	0.9063	3.79	| V Q	|	|	|	|
4+55	0.9342	4.05	| V Q	|	|	|	|
5+ 0	0.9628	4.15	| V Q	|	|	|	|
5+ 5	0.9907	4.05	| V Q	|	|	|	|
5+10	1.0153	3.58	| V Q	|	|	|	|
5+15	1.0388	3.40	| V Q	|	|	|	|
5+20	1.0622	3.40	| V Q	|	|	|	|
5+25	1.0870	3.60	| V Q	|	|	|	|
5+30	1.1123	3.68	| V Q	|	|	|	|
5+35	1.1383	3.78	| V Q	|	|	|	|
5+40	1.1661	4.03	| V Q	|	|	|	|
5+45	1.1946	4.14	| V Q	|	|	|	|
5+50	1.2234	4.18	| V Q	|	|	|	|
5+55	1.2524	4.21	| V Q	|	|	|	|
6+ 0	1.2816	4.24	| V Q	|	|	|	|
6+ 5	1.3114	4.33	| V Q	|	|	|	|
6+10	1.3429	4.58	| V Q|	|	|	|	|
6+15	1.3752	4.69	| V Q|	|	|	|	|
6+20	1.4078	4.73	| V Q|	|	|	|	|
6+25	1.4406	4.76	| V Q|	|	|	|	|
6+30	1.4734	4.77	| V Q|	|	|	|	|
6+35	1.5069	4.86	| V Q|	|	|	|	|
6+40	1.5421	5.11	| V Q	|	|	|	|
6+45	1.5781	5.22	| V Q	|	|	|	|
6+50	1.6143	5.27	| V Q	|	|	|	|
6+55	1.6508	5.29	| V Q	|	|	|	|
7+ 0	1.6874	5.31	| V Q	|	|	|	|
7+ 5	1.7240	5.32	| V Q	|	|	|	|
7+10	1.7607	5.33	| V Q	|	|	|	|
7+15	1.7974	5.33	| V Q	|	|	|	|
7+20	1.8347	5.41	| V Q	|	|	|	|
7+25	1.8736	5.66	| V |Q	|	|	|	|
7+30	1.9133	5.76	| V |Q	|	|	|	|
7+35	1.9479	5.03	| V Q	|	|	|	|
7+40	1.9660	2.62	| Q V|	|	|	|	|
7+45	1.9774	1.65	| Q V|	|	|	|	|

7+50	1.9867	1.35	
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9+ 0	2.2484	4.11	
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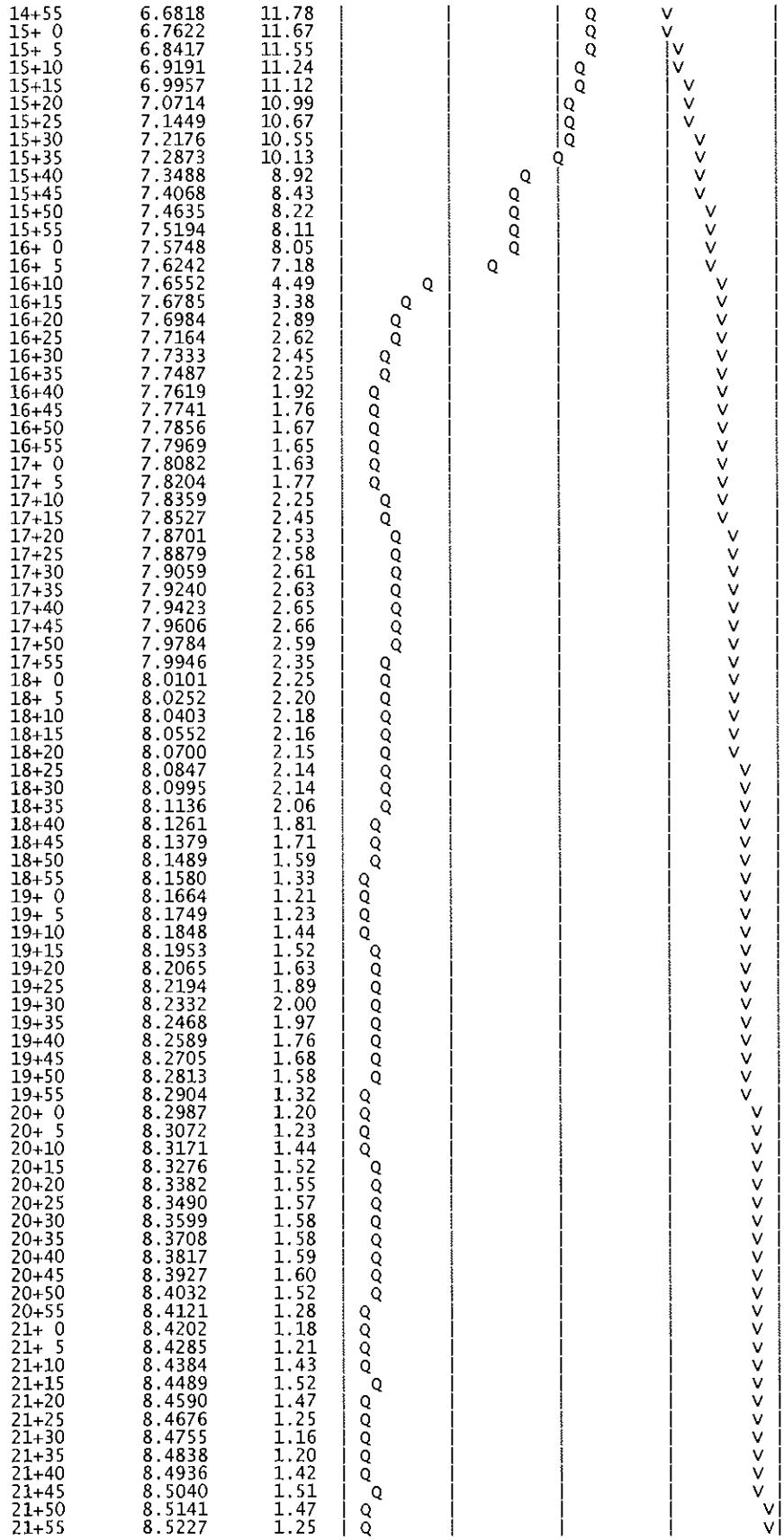

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15+ 5	6.8417	11.55	
15+10	6.9191	11.24	
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15+20	7.0714	10.99	
15+25	7.1449	10.67	
15+30	7.2176	10.55	
15+35	7.2873	10.13	
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18+ 0	8.0101	2.25	
18+ 5	8.0252	2.20	
18+10	8.0403	2.18	
18+15	8.0552	2.16	
18+20	8.0700	2.15	
18+25	8.0847	2.14	
18+30	8.0995	2.14	
18+35	8.1136	2.06	
18+40	8.1261	1.81	
18+45	8.1379	1.71	
18+50	8.1489	1.59	
18+55	8.1580	1.33	
19+ 0	8.1664	1.21	
19+ 5	8.1749	1.23	
19+10	8.1848	1.44	
19+15	8.1953	1.52	
19+20	8.2065	1.63	
19+25	8.2194	1.89	
19+30	8.2332	2.00	
19+35	8.2468	1.97	
19+40	8.2589	1.76	
19+45	8.2705	1.68	
19+50	8.2813	1.58	
19+55	8.2904	1.32	
20+ 0	8.2987	1.20	
20+ 5	8.3072	1.23	
20+10	8.3171	1.44	
20+15	8.3276	1.52	
20+20	8.3382	1.55	
20+25	8.3490	1.57	
20+30	8.3599	1.58	
20+35	8.3708	1.58	
20+40	8.3817	1.59	
20+45	8.3927	1.60	
20+50	8.4032	1.52	
20+55	8.4121	1.28	
21+ 0	8.4202	1.18	
21+ 5	8.4285	1.21	
21+10	8.4384	1.43	
21+15	8.4489	1.52	
21+20	8.4590	1.47	
21+25	8.4676	1.25	
21+30	8.4755	1.16	
21+35	8.4838	1.20	
21+40	8.4936	1.42	
21+45	8.5040	1.51	
21+50	8.5141	1.47	
21+55	8.5227	1.25	

```
  22+ 0       8.5307      1.16  | Q        |         |         |         V|
  22+ 5       8.5389      1.20  | Q        |         |         |         V|
  22+10       8.5487      1.42  | Q        |         |         |         V|
  22+15       8.5591      1.51  |  Q       |         |         |         V|
  22+20       8.5692      1.47  | Q        |         |         |         V|
  22+25       8.5778      1.25  | Q        |         |         |         V|
  22+30       8.5858      1.16  | Q        |         |         |         V|
  22+35       8.5935      1.12  | Q        |         |         |         V|
  22+40       8.6011      1.10  | Q        |         |         |         V|
  22+45       8.6086      1.09  | Q        |         |         |         V|
  22+50       8.6161      1.08  | Q        |         |         |         V|
  22+55       8.6235      1.08  | Q        |         |         |         V|
  23+ 0       8.6309      1.07  | Q        |         |         |         V|
  23+ 5       8.6382      1.07  | Q        |         |         |         V|
  23+10       8.6456      1.07  | Q        |         |         |         V|
  23+15       8.6529      1.07  | Q        |         |         |         V|
  23+20       8.6603      1.07  | Q        |         |         |         V|
  23+25       8.6676      1.07  | Q        |         |         |         V|
  23+30       8.6750      1.07  | Q        |         |         |         V|
  23+35       8.6823      1.07  | Q        |         |         |         V|
  23+40       8.6897      1.07  | Q        |         |         |         V|
  23+45       8.6970      1.07  | Q        |         |         |         V|
  23+50       8.7044      1.07  | Q        |         |         |         V|
  23+55       8.7117      1.07  | Q        |         |         |         V|
  24+ 0       8.7191      1.07  | Q        |         |         |         V|
  24+ 5       8.7254      0.91  |Q         |         |         |         V|
  24+10       8.7283      0.43  Q          |         |         |         V|
  24+15       8.7299      0.23  Q          |         |         |         V|
  24+20       8.7308      0.14  Q          |         |         |         V|
  24+25       8.7314      0.09  Q          |         |         |         V|
  24+30       8.7318      0.06  Q          |         |         |         V|
  24+35       8.7321      0.03  Q          |         |         |         V|
  24+40       8.7322      0.02  Q          |         |         |         V|
  24+45       8.7323      0.01  Q          |         |         |          V
-------------------------------------------------------------------------
```

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727S0102410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format

---------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 10-YEAR

--------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =     62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
       62.40             1.70                  106.08

100 YEAR Area rainfall data:

Area(Ac.)[1]        Rainfall(In)[2]      Weighting[1*2]
       62.40             4.25                  265.20

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =     1.700(In)
Area Averaged 100-Year Rainfall =     4.250(In)

Point rain (area averaged) =     2.749(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    2.749(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    56.400            56.00          0.900
     6.000            86.00          0.000
 Total Area Entered =     62.40(Ac.)

RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)      (In/Hr)       (Dec.)    (In/Hr)
56.0  56.0      0.511      0.900         0.097        0.904      0.088
86.0  86.0      0.176      0.000         0.176        0.096      0.017
                                                    Sum (F) =    0.105
Area averaged mean soil loss (F) (In/Hr) =  0.105
Minimum soil loss rate ((In/Hr)) =  0.052
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
---------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000	Sum= 62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.022	0.185	0.004	0.02
2	0.17	0.07	0.022	0.185	0.004	0.02
3	0.25	0.07	0.022	0.184	0.004	0.02
4	0.33	0.10	0.033	0.183	0.006	0.03
5	0.42	0.10	0.033	0.183	0.006	0.03
6	0.50	0.10	0.033	0.182	0.006	0.03
7	0.58	0.10	0.033	0.181	0.006	0.03
8	0.67	0.10	0.033	0.180	0.006	0.03
9	0.75	0.10	0.033	0.180	0.006	0.03
10	0.83	0.13	0.044	0.179	0.008	0.04
11	0.92	0.13	0.044	0.178	0.008	0.04
12	1.00	0.13	0.044	0.178	0.008	0.04
13	1.08	0.10	0.033	0.177	0.006	0.03
14	1.17	0.10	0.033	0.176	0.006	0.03
15	1.25	0.10	0.033	0.176	0.006	0.03
16	1.33	0.10	0.033	0.175	0.006	0.03
17	1.42	0.10	0.033	0.174	0.006	0.03
18	1.50	0.10	0.033	0.173	0.006	0.03
19	1.58	0.10	0.033	0.173	0.006	0.03
20	1.67	0.10	0.033	0.172	0.006	0.03
21	1.75	0.10	0.033	0.171	0.006	0.03
22	1.83	0.13	0.044	0.171	0.008	0.04
23	1.92	0.13	0.044	0.170	0.008	0.04
24	2.00	0.13	0.044	0.169	0.008	0.04
25	2.08	0.13	0.044	0.169	0.008	0.04
26	2.17	0.13	0.044	0.168	0.008	0.04
27	2.25	0.13	0.044	0.167	0.008	0.04
28	2.33	0.13	0.044	0.167	0.008	0.04
29	2.42	0.13	0.044	0.166	0.008	0.04
30	2.50	0.13	0.044	0.165	0.008	0.04
31	2.58	0.17	0.055	0.165	0.010	0.05
32	2.67	0.17	0.055	0.164	0.010	0.05
33	2.75	0.17	0.055	0.163	0.010	0.05
34	2.83	0.17	0.055	0.163	0.010	0.05
35	2.92	0.17	0.055	0.162	0.010	0.05
36	3.00	0.17	0.055	0.161	0.010	0.05
37	3.08	0.17	0.055	0.161	0.010	0.05
38	3.17	0.17	0.055	0.160	0.010	0.05
39	3.25	0.17	0.055	0.159	0.010	0.05
40	3.33	0.17	0.055	0.159	0.010	0.05
41	3.42	0.17	0.055	0.158	0.010	0.05
42	3.50	0.17	0.055	0.157	0.010	0.05
43	3.58	0.17	0.055	0.157	0.010	0.05
44	3.67	0.17	0.055	0.156	0.010	0.05
45	3.75	0.17	0.055	0.155	0.010	0.05
46	3.83	0.20	0.066	0.155	0.012	0.05
47	3.92	0.20	0.066	0.154	0.012	0.05
48	4.00	0.20	0.066	0.153	0.012	0.05
49	4.08	0.20	0.066	0.153	0.012	0.05
50	4.17	0.20	0.066	0.152	0.012	0.05
51	4.25	0.20	0.066	0.151	0.012	0.05
52	4.33	0.23	0.077	0.151	0.014	0.06
53	4.42	0.23	0.077	0.150	0.014	0.06
54	4.50	0.23	0.077	0.149	0.014	0.06
55	4.58	0.23	0.077	0.149	0.014	0.06
56	4.67	0.23	0.077	0.148	0.014	0.06
57	4.75	0.23	0.077	0.147	0.014	0.06
58	4.83	0.27	0.088	0.147	0.016	0.07
59	4.92	0.27	0.088	0.146	0.016	0.07
60	5.00	0.27	0.088	0.146	0.016	0.07
61	5.08	0.20	0.066	0.145	0.012	0.05
62	5.17	0.20	0.066	0.144	0.012	0.05
63	5.25	0.20	0.066	0.144	0.012	0.05

64	5.33	0.23	0.077	0.143	0.014	0.06
65	5.42	0.23	0.077	0.142	0.014	0.06
66	5.50	0.23	0.077	0.142	0.014	0.06
67	5.58	0.27	0.088	0.141	0.016	0.07
68	5.67	0.27	0.088	0.141	0.016	0.07
69	5.75	0.27	0.088	0.140	0.016	0.07
70	5.83	0.27	0.088	0.139	0.016	0.07
71	5.92	0.27	0.088	0.139	0.016	0.07
72	6.00	0.27	0.088	0.138	0.016	0.07
73	6.08	0.30	0.099	0.137	0.018	0.08
74	6.17	0.30	0.099	0.137	0.018	0.08
75	6.25	0.30	0.099	0.136	0.018	0.08
76	6.33	0.30	0.099	0.136	0.018	0.08
77	6.42	0.30	0.099	0.135	0.018	0.08
78	6.50	0.30	0.099	0.134	0.018	0.08
79	6.58	0.33	0.110	0.134	0.020	0.09
80	6.67	0.33	0.110	0.133	0.020	0.09
81	6.75	0.33	0.110	0.133	0.020	0.09
82	6.83	0.33	0.110	0.132	0.020	0.09
83	6.92	0.33	0.110	0.131	0.020	0.09
84	7.00	0.33	0.110	0.131	0.020	0.09
85	7.08	0.33	0.110	0.130	0.020	0.09
86	7.17	0.33	0.110	0.130	0.020	0.09
87	7.25	0.33	0.110	0.129	0.020	0.09
88	7.33	0.37	0.121	0.128	0.022	0.10
89	7.42	0.37	0.121	0.128	0.022	0.10
90	7.50	0.37	0.121	0.127	0.022	0.10
91	7.58	0.40	0.132	0.127	---	0.01
92	7.67	0.40	0.132	0.126	---	0.01
93	7.75	0.40	0.132	0.126	---	0.01
94	7.83	0.43	0.143	0.125	---	0.02
95	7.92	0.43	0.143	0.124	---	0.02
96	8.00	0.43	0.143	0.124	---	0.02
97	8.08	0.50	0.165	0.123	---	0.04
98	8.17	0.50	0.165	0.123	---	0.04
99	8.25	0.50	0.165	0.122	---	0.04
100	8.33	0.50	0.165	0.122	---	0.04
101	8.42	0.50	0.165	0.121	---	0.04
102	8.50	0.50	0.165	0.120	---	0.04
103	8.58	0.53	0.176	0.120	---	0.06
104	8.67	0.53	0.176	0.119	---	0.06
105	8.75	0.53	0.176	0.119	---	0.06
106	8.83	0.57	0.187	0.118	---	0.07
107	8.92	0.57	0.187	0.118	---	0.07
108	9.00	0.57	0.187	0.117	---	0.07
109	9.08	0.63	0.209	0.116	---	0.09
110	9.17	0.63	0.209	0.116	---	0.09
111	9.25	0.63	0.209	0.115	---	0.09
112	9.33	0.67	0.220	0.115	---	0.11
113	9.42	0.67	0.220	0.114	---	0.11
114	9.50	0.67	0.220	0.114	---	0.11
115	9.58	0.70	0.231	0.113	---	0.12
116	9.67	0.70	0.231	0.113	---	0.12
117	9.75	0.70	0.231	0.112	---	0.12
118	9.83	0.73	0.242	0.112	---	0.13
119	9.92	0.73	0.242	0.111	---	0.13
120	10.00	0.73	0.242	0.110	---	0.13
121	10.08	0.50	0.165	0.110	---	0.05
122	10.17	0.50	0.165	0.109	---	0.06
123	10.25	0.50	0.165	0.109	---	0.06
124	10.33	0.50	0.165	0.108	---	0.06
125	10.42	0.50	0.165	0.108	---	0.06
126	10.50	0.50	0.165	0.107	---	0.06
127	10.58	0.67	0.220	0.107	---	0.11
128	10.67	0.67	0.220	0.106	---	0.11
129	10.75	0.67	0.220	0.106	---	0.11
130	10.83	0.67	0.220	0.105	---	0.11
131	10.92	0.67	0.220	0.105	---	0.12
132	11.00	0.67	0.220	0.104	---	0.12
133	11.08	0.63	0.209	0.104	---	0.11
134	11.17	0.63	0.209	0.103	---	0.11
135	11.25	0.63	0.209	0.103	---	0.11
136	11.33	0.63	0.209	0.102	---	0.11
137	11.42	0.63	0.209	0.102	---	0.11
138	11.50	0.63	0.209	0.101	---	0.11
139	11.58	0.57	0.187	0.101	---	0.09
140	11.67	0.57	0.187	0.100	---	0.09
141	11.75	0.57	0.187	0.100	---	0.09
142	11.83	0.60	0.198	0.099	---	0.10
143	11.92	0.60	0.198	0.099	---	0.10
144	12.00	0.60	0.198	0.098	---	0.10
145	12.08	0.83	0.275	0.098	---	0.18
146	12.17	0.83	0.275	0.097	---	0.18
147	12.25	0.83	0.275	0.097	---	0.18
148	12.33	0.87	0.286	0.096	---	0.19

149	12.42	0.87	0.286	0.096	---	0.19
150	12.50	0.87	0.286	0.095	---	0.19
151	12.58	0.93	0.308	0.095	---	0.21
152	12.67	0.93	0.308	0.094	---	0.21
153	12.75	0.93	0.308	0.094	---	0.21
154	12.83	0.97	0.319	0.093	---	0.23
155	12.92	0.97	0.319	0.093	---	0.23
156	13.00	0.97	0.319	0.092	---	0.23
157	13.08	1.13	0.374	0.092	---	0.28
158	13.17	1.13	0.374	0.091	---	0.28
159	13.25	1.13	0.374	0.091	---	0.28
160	13.33	1.13	0.374	0.091	---	0.28
161	13.42	1.13	0.374	0.090	---	0.28
162	13.50	1.13	0.374	0.090	---	0.28
163	13.58	0.77	0.253	0.089	---	0.16
164	13.67	0.77	0.253	0.089	---	0.16
165	13.75	0.77	0.253	0.088	---	0.16
166	13.83	0.77	0.253	0.088	---	0.17
167	13.92	0.77	0.253	0.087	---	0.17
168	14.00	0.77	0.253	0.087	---	0.17
169	14.08	0.90	0.297	0.086	---	0.21
170	14.17	0.90	0.297	0.086	---	0.21
171	14.25	0.90	0.297	0.086	---	0.21
172	14.33	0.87	0.286	0.085	---	0.20
173	14.42	0.87	0.286	0.085	---	0.20
174	14.50	0.87	0.286	0.084	---	0.20
175	14.58	0.87	0.286	0.084	---	0.20
176	14.67	0.87	0.286	0.083	---	0.20
177	14.75	0.87	0.286	0.083	---	0.20
178	14.83	0.83	0.275	0.083	---	0.19
179	14.92	0.83	0.275	0.082	---	0.19
180	15.00	0.83	0.275	0.082	---	0.19
181	15.08	0.80	0.264	0.081	---	0.18
182	15.17	0.80	0.264	0.081	---	0.18
183	15.25	0.80	0.264	0.080	---	0.18
184	15.33	0.77	0.253	0.080	---	0.17
185	15.42	0.77	0.253	0.080	---	0.17
186	15.50	0.77	0.253	0.079	---	0.17
187	15.58	0.63	0.209	0.079	---	0.13
188	15.67	0.63	0.209	0.078	---	0.13
189	15.75	0.63	0.209	0.078	---	0.13
190	15.83	0.63	0.209	0.078	---	0.13
191	15.92	0.63	0.209	0.077	---	0.13
192	16.00	0.63	0.209	0.077	---	0.13
193	16.08	0.13	0.044	0.076	0.008	0.04
194	16.17	0.13	0.044	0.076	0.008	0.04
195	16.25	0.13	0.044	0.076	0.008	0.04
196	16.33	0.13	0.044	0.075	0.008	0.04
197	16.42	0.13	0.044	0.075	0.008	0.04
198	16.50	0.13	0.044	0.074	0.008	0.04
199	16.58	0.10	0.033	0.074	0.006	0.03
200	16.67	0.10	0.033	0.074	0.006	0.03
201	16.75	0.10	0.033	0.073	0.006	0.03
202	16.83	0.10	0.033	0.073	0.006	0.03
203	16.92	0.10	0.033	0.073	0.006	0.03
204	17.00	0.10	0.033	0.072	0.006	0.03
205	17.08	0.17	0.055	0.072	0.010	0.05
206	17.17	0.17	0.055	0.072	0.010	0.05
207	17.25	0.17	0.055	0.071	0.010	0.05
208	17.33	0.17	0.055	0.071	0.010	0.05
209	17.42	0.17	0.055	0.070	0.010	0.05
210	17.50	0.17	0.055	0.070	0.010	0.05
211	17.58	0.17	0.055	0.070	0.010	0.05
212	17.67	0.17	0.055	0.069	0.010	0.05
213	17.75	0.17	0.055	0.069	0.010	0.05
214	17.83	0.13	0.044	0.069	0.008	0.04
215	17.92	0.13	0.044	0.068	0.008	0.04
216	18.00	0.13	0.044	0.068	0.008	0.04
217	18.08	0.13	0.044	0.068	0.008	0.04
218	18.17	0.13	0.044	0.067	0.008	0.04
219	18.25	0.13	0.044	0.067	0.008	0.04
220	18.33	0.13	0.044	0.067	0.008	0.04
221	18.42	0.13	0.044	0.066	0.008	0.04
222	18.50	0.13	0.044	0.066	0.008	0.04
223	18.58	0.10	0.033	0.066	0.006	0.03
224	18.67	0.10	0.033	0.065	0.006	0.03
225	18.75	0.10	0.033	0.065	0.006	0.03
226	18.83	0.07	0.022	0.065	0.004	0.02
227	18.92	0.07	0.022	0.064	0.004	0.02
228	19.00	0.07	0.022	0.064	0.004	0.02
229	19.08	0.10	0.033	0.064	0.006	0.03
230	19.17	0.10	0.033	0.064	0.006	0.03
231	19.25	0.10	0.033	0.063	0.006	0.03
232	19.33	0.13	0.044	0.063	0.008	0.04
233	19.42	0.13	0.044	0.063	0.008	0.04

234	19.50	0.13	0.044	0.062	0.008	0.04
235	19.58	0.10	0.033	0.062	0.006	0.03
236	19.67	0.10	0.033	0.062	0.006	0.03
237	19.75	0.10	0.033	0.062	0.006	0.03
238	19.83	0.07	0.022	0.061	0.004	0.02
239	19.92	0.07	0.022	0.061	0.004	0.02
240	20.00	0.07	0.022	0.061	0.004	0.02
241	20.08	0.10	0.033	0.060	0.006	0.03
242	20.17	0.10	0.033	0.060	0.006	0.03
243	20.25	0.10	0.033	0.060	0.006	0.03
244	20.33	0.10	0.033	0.060	0.006	0.03
245	20.42	0.10	0.033	0.059	0.006	0.03
246	20.50	0.10	0.033	0.059	0.006	0.03
247	20.58	0.10	0.033	0.059	0.006	0.03
248	20.67	0.10	0.033	0.059	0.006	0.03
249	20.75	0.10	0.033	0.058	0.006	0.03
250	20.83	0.07	0.022	0.058	0.004	0.02
251	20.92	0.07	0.022	0.058	0.004	0.02
252	21.00	0.07	0.022	0.058	0.004	0.02
253	21.08	0.10	0.033	0.058	0.006	0.03
254	21.17	0.10	0.033	0.057	0.006	0.03
255	21.25	0.10	0.033	0.057	0.006	0.03
256	21.33	0.07	0.022	0.057	0.004	0.02
257	21.42	0.07	0.022	0.057	0.004	0.02
258	21.50	0.07	0.022	0.056	0.004	0.02
259	21.58	0.10	0.033	0.056	0.006	0.03
260	21.67	0.10	0.033	0.056	0.006	0.03
261	21.75	0.10	0.033	0.056	0.006	0.03
262	21.83	0.07	0.022	0.056	0.004	0.02
263	21.92	0.07	0.022	0.055	0.004	0.02
264	22.00	0.07	0.022	0.055	0.004	0.02
265	22.08	0.10	0.033	0.055	0.006	0.03
266	22.17	0.10	0.033	0.055	0.006	0.03
267	22.25	0.10	0.033	0.055	0.006	0.03
268	22.33	0.07	0.022	0.055	0.004	0.02
269	22.42	0.07	0.022	0.054	0.004	0.02
270	22.50	0.07	0.022	0.054	0.004	0.02
271	22.58	0.07	0.022	0.054	0.004	0.02
272	22.67	0.07	0.022	0.054	0.004	0.02
273	22.75	0.07	0.022	0.054	0.004	0.02
274	22.83	0.07	0.022	0.054	0.004	0.02
275	22.92	0.07	0.022	0.053	0.004	0.02
276	23.00	0.07	0.022	0.053	0.004	0.02
277	23.08	0.07	0.022	0.053	0.004	0.02
278	23.17	0.07	0.022	0.053	0.004	0.02
279	23.25	0.07	0.022	0.053	0.004	0.02
280	23.33	0.07	0.022	0.053	0.004	0.02
281	23.42	0.07	0.022	0.053	0.004	0.02
282	23.50	0.07	0.022	0.053	0.004	0.02
283	23.58	0.07	0.022	0.053	0.004	0.02
284	23.67	0.07	0.022	0.053	0.004	0.02
285	23.75	0.07	0.022	0.052	0.004	0.02
286	23.83	0.07	0.022	0.052	0.004	0.02
287	23.92	0.07	0.022	0.052	0.004	0.02
288	24.00	0.07	0.022	0.052	0.004	0.02
	Sum =	100.0			Sum =	21.1

Flood volume = Effective rainfall 1.76(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 9.2(Ac.Ft)
Total soil loss = 0.99(In)
Total soil loss = 5.138(Ac.Ft)
Total rainfall = 2.75(In)
Flood volume = 398812.6 Cubic Feet
Total soil loss = 223813.6 Cubic Feet

Peak flow rate of this hydrograph = 17.746(CFS)

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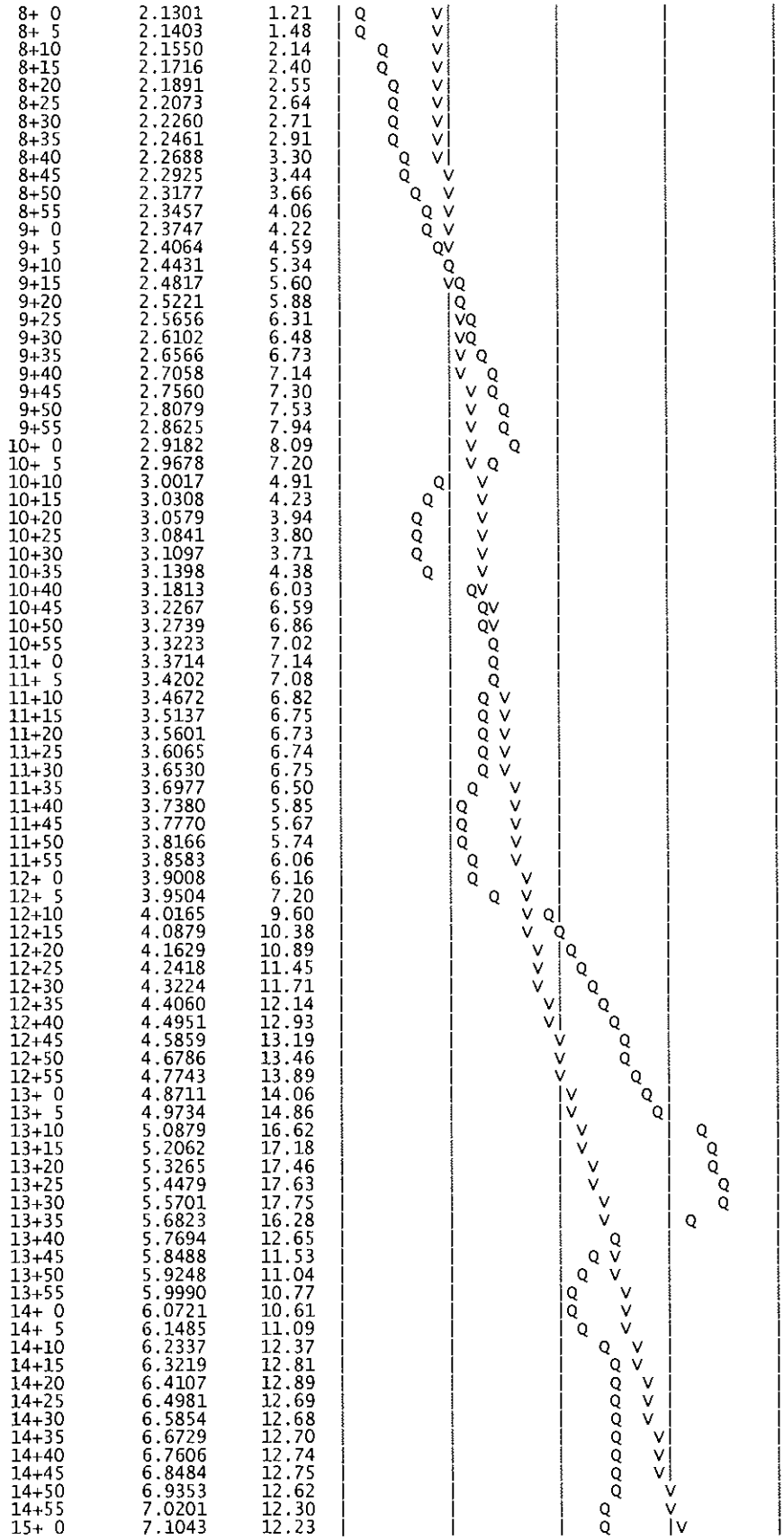
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0016	0.23	Q				
0+10	0.0070	0.78	VQ				
0+15	0.0135	0.95	VQ				
0+20	0.0214	1.15	V Q				
0+25	0.0315	1.47	V Q				
0+30	0.0424	1.58	V Q				
0+35	0.0537	1.64	V Q				
0+40	0.0652	1.67	V Q				
0+45	0.0768	1.69	V Q				
0+50	0.0893	1.81	V Q				

0+55	0.1037	2.09	V Q	|	|	|	|
1+ 0	0.1187	2.18	V Q	|	|	|	|
1+ 5	0.1332	2.10	V Q	|	|	|	|
1+10	0.1459	1.85	V Q	|	|	|	|
1+15	0.1581	1.78	V Q	|	|	|	|
1+20	0.1702	1.75	V Q	|	|	|	|
1+25	0.1821	1.73	V Q	|	|	|	|
1+30	0.1939	1.72	V Q	|	|	|	|
1+35	0.2057	1.71	V Q	|	|	|	|
1+40	0.2174	1.70	V Q	|	|	|	|
1+45	0.2291	1.70	|V Q	|	|	|	|
1+50	0.2417	1.82	|V Q	|	|	|	|
1+55	0.2561	2.09	|V Q	|	|	|	|
2+ 0	0.2711	2.18	|V Q	|	|	|	|
2+ 5	0.2863	2.22	|V Q	|	|	|	|
2+10	0.3018	2.24	|V Q	|	|	|	|
2+15	0.3173	2.25	|V Q	|	|	|	|
2+20	0.3329	2.26	|V Q	|	|	|	|
2+25	0.3485	2.27	|V Q	|	|	|	|
2+30	0.3641	2.27	|V Q	|	|	|	|
2+35	0.3805	2.38	|V Q	|	|	|	|
2+40	0.3989	2.66	|V Q	|	|	|	|
2+45	0.4178	2.75	|V Q	|	|	|	|
2+50	0.4370	2.78	|V Q	|	|	|	|
2+55	0.4563	2.81	|V Q	|	|	|	|
3+ 0	0.4757	2.82	| V Q	|	|	|	|
3+ 5	0.4952	2.83	| V Q	|	|	|	|
3+10	0.5147	2.84	| V Q	|	|	|	|
3+15	0.5343	2.84	| V Q	|	|	|	|
3+20	0.5538	2.84	| V Q	|	|	|	|
3+25	0.5733	2.84	| V Q	|	|	|	|
3+30	0.5929	2.84	| V Q	|	|	|	|
3+35	0.6124	2.84	| V Q	|	|	|	|
3+40	0.6319	2.84	| V Q	|	|	|	|
3+45	0.6515	2.84	| V Q	|	|	|	|
3+50	0.6718	2.95	| V Q	|	|	|	|
3+55	0.6940	3.23	| V Q	|	|	|	|
4+ 0	0.7168	3.31	| V Q	|	|	|	|
4+ 5	0.7399	3.35	| V Q	|	|	|	|
4+10	0.7632	3.37	| V Q	|	|	|	|
4+15	0.7865	3.39	| V Q	|	|	|	|
4+20	0.8107	3.51	| V Q	|	|	|	|
4+25	0.8368	3.79	| V Q	|	|	|	|
4+30	0.8636	3.88	| V Q	|	|	|	|
4+35	0.8905	3.92	| V Q	|	|	|	|
4+40	0.9177	3.94	| V Q	|	|	|	|
4+45	0.9449	3.96	| V Q	|	|	|	|
4+50	0.9730	4.08	| V Q	|	|	|	|
4+55	1.0031	4.36	| V Q	|	|	|	|
5+ 0	1.0337	4.45	| V Q	|	|	|	|
5+ 5	1.0630	4.26	| V Q	|	|	|	|
5+10	1.0887	3.73	| V Q	|	|	|	|
5+15	1.1133	3.57	| V Q	|	|	|	|
5+20	1.1381	3.61	| V Q	|	|	|	|
5+25	1.1647	3.85	| V Q	|	|	|	|
5+30	1.1916	3.91	| V Q	|	|	|	|
5+35	1.2195	4.05	| V Q	|	|	|	|
5+40	1.2494	4.33	| V Q	|	|	|	|
5+45	1.2799	4.43	| V Q	|	|	|	|
5+50	1.3107	4.48	| V Q	|	|	|	|
5+55	1.3418	4.51	| V Q	|	|	|	|
6+ 0	1.3729	4.52	| V Q	|	|	|	|
6+ 5	1.4049	4.65	| V Q	|	|	|	|
6+10	1.4389	4.93	| V Q	|	|	|	|
6+15	1.4734	5.02	| V Q	|	|	|	|
6+20	1.5082	5.05	| V Q	|	|	|	|
6+25	1.5432	5.08	| V Q	|	|	|	|
6+30	1.5782	5.09	| V Q	|	|	|	|
6+35	1.6141	5.21	| V Q	|	|	|	|
6+40	1.6520	5.50	| V Q	|	|	|	|
6+45	1.6904	5.58	| V |Q	|	|	|	|
6+50	1.7292	5.62	| V |Q	|	|	|	|
6+55	1.7680	5.64	| V |Q	|	|	|	|
7+ 0	1.8070	5.66	| V |Q	|	|	|	|
7+ 5	1.8460	5.67	| V |Q	|	|	|	|
7+10	1.8851	5.67	| V |Q	|	|	|	|
7+15	1.9241	5.67	| V |Q	|	|	|	|
7+20	1.9640	5.79	| V |Q	|	|	|	|
7+25	2.0058	6.06	| V | Q	|	|	|	|
7+30	2.0481	6.15	| V | Q	|	|	|	|
7+35	2.0825	4.99	| Q|	|	|	|	|
7+40	2.0972	2.14	| Q V|	|	|	|	|
7+45	2.1061	1.29	| Q V|	|	|	|	|
7+50	2.1134	1.06	| Q V|	|	|	|	|
7+55	2.1218	1.21	| Q V|	|	|	|	|



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8+ 5	2.1403	1.48	
8+10	2.1550	2.14	
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8+30	2.2260	2.71	
8+35	2.2461	2.91	
8+40	2.2688	3.30	
8+45	2.2925	3.44	
8+50	2.3177	3.66	
8+55	2.3457	4.06	
9+ 0	2.3747	4.22	
9+ 5	2.4064	4.59	
9+10	2.4431	5.34	
9+15	2.4817	5.60	
9+20	2.5221	5.88	
9+25	2.5656	6.31	
9+30	2.6102	6.48	
9+35	2.6566	6.73	
9+40	2.7058	7.14	
9+45	2.7560	7.30	
9+50	2.8079	7.53	
9+55	2.8625	7.94	
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10+20	3.0579	3.94	
10+25	3.0841	3.80	
10+30	3.1097	3.71	
10+35	3.1398	4.38	
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10+50	3.2739	6.86	
10+55	3.3223	7.02	
11+ 0	3.3714	7.14	
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11+10	3.4672	6.82	
11+15	3.5137	6.75	
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11+25	3.6065	6.74	
11+30	3.6530	6.75	
11+35	3.6977	6.50	
11+40	3.7380	5.85	
11+45	3.7770	5.67	
11+50	3.8166	5.74	
11+55	3.8583	6.06	
12+ 0	3.9008	6.16	
12+ 5	3.9504	7.20	
12+10	4.0165	9.60	
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12+25	4.2418	11.45	
12+30	4.3224	11.71	
12+35	4.4060	12.14	
12+40	4.4951	12.93	
12+45	4.5859	13.19	
12+50	4.6786	13.46	
12+55	4.7743	13.89	
13+ 0	4.8711	14.06	
13+ 5	4.9734	14.86	
13+10	5.0879	16.62	
13+15	5.2062	17.18	
13+20	5.3265	17.46	
13+25	5.4479	17.63	
13+30	5.5701	17.75	
13+35	5.6823	16.28	
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13+55	5.9990	10.77	
14+ 0	6.0721	10.61	
14+ 5	6.1485	11.09	
14+10	6.2337	12.37	
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14+20	6.4107	12.89	
14+25	6.4981	12.69	
14+30	6.5854	12.68	
14+35	6.6729	12.70	
14+40	6.7606	12.74	
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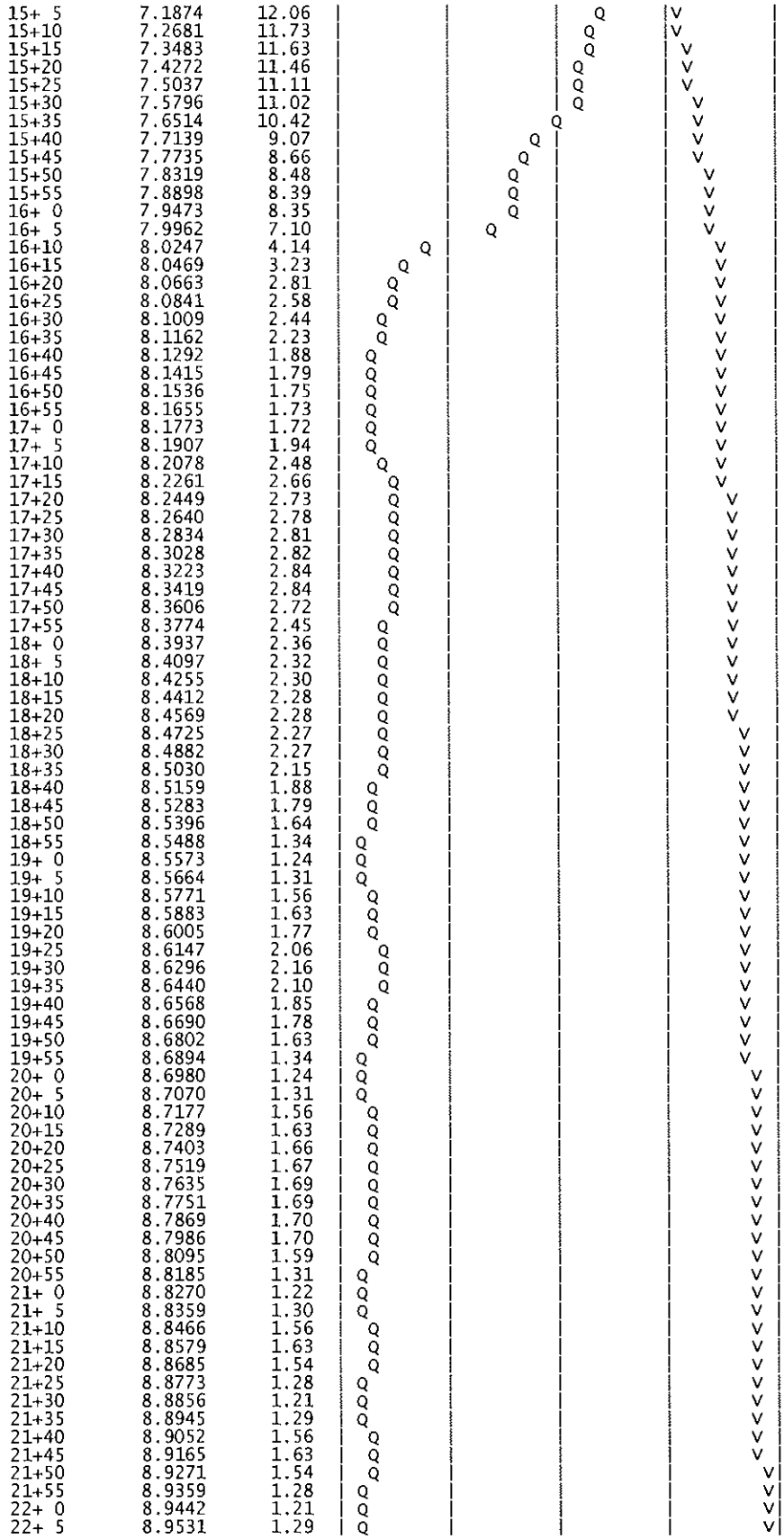
14+55	7.0201	12.30	
15+ 0	7.1043	12.23	



15+ 5	7.1874	12.06	
15+10	7.2681	11.73	
15+15	7.3483	11.63	
15+20	7.4272	11.46	
15+25	7.5037	11.11	
15+30	7.5796	11.02	
15+35	7.6514	10.42	
15+40	7.7139	9.07	
15+45	7.7735	8.66	
15+50	7.8319	8.48	
15+55	7.8898	8.39	
16+ 0	7.9473	8.35	
16+ 5	7.9962	7.10	
16+10	8.0247	4.14	
16+15	8.0469	3.23	
16+20	8.0663	2.81	
16+25	8.0841	2.58	
16+30	8.1009	2.44	
16+35	8.1162	2.23	
16+40	8.1292	1.88	
16+45	8.1415	1.79	
16+50	8.1536	1.75	
16+55	8.1655	1.73	
17+ 0	8.1773	1.72	
17+ 5	8.1907	1.94	
17+10	8.2078	2.48	
17+15	8.2261	2.66	
17+20	8.2449	2.73	
17+25	8.2640	2.78	
17+30	8.2834	2.81	
17+35	8.3028	2.82	
17+40	8.3223	2.84	
17+45	8.3419	2.84	
17+50	8.3606	2.72	
17+55	8.3774	2.45	
18+ 0	8.3937	2.36	
18+ 5	8.4097	2.32	
18+10	8.4255	2.30	
18+15	8.4412	2.28	
18+20	8.4569	2.28	
18+25	8.4725	2.27	
18+30	8.4882	2.27	
18+35	8.5030	2.15	
18+40	8.5159	1.88	
18+45	8.5283	1.79	
18+50	8.5396	1.64	
18+55	8.5488	1.34	
19+ 0	8.5573	1.24	
19+ 5	8.5664	1.31	
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19+15	8.5883	1.63	
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19+25	8.6147	2.06	
19+30	8.6296	2.16	
19+35	8.6440	2.10	
19+40	8.6568	1.85	
19+45	8.6690	1.78	
19+50	8.6802	1.63	
19+55	8.6894	1.34	
20+ 0	8.6980	1.24	
20+ 5	8.7070	1.31	
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20+40	8.7869	1.70	
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20+50	8.8095	1.59	
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21+ 0	8.8270	1.22	
21+ 5	8.8359	1.30	
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21+15	8.8579	1.63	
21+20	8.8685	1.54	
21+25	8.8773	1.28	
21+30	8.8856	1.21	
21+35	8.8945	1.29	
21+40	8.9052	1.56	
21+45	8.9165	1.63	
21+50	8.9271	1.54	
21+55	8.9359	1.28	
22+ 0	8.9442	1.21	
22+ 5	8.9531	1.29	

22+10	8.9639	1.56	Q	|	|	|	V|
22+15	8.9751	1.63	Q	|	|	|	V|
22+20	8.9857	1.54	Q	|	|	|	V|
22+25	8.9945	1.28	Q	|	|	|	V|
22+30	9.0028	1.21	Q	|	|	|	V|
22+35	9.0109	1.18	Q	|	|	|	V|
22+40	9.0190	1.16	Q	|	|	|	V|
22+45	9.0269	1.15	Q	|	|	|	V|
22+50	9.0348	1.14	Q	|	|	|	V|
22+55	9.0426	1.13	Q	|	|	|	V|
23+ 0	9.0504	1.13	Q	|	|	|	V|
23+ 5	9.0582	1.13	Q	|	|	|	V|
23+10	9.0660	1.13	Q	|	|	|	V|
23+15	9.0738	1.13	Q	|	|	|	V|
23+20	9.0816	1.13	Q	|	|	|	V|
23+25	9.0894	1.13	Q	|	|	|	V|
23+30	9.0973	1.13	Q	|	|	|	V|
23+35	9.1051	1.13	Q	|	|	|	V|
23+40	9.1129	1.13	Q	|	|	|	V|
23+45	9.1207	1.13	Q	|	|	|	V|
23+50	9.1285	1.13	Q	|	|	|	V|
23+55	9.1363	1.13	Q	|	|	|	V|
24+ 0	9.1441	1.13	Q	|	|	|	V|
24+ 5	9.1504	0.90	Q	|	|	|	V|
24+10	9.1528	0.35	Q	|	|	|	V|
24+15	9.1540	0.18	Q	|	|	|	V|
24+20	9.1548	0.10	Q	|	|	|	V|
24+25	9.1552	0.06	Q	|	|	|	V|
24+30	9.1554	0.03	Q	|	|	|	V|
24+35	9.1555	0.01	Q	|	|	|	V|

U n i t   H y d r o g r a p h   A n a l y s i s

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Study date 05/12/08 File: 0727N010610.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 58.70(Ac.) = 0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 58.70(Ac.) = 0.092 Sq. Mi.
Length along longest watercourse = 3750.00(Ft.)
Length along longest watercourse measured to centroid = 1875.00(Ft.)
Length along longest watercourse = 0.710 Mi.
Length along longest watercourse measured to centroid = 0.355 Mi.
Difference in elevation = 39.50(Ft.)
Slope along watercourse = 55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.39 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	1.10	64.57

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	2.50	146.75

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.676(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.676(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
55.300	56.00	0.900
3.400	86.00	0.000

Total Area Entered = 58.70(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.900	0.097	0.942	0.091
86.0	86.0	0.176	0.000	0.176	0.058	0.010
					Sum (F) =	0.102

Area averaged mean soil loss (F) (In/Hr) = 0.102
Minimum soil loss rate ((In/Hr)) = 0.051
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000 Sum=	59.159

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.101	0.102	0.018	0.08
2	0.17	0.60	0.121	0.102	---	0.02
3	0.25	0.60	0.121	0.102	---	0.02
4	0.33	0.60	0.121	0.102	---	0.02
5	0.42	0.60	0.121	0.102	---	0.02
6	0.50	0.70	0.141	0.102	---	0.04
7	0.58	0.70	0.141	0.102	---	0.04
8	0.67	0.70	0.141	0.102	---	0.04
9	0.75	0.70	0.141	0.102	---	0.04
10	0.83	0.70	0.141	0.102	---	0.04
11	0.92	0.70	0.141	0.102	---	0.04
12	1.00	0.80	0.161	0.102	---	0.06
13	1.08	0.80	0.161	0.102	---	0.06
14	1.17	0.80	0.161	0.102	---	0.06
15	1.25	0.80	0.161	0.102	---	0.06
16	1.33	0.80	0.161	0.102	---	0.06
17	1.42	0.80	0.161	0.102	---	0.06
18	1.50	0.80	0.161	0.102	---	0.06
19	1.58	0.80	0.161	0.102	---	0.06
20	1.67	0.80	0.161	0.102	---	0.06
21	1.75	0.80	0.161	0.102	---	0.06
22	1.83	0.80	0.161	0.102	---	0.06
23	1.92	0.80	0.161	0.102	---	0.06
24	2.00	0.90	0.181	0.102	---	0.08
25	2.08	0.80	0.161	0.102	---	0.06
26	2.17	0.90	0.181	0.102	---	0.08
27	2.25	0.90	0.181	0.102	---	0.08
28	2.33	0.90	0.181	0.102	---	0.08
29	2.42	0.90	0.181	0.102	---	0.08
30	2.50	0.90	0.181	0.102	---	0.08
31	2.58	0.90	0.181	0.102	---	0.08
32	2.67	0.90	0.181	0.102	---	0.08
33	2.75	1.00	0.201	0.102	---	0.10
34	2.83	1.00	0.201	0.102	---	0.10
35	2.92	1.00	0.201	0.102	---	0.10
36	3.00	1.00	0.201	0.102	---	0.10
37	3.08	1.00	0.201	0.102	---	0.10
38	3.17	1.10	0.221	0.102	---	0.12
39	3.25	1.10	0.221	0.102	---	0.12
40	3.33	1.10	0.221	0.102	---	0.12
41	3.42	1.20	0.241	0.102	---	0.14
42	3.50	1.30	0.261	0.102	---	0.16
43	3.58	1.40	0.282	0.102	---	0.18
44	3.67	1.40	0.282	0.102	---	0.18
45	3.75	1.50	0.302	0.102	---	0.20
46	3.83	1.50	0.302	0.102	---	0.20
47	3.92	1.60	0.322	0.102	---	0.22
48	4.00	1.60	0.322	0.102	---	0.22
49	4.08	1.70	0.342	0.102	---	0.24
50	4.17	1.80	0.362	0.102	---	0.26
51	4.25	1.90	0.382	0.102	---	0.28
52	4.33	2.00	0.402	0.102	---	0.30
53	4.42	2.10	0.422	0.102	---	0.32
54	4.50	2.10	0.422	0.102	---	0.32
55	4.58	2.20	0.442	0.102	---	0.34
56	4.67	2.30	0.462	0.102	---	0.36
57	4.75	2.40	0.483	0.102	---	0.38
58	4.83	2.40	0.483	0.102	---	0.38
59	4.92	2.50	0.503	0.102	---	0.40
60	5.00	2.60	0.523	0.102	---	0.42
61	5.08	3.10	0.623	0.102	---	0.52

62	5.17	3.60	0.724	0.102	---	0.62
63	5.25	3.90	0.784	0.102	---	0.68
64	5.33	4.20	0.845	0.102	---	0.74
65	5.42	4.70	0.945	0.102	---	0.84
66	5.50	5.60	1.126	0.102	---	1.02
67	5.58	1.90	0.382	0.102	---	0.28
68	5.67	0.90	0.181	0.102	---	0.08
69	5.75	0.60	0.121	0.102	---	0.02
70	5.83	0.50	0.101	0.102	0.018	0.08
71	5.92	0.30	0.060	0.102	0.011	0.05
72	6.00	0.20	0.040	0.102	0.007	0.03
Sum =		100.0			Sum =	13.1

Flood volume = Effective rainfall 1.10(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 5.4(Ac.Ft)
Total soil loss = 0.58(In)
Total soil loss = 2.838(Ac.Ft)
Total rainfall = 1.68(In)
Flood volume = 233401.8 Cubic Feet
Total soil loss = 123643.8 Cubic Feet

Peak flow rate of this hydrograph = 47.449(CFS)

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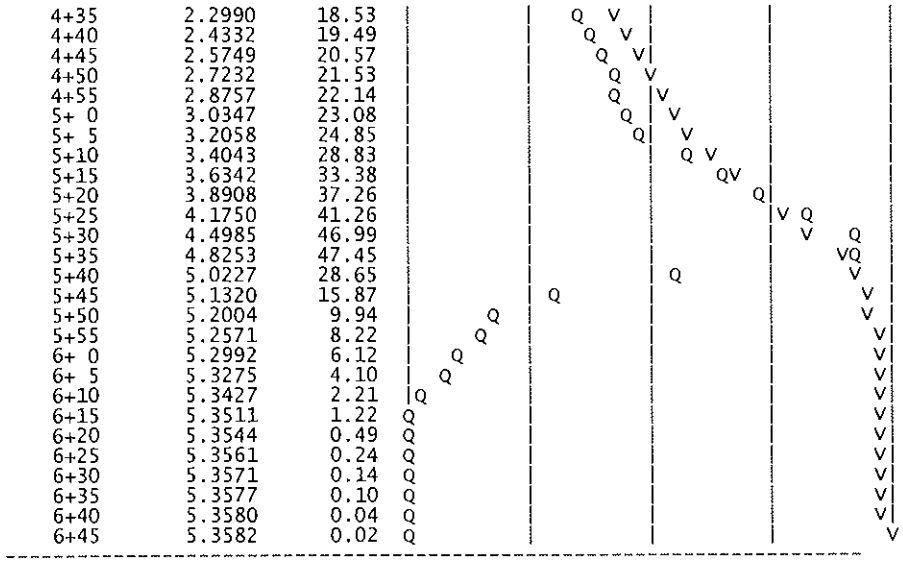
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0048	0.70	Q				
0+10	0.0213	2.39	VQ				
0+15	0.0323	1.60	VQ				
0+20	0.0411	1.28	VQ				
0+25	0.0494	1.21	Q				
0+30	0.0587	1.35	VQ				
0+35	0.0717	1.88	VQ				
0+40	0.0862	2.10	VQ				
0+45	0.1012	2.19	VQ				
0+50	0.1167	2.25	VQ				
0+55	0.1323	2.25	VQ				
1+ 0	0.1491	2.45	|Q				
1+ 5	0.1699	3.01	|VQ				
1+10	0.1922	3.25	|VQ				
1+15	0.2153	3.35	|VQ				
1+20	0.2388	3.41	|VQ				
1+25	0.2625	3.44	|VQ				
1+30	0.2864	3.47	| Q				
1+35	0.3104	3.49	| Q				
1+40	0.3345	3.50	| Q				
1+45	0.3586	3.51	| Q				
1+50	0.3828	3.51	| Q				
1+55	0.4069	3.51	| QV				
2+ 0	0.4323	3.68	| QV				
2+ 5	0.4602	4.05	| Q				
2+10	0.4870	3.90	| Q				
2+15	0.5168	4.32	| Q				
2+20	0.5478	4.50	| QV				
2+25	0.5793	4.58	| QV				
2+30	0.6112	4.62	| QV				
2+35	0.6432	4.65	| QV				
2+40	0.6753	4.67	| Q V				
2+45	0.7088	4.86	| Q V				
2+50	0.7460	5.40	| QV				
2+55	0.7848	5.64	| QV				
3+ 0	0.8243	5.73	| Q V				
3+ 5	0.8642	5.79	| Q V				
3+10	0.9055	5.99	| Q V				
3+15	0.9507	6.56	| Q V				
3+20	0.9975	6.81	| Q V				
3+25	1.0463	7.08	| Q V				
3+30	1.1005	7.86	| Q V				
3+35	1.1613	8.84	| QV				
3+40	1.2283	9.73	| Q V				
3+45	1.2992	10.29	| QV				
3+50	1.3752	11.03	| Q V				
3+55	1.4548	11.56	| QV				
4+ 0	1.5393	12.27	| Q|V				
4+ 5	1.6273	12.78	| Q V				
4+10	1.7214	13.66	| Q V				
4+15	1.8227	14.70	| |Q V				
4+20	1.9315	15.80	| | Q V				
4+25	2.0481	16.93	| | Q V				
4+30	2.1714	17.91	| | Q V				



4+35	2.2990	18.53	
4+40	2.4332	19.49	
4+45	2.5749	20.57	
4+50	2.7232	21.53	
4+55	2.8757	22.14	
5+ 0	3.0347	23.08	
5+ 5	3.2058	24.85	
5+10	3.4043	28.83	
5+15	3.6342	33.38	
5+20	3.8908	37.26	
5+25	4.1750	41.26	
5+30	4.4985	46.99	
5+35	4.8253	47.45	
5+40	5.0227	28.65	
5+45	5.1320	15.87	
5+50	5.2004	9.94	
5+55	5.2571	8.22	
6+ 0	5.2992	6.12	
6+ 5	5.3275	4.10	
6+10	5.3427	2.21	
6+15	5.3511	1.22	
6+20	5.3544	0.49	
6+25	5.3561	0.24	
6+30	5.3571	0.14	
6+35	5.3577	0.10	
6+40	5.3580	0.04	
6+45	5.3582	0.02	

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727S010610.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 62.40(Ac.) = 0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 62.40(Ac.) = 0.098 Sq. Mi.
Length along longest watercourse = 3060.00(Ft.)
Length along longest watercourse measured to centroid = 1530.00(Ft.)
Length along longest watercourse = 0.580 Mi.
Length along longest watercourse measured to centroid = 0.290 Mi.
Difference in elevation = 43.66(Ft.)
Slope along watercourse = 75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.080 Hr.
Lag time = 4.82 Min.
25% of lag time = 1.21 Min.
40% of lag time = 1.93 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	1.10	68.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	2.50	156.00

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.676(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.676(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
56.400	56.00	0.900
6.000	86.00	0.000

Total Area Entered = 62.40(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.900	0.097	0.904	0.088
86.0	86.0	0.176	0.000	0.176	0.096	0.017
					Sum (F) =	0.105

Area averaged mean soil loss (F) (In/Hr) = 0.105
Minimum soil loss rate ((In/Hr)) = 0.052
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000 Sum=	62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.101	0.105	0.018	0.08
2	0.17	0.60	0.121	0.105	---	0.02
3	0.25	0.60	0.121	0.105	---	0.02
4	0.33	0.60	0.121	0.105	---	0.02
5	0.42	0.60	0.121	0.105	---	0.02
6	0.50	0.70	0.141	0.105	---	0.04
7	0.58	0.70	0.141	0.105	---	0.04
8	0.67	0.70	0.141	0.105	---	0.04
9	0.75	0.70	0.141	0.105	---	0.04
10	0.83	0.70	0.141	0.105	---	0.04
11	0.92	0.70	0.141	0.105	---	0.04
12	1.00	0.80	0.161	0.105	---	0.06
13	1.08	0.80	0.161	0.105	---	0.06
14	1.17	0.80	0.161	0.105	---	0.06
15	1.25	0.80	0.161	0.105	---	0.06
16	1.33	0.80	0.161	0.105	---	0.06
17	1.42	0.80	0.161	0.105	---	0.06
18	1.50	0.80	0.161	0.105	---	0.06
19	1.58	0.80	0.161	0.105	---	0.06
20	1.67	0.80	0.161	0.105	---	0.06
21	1.75	0.80	0.161	0.105	---	0.06
22	1.83	0.80	0.161	0.105	---	0.06
23	1.92	0.80	0.161	0.105	---	0.06
24	2.00	0.90	0.181	0.105	---	0.08
25	2.08	0.80	0.161	0.105	---	0.06
26	2.17	0.90	0.181	0.105	---	0.08
27	2.25	0.90	0.181	0.105	---	0.08
28	2.33	0.90	0.181	0.105	---	0.08
29	2.42	0.90	0.181	0.105	---	0.08
30	2.50	0.90	0.181	0.105	---	0.08
31	2.58	0.90	0.181	0.105	---	0.08
32	2.67	0.90	0.181	0.105	---	0.08
33	2.75	1.00	0.201	0.105	---	0.10
34	2.83	1.00	0.201	0.105	---	0.10
35	2.92	1.00	0.201	0.105	---	0.10
36	3.00	1.00	0.201	0.105	---	0.10
37	3.08	1.00	0.201	0.105	---	0.10
38	3.17	1.10	0.221	0.105	---	0.12
39	3.25	1.10	0.221	0.105	---	0.12
40	3.33	1.10	0.221	0.105	---	0.12
41	3.42	1.20	0.241	0.105	---	0.14
42	3.50	1.30	0.261	0.105	---	0.16
43	3.58	1.40	0.282	0.105	---	0.18
44	3.67	1.40	0.282	0.105	---	0.18
45	3.75	1.50	0.302	0.105	---	0.20
46	3.83	1.50	0.302	0.105	---	0.20
47	3.92	1.60	0.322	0.105	---	0.22
48	4.00	1.60	0.322	0.105	---	0.22
49	4.08	1.70	0.342	0.105	---	0.24
50	4.17	1.80	0.362	0.105	---	0.26
51	4.25	1.90	0.382	0.105	---	0.28
52	4.33	2.00	0.402	0.105	---	0.30
53	4.42	2.10	0.422	0.105	---	0.32
54	4.50	2.10	0.422	0.105	---	0.32
55	4.58	2.20	0.442	0.105	---	0.34
56	4.67	2.30	0.462	0.105	---	0.36
57	4.75	2.40	0.483	0.105	---	0.38
58	4.83	2.40	0.483	0.105	---	0.38
59	4.92	2.50	0.503	0.105	---	0.40
60	5.00	2.60	0.523	0.105	---	0.42
61	5.08	3.10	0.623	0.105	---	0.52
62	5.17	3.60	0.724	0.105	---	0.62
63	5.25	3.90	0.784	0.105	---	0.68

64	5.33	4.20	0.845	0.105	---	0.74
65	5.42	4.70	0.945	0.105	---	0.84
66	5.50	5.60	1.126	0.105	---	1.02
67	5.58	1.90	0.382	0.105	---	0.28
68	5.67	0.90	0.181	0.105	---	0.08
69	5.75	0.60	0.121	0.105	---	0.02
70	5.83	0.50	0.101	0.105	0.018	0.08
71	5.92	0.30	0.060	0.105	0.011	0.05
72	6.00	0.20	0.040	0.105	0.007	0.03
Sum =		100.0			Sum =	12.9

Flood volume = Effective rainfall 1.08(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 5.6(Ac.Ft)
Total soil loss = 0.60(In)
Total soil loss = 3.106(Ac.Ft)
Total rainfall = 1.68(In)
Flood volume = 244254.2 Cubic Feet
Total soil loss = 135292.0 Cubic Feet

Peak flow rate of this hydrograph = 51.759(CFS)

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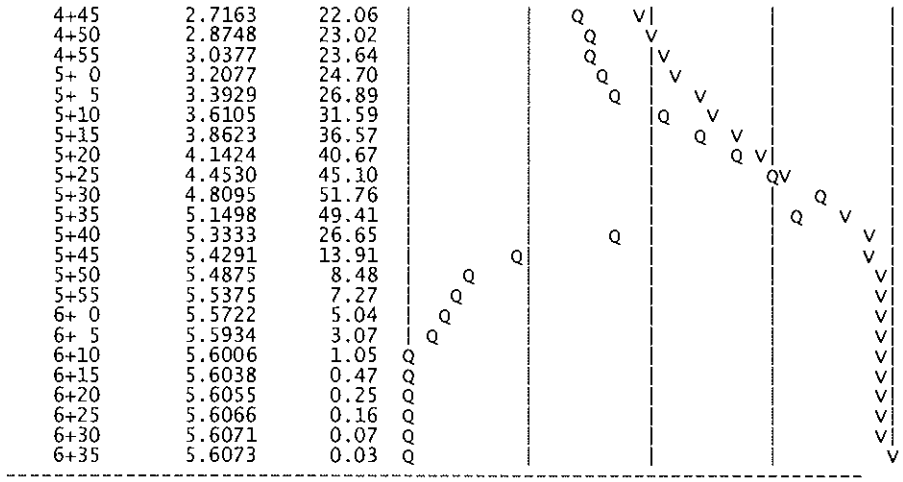
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0073	1.05	Q	|	|	|	|
0+10	0.0260	2.73	VQ	|	|	|	|
0+15	0.0362	1.48	Q	|	|	|	|
0+20	0.0445	1.20	Q	|	|	|	|
0+25	0.0522	1.12	Q	|	|	|	|
0+30	0.0615	1.34	Q	|	|	|	|
0+35	0.0748	1.93	VQ	|	|	|	|
0+40	0.0894	2.13	VQ	|	|	|	|
0+45	0.1043	2.16	VQ	|	|	|	|
0+50	0.1195	2.21	VQ	|	|	|	|
0+55	0.1349	2.24	VQ	|	|	|	|
1+ 0	0.1522	2.52	|Q	|	|	|	|
1+ 5	0.1739	3.15	|VQ	|	|	|	|
1+10	0.1969	3.34	|VQ	|	|	|	|
1+15	0.2205	3.42	|VQ	|	|	|	|
1+20	0.2444	3.47	|VQ	|	|	|	|
1+25	0.2685	3.50	|VQ	|	|	|	|
1+30	0.2928	3.52	| Q	|	|	|	|
1+35	0.3172	3.54	| Q	|	|	|	|
1+40	0.3415	3.54	| Q	|	|	|	|
1+45	0.3659	3.54	| Q	|	|	|	|
1+50	0.3903	3.54	| Q	|	|	|	|
1+55	0.4147	3.54	| Q	|	|	|	|
2+ 0	0.4408	3.80	| QV	|	|	|	|
2+ 5	0.4694	4.15	| QV	|	|	|	|
2+10	0.4969	3.99	| QV	|	|	|	|
2+15	0.5279	4.50	| QV	|	|	|	|
2+20	0.5599	4.65	| Q	|	|	|	|
2+25	0.5924	4.72	| QV	|	|	|	|
2+30	0.6252	4.76	| QV	|	|	|	|
2+35	0.6582	4.79	| QV	|	|	|	|
2+40	0.6911	4.79	| QV	|	|	|	|
2+45	0.7260	5.06	| Q V	|	|	|	|
2+50	0.7651	5.68	| Q V	|	|	|	|
2+55	0.8055	5.87	| Q V	|	|	|	|
3+ 0	0.8465	5.96	| Q V	|	|	|	|
3+ 5	0.8879	6.00	| Q V	|	|	|	|
3+10	0.9312	6.29	| Q V	|	|	|	|
3+15	0.9789	6.93	| Q V	|	|	|	|
3+20	1.0280	7.13	| Q V	|	|	|	|
3+25	1.0795	7.48	| Q V	|	|	|	|
3+30	1.1374	8.40	| Q V	|	|	|	|
3+35	1.2027	9.49	| Q V	|	|	|	|
3+40	1.2744	10.41	| Q V	|	|	|	|
3+45	1.3502	11.00	| Q V	|	|	|	|
3+50	1.4314	11.79	| Q V	|	|	|	|
3+55	1.5163	12.33	| Q V	|	|	|	|
4+ 0	1.6066	13.10	| Q |V	|	|	|	|
4+ 5	1.7005	13.63	| Q| V	|	|	|	|
4+10	1.8013	14.64	| Q| V	|	|	|	|
4+15	1.9099	15.77	| Q V	|	|	|	|
4+20	2.0268	16.97	| |Q V	|	|	|	|
4+25	2.1520	18.19	| | Q V	|	|	|	|
4+30	2.2841	19.18	| | Q V	|	|	|	|
4+35	2.4205	19.81	| | Q V	|	|	|	|
4+40	2.5643	20.88	| | Q V	|	|	|	|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4+50 2.8748 23.02
4+55 3.0377 23.64
5+ 0 3.2077 24.70
5+ 5 3.3929 26.89
5+10 3.6105 31.59
5+15 3.8623 36.57
5+20 4.1424 40.67
5+25 4.4530 45.10
5+30 4.8095 51.76
5+35 5.1498 49.41
5+40 5.3333 26.65
5+45 5.4291 13.91
5+50 5.4875 8.48
5+55 5.5375 7.27
6+ 0 5.5722 5.04
6+ 5 5.5934 3.07
6+10 5.6006 1.05
6+15 5.6038 0.47
6+20 5.6055 0.25
6+25 5.6066 0.16
6+30 5.6071 0.07
6+35 5.6073 0.03

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 58.70(Ac.) = 0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 58.70(Ac.) = 0.092 Sq. Mi.
Length along longest watercourse = 3750.00(Ft.)
Length along longest watercourse measured to centroid = 1875.00(Ft.)
Length along longest watercourse = 0.710 Mi.
Length along longest watercourse measured to centroid = 0.355 Mi.
Difference in elevation = 39.50(Ft.)
Slope along watercourse = 55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.39 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	0.80	46.96

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	1.85	108.60

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 1.232(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.232(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
55.300	56.00	0.900
3.400	86.00	0.000

Total Area Entered = 58.70(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.900	0.097	0.942	0.091
86.0	86.0	0.176	0.000	0.176	0.058	0.010
					Sum (F) =	0.102

Area averaged mean soil loss (F) (In/Hr) = 0.102
Minimum soil loss rate ((In/Hr)) = 0.051
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000 Sum=	59.159

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)		Effective
(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1 0.08	1.30	0.192	0.102	---	0.09
2 0.17	1.30	0.192	0.102	---	0.09
3 0.25	1.10	0.163	0.102	---	0.06
4 0.33	1.50	0.222	0.102	---	0.12
5 0.42	1.50	0.222	0.102	---	0.12
6 0.50	1.80	0.266	0.102	---	0.16
7 0.58	1.50	0.222	0.102	---	0.12
8 0.67	1.80	0.266	0.102	---	0.16
9 0.75	1.80	0.266	0.102	---	0.16
10 0.83	1.50	0.222	0.102	---	0.12
11 0.92	1.60	0.236	0.102	---	0.13
12 1.00	1.80	0.266	0.102	---	0.16
13 1.08	2.20	0.325	0.102	---	0.22
14 1.17	2.20	0.325	0.102	---	0.22
15 1.25	2.20	0.325	0.102	---	0.22
16 1.33	2.00	0.296	0.102	---	0.19
17 1.42	2.60	0.384	0.102	---	0.28
18 1.50	2.70	0.399	0.102	---	0.30
19 1.58	2.40	0.355	0.102	---	0.25
20 1.67	2.70	0.399	0.102	---	0.30
21 1.75	3.30	0.488	0.102	---	0.39
22 1.83	3.10	0.458	0.102	---	0.36
23 1.92	2.90	0.429	0.102	---	0.33
24 2.00	3.00	0.443	0.102	---	0.34
25 2.08	3.10	0.458	0.102	---	0.36
26 2.17	4.20	0.621	0.102	---	0.52
27 2.25	5.00	0.739	0.102	---	0.64
28 2.33	3.50	0.517	0.102	---	0.42
29 2.42	6.80	1.005	0.102	---	0.90
30 2.50	7.30	1.079	0.102	---	0.98
31 2.58	8.20	1.212	0.102	---	1.11
32 2.67	5.90	0.872	0.102	---	0.77
33 2.75	2.00	0.296	0.102	---	0.19
34 2.83	1.80	0.266	0.102	---	0.16
35 2.92	1.80	0.266	0.102	---	0.16
36 3.00	0.60	0.089	0.102	0.016	0.07
Sum =	100.0			Sum =	11.2

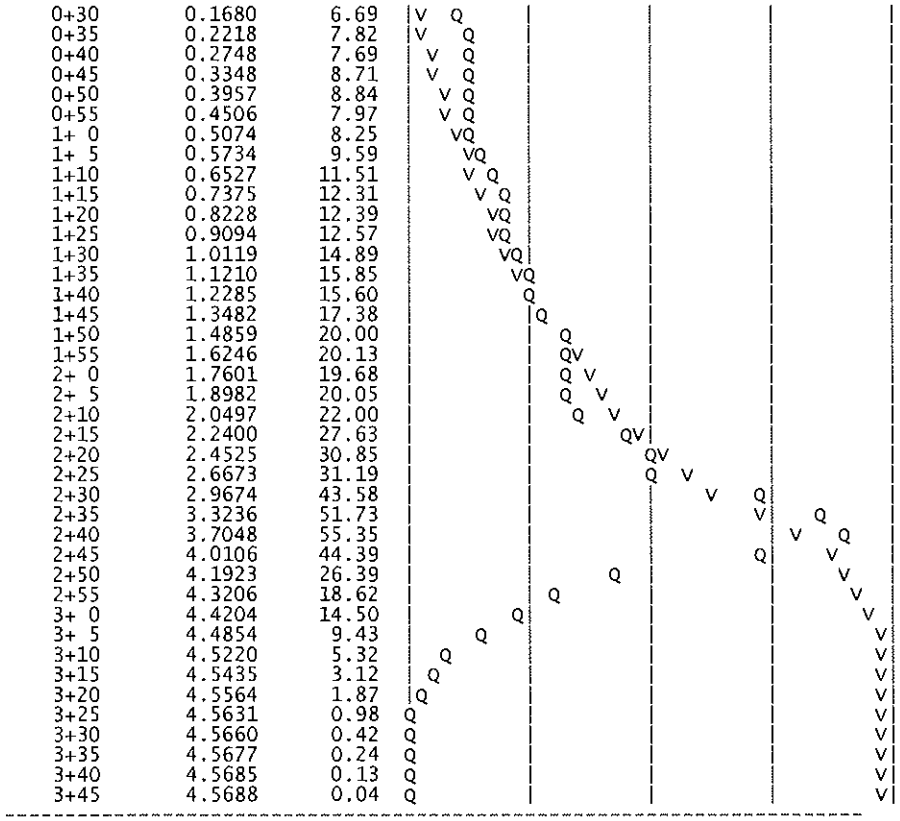
Flood volume = Effective rainfall 0.93(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 4.6(Ac.Ft)
Total soil loss = 0.30(In)
Total soil loss = 1.456(Ac.Ft)
Total rainfall = 1.23(In)
Flood volume = 199016.3 Cubic Feet
Total soil loss = 63427.5 Cubic Feet

Peak flow rate of this hydrograph = 55.352(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0053	0.77	Q	|	|	|	|
0+10	0.0275	3.22	V Q	|	|	|	|
0+15	0.0548	3.98	V Q	|	|	|	|
0+20	0.0831	4.11	V Q	|	|	|	|
0+25	0.1219	5.63	|V Q	|	|	|	|


0+30 0.1680 6.69
0+35 0.2218 7.82
0+40 0.2748 7.69
0+45 0.3348 8.71
0+50 0.3957 8.84
0+55 0.4506 7.97
1+ 0 0.5074 8.25
1+ 5 0.5734 9.59
1+10 0.6527 11.51
1+15 0.7375 12.31
1+20 0.8228 12.39
1+25 0.9094 12.57
1+30 1.0119 14.89
1+35 1.1210 15.85
1+40 1.2285 15.60
1+45 1.3482 17.38
1+50 1.4859 20.00
1+55 1.6246 20.13
2+ 0 1.7601 19.68
2+ 5 1.8982 20.05
2+10 2.0497 22.00
2+15 2.2400 27.63
2+20 2.4525 30.85
2+25 2.6673 31.19
2+30 2.9674 43.58
2+35 3.3236 51.73
2+40 3.7048 55.35
2+45 4.0106 44.39
2+50 4.1923 26.39
2+55 4.3206 18.62
3+ 0 4.4204 14.50
3+ 5 4.4854 9.43
3+10 4.5220 5.32
3+15 4.5435 3.12
3+20 4.5564 1.87
3+25 4.5631 0.98
3+30 4.5660 0.42
3+35 4.5677 0.24
3+40 4.5685 0.13
3+45 4.5688 0.04

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727S010310.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 62.40(Ac.) = 0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 62.40(Ac.) = 0.098 Sq. Mi.
Length along longest watercourse = 3060.00(Ft.)
Length along longest watercourse measured to centroid = 1530.00(Ft.)
Length along longest watercourse = 0.580 Mi.
Length along longest watercourse measured to centroid = 0.290 Mi.
Difference in elevation = 43.66(Ft.)
Slope along watercourse = 75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.080 Hr.
Lag time = 4.82 Min.
25% of lag time = 1.21 Min.
40% of lag time = 1.93 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	0.80	49.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	1.85	115.44

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 1.232(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.232(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
56.400	56.00	0.900
6.000	86.00	0.000

Total Area Entered = 62.40(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.900	0.097	0.904	0.088
86.0	86.0	0.176	0.000	0.176	0.096	0.017
					Sum (F) =	0.105

Area averaged mean soil loss (F) (In/Hr) = 0.105
Minimum soil loss rate ((In/Hr)) = 0.052
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000	Sum= 62.888

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.192	0.105	---	0.09
2	0.17	1.30	0.192	0.105	---	0.09
3	0.25	1.10	0.163	0.105	---	0.06
4	0.33	1.50	0.222	0.105	---	0.12
5	0.42	1.50	0.222	0.105	---	0.12
6	0.50	1.80	0.266	0.105	---	0.16
7	0.58	1.50	0.222	0.105	---	0.12
8	0.67	1.80	0.266	0.105	---	0.16
9	0.75	1.80	0.266	0.105	---	0.16
10	0.83	1.50	0.222	0.105	---	0.12
11	0.92	1.60	0.236	0.105	---	0.13
12	1.00	1.80	0.266	0.105	---	0.16
13	1.08	2.20	0.325	0.105	---	0.22
14	1.17	2.20	0.325	0.105	---	0.22
15	1.25	2.20	0.325	0.105	---	0.22
16	1.33	2.00	0.296	0.105	---	0.19
17	1.42	2.60	0.384	0.105	---	0.28
18	1.50	2.70	0.399	0.105	---	0.29
19	1.58	2.40	0.355	0.105	---	0.25
20	1.67	2.70	0.399	0.105	---	0.29
21	1.75	3.30	0.488	0.105	---	0.38
22	1.83	3.10	0.458	0.105	---	0.35
23	1.92	2.90	0.429	0.105	---	0.32
24	2.00	3.00	0.443	0.105	---	0.34
25	2.08	3.10	0.458	0.105	---	0.35
26	2.17	4.20	0.621	0.105	---	0.52
27	2.25	5.00	0.739	0.105	---	0.63
28	2.33	3.50	0.517	0.105	---	0.41
29	2.42	6.80	1.005	0.105	---	0.90
30	2.50	7.30	1.079	0.105	---	0.97
31	2.58	8.20	1.212	0.105	---	1.11
32	2.67	5.90	0.872	0.105	---	0.77
33	2.75	2.00	0.296	0.105	---	0.19
34	2.83	1.80	0.266	0.105	---	0.16
35	2.92	1.80	0.266	0.105	---	0.16
36	3.00	0.60	0.089	0.105	0.016	0.07
Sum =		100.0			Sum =	11.1

Flood volume = Effective rainfall 0.93(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 4.8(Ac.Ft)
Total soil loss = 0.31(In)
Total soil loss = 1.593(Ac.Ft)
Total rainfall = 1.23(In)
Flood volume = 209572.3 Cubic Feet
Total soil loss = 69409.4 Cubic Feet

Peak flow rate of this hydrograph = 59.598(CFS)

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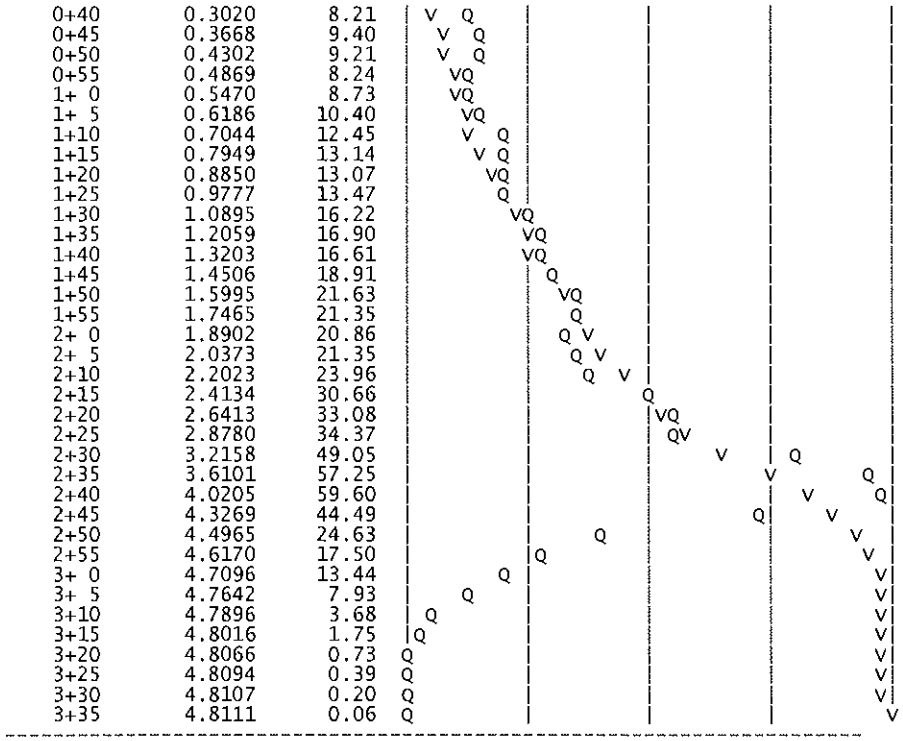
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 15.0 30.0 45.0 60.0
0+ 5	0.0077	1.12	Q
0+10	0.0339	3.80	V Q
0+15	0.0631	4.25	V Q
0+20	0.0940	4.48	V Q
0+25	0.1369	6.22	|V Q
0+30	0.1875	7.36	|V Q
0+35	0.2455	8.41	| V Q


0+40 0.3020 8.21
0+45 0.3668 9.40
0+50 0.4302 9.21
0+55 0.4869 8.24
1+ 0 0.5470 8.73
1+ 5 0.6186 10.40
1+10 0.7044 12.45
1+15 0.7949 13.14
1+20 0.8850 13.07
1+25 0.9777 13.47
1+30 1.0895 16.22
1+35 1.2059 16.90
1+40 1.3203 16.61
1+45 1.4506 18.91
1+50 1.5995 21.63
1+55 1.7465 21.35
2+ 0 1.8902 20.86
2+ 5 2.0373 21.35
2+10 2.2023 23.96
2+15 2.4134 30.66
2+20 2.6413 33.08
2+25 2.8780 34.37
2+30 3.2158 49.05
2+35 3.6101 57.25
2+40 4.0205 59.60
2+45 4.3269 44.49
2+50 4.4965 24.63
2+55 4.6170 17.50
3+ 0 4.7096 13.44
3+ 5 4.7642 7.93
3+10 4.7896 3.68
3+15 4.8016 1.75
3+20 4.8066 0.73
3+25 4.8094 0.39
3+30 4.8107 0.20
3+35 4.8111 0.06

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727N010110.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 58.70(Ac.) = 0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 58.70(Ac.) = 0.092 Sq. Mi.
Length along longest watercourse = 3750.00(Ft.)
Length along longest watercourse measured to centroid = 1875.00(Ft.)
Length along longest watercourse = 0.710 Mi.
Length along longest watercourse measured to centroid = 0.355 Mi.
Difference in elevation = 39.50(Ft.)
Slope along watercourse = 55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.39 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	0.48	28.18

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	1.20	70.44

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.776(In)
Areal adjustment factor = 99.95 %
Adjusted average point rain = 0.776(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
55.300	56.00	0.900
3.400	86.00	0.000

Total Area Entered = 58.70(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.900	0.097	0.942	0.091
86.0	86.0	0.176	0.000	0.176	0.058	0.010
					Sum (F) =	0.102

Area averaged mean soil loss (F) (In/Hr) = 0.102
Minimum soil loss rate ((In/Hr)) = 0.051
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000	Sum= 59.159

Unit Time		Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	4.20	0.391	0.102	---	0.29
2	0.17	4.30	0.400	0.102	---	0.30
3	0.25	5.00	0.465	0.102	---	0.36
4	0.33	5.00	0.465	0.102	---	0.36
5	0.42	5.80	0.540	0.102	---	0.44
6	0.50	6.50	0.605	0.102	---	0.50
7	0.58	7.40	0.689	0.102	---	0.59
8	0.67	8.60	0.801	0.102	---	0.70
9	0.75	12.30	1.145	0.102	---	1.04
10	0.83	29.10	2.709	0.102	---	2.61
11	0.92	6.80	0.633	0.102	---	0.53
12	1.00	5.00	0.465	0.102	---	0.36
Sum =		100.0			Sum =	8.1

Flood volume = Effective rainfall 0.67(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 3.3(Ac.Ft)
Total soil loss = 0.10(In)
Total soil loss = 0.497(Ac.Ft)
Total rainfall = 0.78(In)
Flood volume = 143659.1 Cubic Feet
Total soil loss = 21649.4 Cubic Feet

Peak flow rate of this hydrograph = 93.668(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 25.0 50.0 75.0 100.0
0+ 5	0.0170	2.46	Q
0+10	0.0883	10.36	V Q
0+15	0.1875	14.40	V Q
0+20	0.3089	17.63	V Q
0+25	0.4456	19.86	V Q
0+30	0.6059	23.26	V Q
0+35	0.7928	27.14	VQ
0+40	1.0118	31.80	Q
0+45	1.2835	39.46	Q
0+50	1.7260	64.24	V Q
0+55	2.3711	93.67	V Q
1+ 0	2.7563	55.93	Q V
1+ 5	2.9896	33.88	Q V
1+10	3.1112	17.66	Q V
1+15	3.1822	10.30	Q V
1+20	3.2292	6.83	Q V
1+25	3.2600	4.46	Q V
1+30	3.2799	2.90	Q V
1+35	3.2934	1.95	Q V
1+40	3.2967	0.48	Q V
1+45	3.2980	0.19	Q V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727S010110.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 10-YEAR

Drainage Area = 62.40(Ac.) = 0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 62.40(Ac.) = 0.098 Sq. Mi.
Length along longest watercourse = 3060.00(Ft.)
Length along longest watercourse measured to centroid = 1530.00(Ft.)
Length along longest watercourse = 0.580 Mi.
Length along longest watercourse measured to centroid = 0.290 Mi.
Difference in elevation = 43.66(Ft.)
Slope along watercourse = 75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.080 Hr.
Lag time = 4.82 Min.
25% of lag time = 1.21 Min.
40% of lag time = 1.93 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	0.48	29.95

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	1.20	74.88

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.480(In)
Area Averaged 100-Year Rainfall = 1.200(In)

Point rain (area averaged) = 0.776(In)
Areal adjustment factor = 99.94 %
Adjusted average point rain = 0.776(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
56.400	56.00	0.900
6.000	86.00	0.000

Total Area Entered = 62.40(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.900	0.097	0.904	0.088
86.0	86.0	0.176	0.000	0.176	0.096	0.017
					Sum (F) =	0.105

Area averaged mean soil loss (F) (In/Hr) = 0.105
Minimum soil loss rate ((In/Hr)) = 0.052
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
		Sum = 100.000	Sum=	62.888

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1 0.08	4.20	0.391	0.105	---	0.29
2 0.17	4.30	0.400	0.105	---	0.30
3 0.25	5.00	0.465	0.105	---	0.36
4 0.33	5.00	0.465	0.105	---	0.36
5 0.42	5.80	0.540	0.105	---	0.44
6 0.50	6.50	0.605	0.105	---	0.50
7 0.58	7.40	0.689	0.105	---	0.58
8 0.67	8.60	0.801	0.105	---	0.70
9 0.75	12.30	1.145	0.105	---	1.04
10 0.83	29.10	2.709	0.105	---	2.60
11 0.92	6.80	0.633	0.105	---	0.53
12 1.00	5.00	0.465	0.105	---	0.36
Sum =	100.0			Sum =	8.1

Flood volume = Effective rainfall 0.67(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 3.5(Ac.Ft)
Total soil loss = 0.10(In)
Total soil loss = 0.544(Ac.Ft)
Total rainfall = 0.78(In)
Flood volume = 152028.1 Cubic Feet
Total soil loss = 23694.2 Cubic Feet

Peak flow rate of this hydrograph = 102.235(CFS)

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1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 50.0 100.0 150.0 200.0
0+ 5	0.0252	3.66	Q
0+10	0.1116	12.54	VQ
0+15	0.2244	16.38	VQ
0+20	0.3602	19.71	QV
0+25	0.5117	22.01	QV
0+30	0.6899	25.87	Q V
0+35	0.8971	30.08	Q V
0+40	1.1406	35.36	Q V
0+45	1.4471	44.50	Q V
0+50	1.9759	76.79	Q V
0+55	2.6800	102.24	Q V
1+ 0	3.0481	53.44	Q V
1+ 5	3.2675	31.87	Q V
1+10	3.3690	14.74	Q V
1+15	3.4269	8.41	Q V
1+20	3.4611	4.97	Q V
1+25	3.4828	3.15	Q V
1+30	3.4881	0.76	Q V
1+35	3.4901	0.29	Q V

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        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727N005245.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 5-YEAR

-----------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      58.70            1.70                  99.79

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      58.70            4.25                 249.48

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    1.700(In)
Area Averaged 100-Year Rainfall =    4.250(In)

Point rain (area averaged) =    2.297(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    2.297(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    55.300            56.00          0.900
     3.400            86.00          0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134       0.942      0.126
86.0  71.6      0.343     0.000        0.343       0.058      0.020
                                                  Sum (F) =    0.146
Area averaged mean soil loss (F) (In/Hr) =  0.146
Minimum soil loss rate ((In/Hr)) =  0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
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Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000 Sum=	59.159

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.259	0.003	0.02
2	0.17	0.07	0.018	0.258	0.003	0.02
3	0.25	0.07	0.018	0.257	0.003	0.02
4	0.33	0.10	0.028	0.256	0.005	0.02
5	0.42	0.10	0.028	0.255	0.005	0.02
6	0.50	0.10	0.028	0.254	0.005	0.02
7	0.58	0.10	0.028	0.253	0.005	0.02
8	0.67	0.10	0.028	0.252	0.005	0.02
9	0.75	0.10	0.028	0.251	0.005	0.02
10	0.83	0.13	0.037	0.250	0.007	0.03
11	0.92	0.13	0.037	0.249	0.007	0.03
12	1.00	0.13	0.037	0.248	0.007	0.03
13	1.08	0.10	0.028	0.247	0.005	0.02
14	1.17	0.10	0.028	0.246	0.005	0.02
15	1.25	0.10	0.028	0.245	0.005	0.02
16	1.33	0.10	0.028	0.244	0.005	0.02
17	1.42	0.10	0.028	0.243	0.005	0.02
18	1.50	0.10	0.028	0.242	0.005	0.02
19	1.58	0.10	0.028	0.242	0.005	0.02
20	1.67	0.10	0.028	0.241	0.005	0.02
21	1.75	0.10	0.028	0.240	0.005	0.02
22	1.83	0.13	0.037	0.239	0.007	0.03
23	1.92	0.13	0.037	0.238	0.007	0.03
24	2.00	0.13	0.037	0.237	0.007	0.03
25	2.08	0.13	0.037	0.236	0.007	0.03
26	2.17	0.13	0.037	0.235	0.007	0.03
27	2.25	0.13	0.037	0.234	0.007	0.03
28	2.33	0.13	0.037	0.233	0.007	0.03
29	2.42	0.13	0.037	0.232	0.007	0.03
30	2.50	0.13	0.037	0.231	0.007	0.03
31	2.58	0.17	0.046	0.230	0.008	0.04
32	2.67	0.17	0.046	0.229	0.008	0.04
33	2.75	0.17	0.046	0.228	0.008	0.04
34	2.83	0.17	0.046	0.227	0.008	0.04
35	2.92	0.17	0.046	0.226	0.008	0.04
36	3.00	0.17	0.046	0.225	0.008	0.04
37	3.08	0.17	0.046	0.224	0.008	0.04
38	3.17	0.17	0.046	0.223	0.008	0.04
39	3.25	0.17	0.046	0.223	0.008	0.04
40	3.33	0.17	0.046	0.222	0.008	0.04
41	3.42	0.17	0.046	0.221	0.008	0.04
42	3.50	0.17	0.046	0.220	0.008	0.04
43	3.58	0.17	0.046	0.219	0.008	0.04
44	3.67	0.17	0.046	0.218	0.008	0.04
45	3.75	0.17	0.046	0.217	0.008	0.04
46	3.83	0.20	0.055	0.216	0.010	0.05
47	3.92	0.20	0.055	0.215	0.010	0.05
48	4.00	0.20	0.055	0.214	0.010	0.05
49	4.08	0.20	0.055	0.213	0.010	0.05
50	4.17	0.20	0.055	0.212	0.010	0.05
51	4.25	0.20	0.055	0.212	0.010	0.05
52	4.33	0.23	0.064	0.211	0.012	0.05
53	4.42	0.23	0.064	0.210	0.012	0.05
54	4.50	0.23	0.064	0.209	0.012	0.05
55	4.58	0.23	0.064	0.208	0.012	0.05
56	4.67	0.23	0.064	0.207	0.012	0.05
57	4.75	0.23	0.064	0.206	0.012	0.05
58	4.83	0.27	0.074	0.205	0.013	0.06
59	4.92	0.27	0.074	0.204	0.013	0.06
60	5.00	0.27	0.074	0.203	0.013	0.06
61	5.08	0.20	0.055	0.203	0.010	0.05

62	5.17	0.20	0.055	0.202	0.010	0.05
63	5.25	0.20	0.055	0.201	0.010	0.05
64	5.33	0.23	0.064	0.200	0.012	0.05
65	5.42	0.23	0.064	0.199	0.012	0.05
66	5.50	0.23	0.064	0.198	0.012	0.05
67	5.58	0.27	0.074	0.197	0.013	0.06
68	5.67	0.27	0.074	0.196	0.013	0.06
69	5.75	0.27	0.074	0.196	0.013	0.06
70	5.83	0.27	0.074	0.195	0.013	0.06
71	5.92	0.27	0.074	0.194	0.013	0.06
72	6.00	0.27	0.074	0.193	0.013	0.06
73	6.08	0.30	0.083	0.192	0.015	0.07
74	6.17	0.30	0.083	0.191	0.015	0.07
75	6.25	0.30	0.083	0.190	0.015	0.07
76	6.33	0.30	0.083	0.190	0.015	0.07
77	6.42	0.30	0.083	0.189	0.015	0.07
78	6.50	0.30	0.083	0.188	0.015	0.07
79	6.58	0.33	0.092	0.187	0.017	0.08
80	6.67	0.33	0.092	0.186	0.017	0.08
81	6.75	0.33	0.092	0.185	0.017	0.08
82	6.83	0.33	0.092	0.185	0.017	0.08
83	6.92	0.33	0.092	0.184	0.017	0.08
84	7.00	0.33	0.092	0.183	0.017	0.08
85	7.08	0.33	0.092	0.182	0.017	0.08
86	7.17	0.33	0.092	0.181	0.017	0.08
87	7.25	0.33	0.092	0.180	0.017	0.08
88	7.33	0.37	0.101	0.180	0.018	0.08
89	7.42	0.37	0.101	0.179	0.018	0.08
90	7.50	0.37	0.101	0.178	0.018	0.08
91	7.58	0.40	0.110	0.177	0.020	0.09
92	7.67	0.40	0.110	0.176	0.020	0.09
93	7.75	0.40	0.110	0.175	0.020	0.09
94	7.83	0.43	0.119	0.175	0.021	0.10
95	7.92	0.43	0.119	0.174	0.021	0.10
96	8.00	0.43	0.119	0.173	0.021	0.10
97	8.08	0.50	0.138	0.172	0.025	0.11
98	8.17	0.50	0.138	0.171	0.025	0.11
99	8.25	0.50	0.138	0.171	0.025	0.11
100	8.33	0.50	0.138	0.170	0.025	0.11
101	8.42	0.50	0.138	0.169	0.025	0.11
102	8.50	0.50	0.138	0.168	0.025	0.11
103	8.58	0.53	0.147	0.167	0.026	0.12
104	8.67	0.53	0.147	0.167	0.026	0.12
105	8.75	0.53	0.147	0.166	0.026	0.12
106	8.83	0.57	0.156	0.165	0.028	0.13
107	8.92	0.57	0.156	0.164	0.028	0.13
108	9.00	0.57	0.156	0.164	0.028	0.13
109	9.08	0.63	0.175	0.163	---	0.01
110	9.17	0.63	0.175	0.162	---	0.01
111	9.25	0.63	0.175	0.161	---	0.01
112	9.33	0.67	0.184	0.160	---	0.02
113	9.42	0.67	0.184	0.160	---	0.02
114	9.50	0.67	0.184	0.159	---	0.02
115	9.58	0.70	0.193	0.158	---	0.03
116	9.67	0.70	0.193	0.157	---	0.04
117	9.75	0.70	0.193	0.157	---	0.04
118	9.83	0.73	0.202	0.156	---	0.05
119	9.92	0.73	0.202	0.155	---	0.05
120	10.00	0.73	0.202	0.154	---	0.05
121	10.08	0.50	0.138	0.154	0.025	0.11
122	10.17	0.50	0.138	0.153	0.025	0.11
123	10.25	0.50	0.138	0.152	0.025	0.11
124	10.33	0.50	0.138	0.151	0.025	0.11
125	10.42	0.50	0.138	0.151	0.025	0.11
126	10.50	0.50	0.138	0.150	0.025	0.11
127	10.58	0.67	0.184	0.149	---	0.03
128	10.67	0.67	0.184	0.149	---	0.04
129	10.75	0.67	0.184	0.148	---	0.04
130	10.83	0.67	0.184	0.147	---	0.04
131	10.92	0.67	0.184	0.146	---	0.04
132	11.00	0.67	0.184	0.146	---	0.04
133	11.08	0.63	0.175	0.145	---	0.03
134	11.17	0.63	0.175	0.144	---	0.03
135	11.25	0.63	0.175	0.143	---	0.03
136	11.33	0.63	0.175	0.143	---	0.03
137	11.42	0.63	0.175	0.142	---	0.03
138	11.50	0.63	0.175	0.141	---	0.03
139	11.58	0.57	0.156	0.141	---	0.02
140	11.67	0.57	0.156	0.140	---	0.02
141	11.75	0.57	0.156	0.139	---	0.02
142	11.83	0.60	0.165	0.139	---	0.03
143	11.92	0.60	0.165	0.138	---	0.03
144	12.00	0.60	0.165	0.137	---	0.03
145	12.08	0.83	0.230	0.137	---	0.09
146	12.17	0.83	0.230	0.136	---	0.09

147	12.25	0.83	0.230	0.135	---	0.09
148	12.33	0.87	0.239	0.134	---	0.10
149	12.42	0.87	0.239	0.134	---	0.11
150	12.50	0.87	0.239	0.133	---	0.11
151	12.58	0.93	0.257	0.132	---	0.12
152	12.67	0.93	0.257	0.132	---	0.13
153	12.75	0.93	0.257	0.131	---	0.13
154	12.83	0.97	0.266	0.130	---	0.14
155	12.92	0.97	0.266	0.130	---	0.14
156	13.00	0.97	0.266	0.129	---	0.14
157	13.08	1.13	0.312	0.128	---	0.18
158	13.17	1.13	0.312	0.128	---	0.18
159	13.25	1.13	0.312	0.127	---	0.19
160	13.33	1.13	0.312	0.127	---	0.19
161	13.42	1.13	0.312	0.126	---	0.19
162	13.50	1.13	0.312	0.125	---	0.19
163	13.58	0.77	0.211	0.125	---	0.09
164	13.67	0.77	0.211	0.124	---	0.09
165	13.75	0.77	0.211	0.123	---	0.09
166	13.83	0.77	0.211	0.123	---	0.09
167	13.92	0.77	0.211	0.122	---	0.09
168	14.00	0.77	0.211	0.121	---	0.09
169	14.08	0.90	0.248	0.121	---	0.13
170	14.17	0.90	0.248	0.120	---	0.13
171	14.25	0.90	0.248	0.120	---	0.13
172	14.33	0.87	0.239	0.119	---	0.12
173	14.42	0.87	0.239	0.118	---	0.12
174	14.50	0.87	0.239	0.118	---	0.12
175	14.58	0.87	0.239	0.117	---	0.12
176	14.67	0.87	0.239	0.117	---	0.12
177	14.75	0.87	0.239	0.116	---	0.12
178	14.83	0.83	0.230	0.115	---	0.11
179	14.92	0.83	0.230	0.115	---	0.11
180	15.00	0.83	0.230	0.114	---	0.12
181	15.08	0.80	0.221	0.114	---	0.11
182	15.17	0.80	0.221	0.113	---	0.11
183	15.25	0.80	0.221	0.112	---	0.11
184	15.33	0.77	0.211	0.112	---	0.10
185	15.42	0.77	0.211	0.111	---	0.10
186	15.50	0.77	0.211	0.111	---	0.10
187	15.58	0.63	0.175	0.110	---	0.06
188	15.67	0.63	0.175	0.110	---	0.06
189	15.75	0.63	0.175	0.109	---	0.07
190	15.83	0.63	0.175	0.109	---	0.07
191	15.92	0.63	0.175	0.108	---	0.07
192	16.00	0.63	0.175	0.107	---	0.07
193	16.08	0.13	0.037	0.107	0.007	0.03
194	16.17	0.13	0.037	0.106	0.007	0.03
195	16.25	0.13	0.037	0.106	0.007	0.03
196	16.33	0.13	0.037	0.105	0.007	0.03
197	16.42	0.13	0.037	0.105	0.007	0.03
198	16.50	0.13	0.037	0.104	0.007	0.03
199	16.58	0.10	0.028	0.104	0.005	0.02
200	16.67	0.10	0.028	0.103	0.005	0.02
201	16.75	0.10	0.028	0.103	0.005	0.02
202	16.83	0.10	0.028	0.102	0.005	0.02
203	16.92	0.10	0.028	0.102	0.005	0.02
204	17.00	0.10	0.028	0.101	0.005	0.02
205	17.08	0.17	0.046	0.101	0.008	0.04
206	17.17	0.17	0.046	0.100	0.008	0.04
207	17.25	0.17	0.046	0.099	0.008	0.04
208	17.33	0.17	0.046	0.099	0.008	0.04
209	17.42	0.17	0.046	0.099	0.008	0.04
210	17.50	0.17	0.046	0.098	0.008	0.04
211	17.58	0.17	0.046	0.098	0.008	0.04
212	17.67	0.17	0.046	0.097	0.008	0.04
213	17.75	0.17	0.046	0.097	0.008	0.04
214	17.83	0.13	0.037	0.096	0.007	0.03
215	17.92	0.13	0.037	0.096	0.007	0.03
216	18.00	0.13	0.037	0.095	0.007	0.03
217	18.08	0.13	0.037	0.095	0.007	0.03
218	18.17	0.13	0.037	0.094	0.007	0.03
219	18.25	0.13	0.037	0.094	0.007	0.03
220	18.33	0.13	0.037	0.093	0.007	0.03
221	18.42	0.13	0.037	0.093	0.007	0.03
222	18.50	0.13	0.037	0.092	0.007	0.03
223	18.58	0.10	0.028	0.092	0.005	0.02
224	18.67	0.10	0.028	0.091	0.005	0.02
225	18.75	0.10	0.028	0.091	0.005	0.02
226	18.83	0.07	0.018	0.091	0.003	0.02
227	18.92	0.07	0.018	0.090	0.003	0.02
228	19.00	0.07	0.018	0.090	0.003	0.02
229	19.08	0.10	0.028	0.089	0.005	0.02
230	19.17	0.10	0.028	0.089	0.005	0.02
231	19.25	0.10	0.028	0.088	0.005	0.02

232	19.33	0.13	0.037	0.088	0.007	0.03
233	19.42	0.13	0.037	0.088	0.007	0.03
234	19.50	0.13	0.037	0.087	0.007	0.03
235	19.58	0.10	0.028	0.087	0.005	0.02
236	19.67	0.10	0.028	0.086	0.005	0.02
237	19.75	0.10	0.028	0.086	0.005	0.02
238	19.83	0.07	0.018	0.086	0.003	0.02
239	19.92	0.07	0.018	0.085	0.003	0.02
240	20.00	0.07	0.018	0.085	0.003	0.02
241	20.08	0.10	0.028	0.085	0.005	0.02
242	20.17	0.10	0.028	0.084	0.005	0.02
243	20.25	0.10	0.028	0.084	0.005	0.02
244	20.33	0.10	0.028	0.083	0.005	0.02
245	20.42	0.10	0.028	0.083	0.005	0.02
246	20.50	0.10	0.028	0.083	0.005	0.02
247	20.58	0.10	0.028	0.082	0.005	0.02
248	20.67	0.10	0.028	0.082	0.005	0.02
249	20.75	0.10	0.028	0.082	0.005	0.02
250	20.83	0.07	0.018	0.081	0.003	0.02
251	20.92	0.07	0.018	0.081	0.003	0.02
252	21.00	0.07	0.018	0.081	0.003	0.02
253	21.08	0.10	0.028	0.080	0.005	0.02
254	21.17	0.10	0.028	0.080	0.005	0.02
255	21.25	0.10	0.028	0.080	0.005	0.02
256	21.33	0.07	0.018	0.079	0.003	0.02
257	21.42	0.07	0.018	0.079	0.003	0.02
258	21.50	0.07	0.018	0.079	0.003	0.02
259	21.58	0.10	0.028	0.079	0.005	0.02
260	21.67	0.10	0.028	0.078	0.005	0.02
261	21.75	0.10	0.028	0.078	0.005	0.02
262	21.83	0.07	0.018	0.078	0.003	0.02
263	21.92	0.07	0.018	0.077	0.003	0.02
264	22.00	0.07	0.018	0.077	0.003	0.02
265	22.08	0.10	0.028	0.077	0.005	0.02
266	22.17	0.10	0.028	0.077	0.005	0.02
267	22.25	0.10	0.028	0.076	0.005	0.02
268	22.33	0.07	0.018	0.076	0.003	0.02
269	22.42	0.07	0.018	0.076	0.003	0.02
270	22.50	0.07	0.018	0.076	0.003	0.02
271	22.58	0.07	0.018	0.076	0.003	0.02
272	22.67	0.07	0.018	0.075	0.003	0.02
273	22.75	0.07	0.018	0.075	0.003	0.02
274	22.83	0.07	0.018	0.075	0.003	0.02
275	22.92	0.07	0.018	0.075	0.003	0.02
276	23.00	0.07	0.018	0.075	0.003	0.02
277	23.08	0.07	0.018	0.074	0.003	0.02
278	23.17	0.07	0.018	0.074	0.003	0.02
279	23.25	0.07	0.018	0.074	0.003	0.02
280	23.33	0.07	0.018	0.074	0.003	0.02
281	23.42	0.07	0.018	0.074	0.003	0.02
282	23.50	0.07	0.018	0.074	0.003	0.02
283	23.58	0.07	0.018	0.074	0.003	0.02
284	23.67	0.07	0.018	0.073	0.003	0.02
285	23.75	0.07	0.018	0.073	0.003	0.02
286	23.83	0.07	0.018	0.073	0.003	0.02
287	23.92	0.07	0.018	0.073	0.003	0.02
288	24.00	0.07	0.018	0.073	0.003	0.02
	Sum =	100.0			Sum =	15.3

Flood volume = Effective rainfall 1.27(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 6.2(Ac.Ft)
Total soil loss = 1.02(In)
Total soil loss = 4.999(Ac.Ft)
Total rainfall = 2.30(In)
Flood volume = 271674.3 Cubic Feet
Total soil loss = 217774.6 Cubic Feet

Peak flow rate of this hydrograph = 10.857(CFS)

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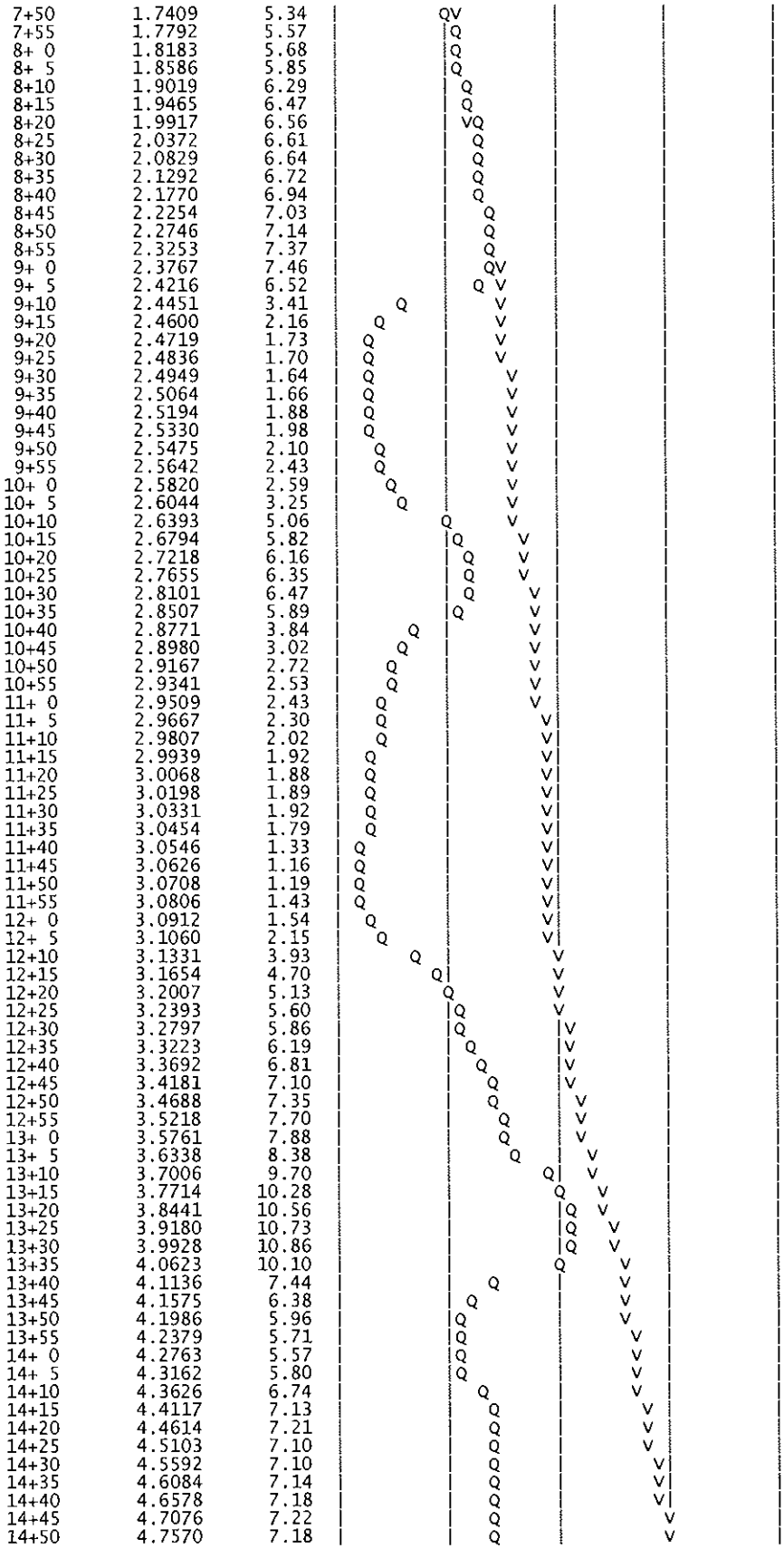
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0009	0.13	Q	|	|	|	|
0+10	0.0046	0.54	VQ	|	|	|	|
0+15	0.0094	0.70	VQ	|	|	|	|
0+20	0.0152	0.84	VQ	|	|	|	|
0+25	0.0227	1.09	V Q	|	|	|	|
0+30	0.0309	1.20	V Q	|	|	|	|
0+35	0.0395	1.25	V Q	|	|	|	|
0+40	0.0484	1.28	V Q	|	|	|	|

0+45	0.0574	1.31	V Q	|	|	|	|
0+50	0.0669	1.39	V Q	|	|	|	|
0+55	0.0779	1.60	V Q	|	|	|	|
1+ 0	0.0895	1.69	V Q	|	|	|	|
1+ 5	0.1010	1.66	V Q	|	|	|	|
1+10	0.1111	1.48	V Q	|	|	|	|
1+15	0.1208	1.41	V Q	|	|	|	|
1+20	0.1304	1.38	V Q	|	|	|	|
1+25	0.1398	1.37	V Q	|	|	|	|
1+30	0.1491	1.36	V Q	|	|	|	|
1+35	0.1584	1.35	VQ	|	|	|	|
1+40	0.1677	1.35	VQ	|	|	|	|
1+45	0.1769	1.34	VQ	|	|	|	|
1+50	0.1866	1.40	VQ	|	|	|	|
1+55	0.1977	1.61	V Q	|	|	|	|
2+ 0	0.2093	1.69	V Q	|	|	|	|
2+ 5	0.2212	1.73	V Q	|	|	|	|
2+10	0.2332	1.75	V Q	|	|	|	|
2+15	0.2453	1.76	V Q	|	|	|	|
2+20	0.2575	1.77	V Q	|	|	|	|
2+25	0.2697	1.78	V Q	|	|	|	|
2+30	0.2820	1.78	V Q	|	|	|	|
2+35	0.2947	1.85	V Q	|	|	|	|
2+40	0.3089	2.05	V Q	|	|	|	|
2+45	0.3236	2.14	V Q	|	|	|	|
2+50	0.3385	2.17	V Q	|	|	|	|
2+55	0.3536	2.19	V Q	|	|	|	|
3+ 0	0.3688	2.21	V Q	|	|	|	|
3+ 5	0.3841	2.22	V Q	|	|	|	|
3+10	0.3994	2.22	V Q	|	|	|	|
3+15	0.4147	2.23	V Q	|	|	|	|
3+20	0.4300	2.23	V Q	|	|	|	|
3+25	0.4454	2.23	V Q	|	|	|	|
3+30	0.4608	2.23	V Q	|	|	|	|
3+35	0.4761	2.23	VQ	|	|	|	|
3+40	0.4915	2.23	VQ	|	|	|	|
3+45	0.5068	2.23	VQ	|	|	|	|
3+50	0.5226	2.29	VQ	|	|	|	|
3+55	0.5398	2.50	VQ	|	|	|	|
4+ 0	0.5576	2.58	V Q	|	|	|	|
4+ 5	0.5756	2.62	V Q	|	|	|	|
4+10	0.5938	2.64	V Q	|	|	|	|
4+15	0.6121	2.65	V Q	|	|	|	|
4+20	0.6308	2.73	VQ	|	|	|	|
4+25	0.6510	2.94	VQ	|	|	|	|
4+30	0.6719	3.02	V Q	|	|	|	|
4+35	0.6930	3.06	V Q	|	|	|	|
4+40	0.7142	3.08	V Q	|	|	|	|
4+45	0.7355	3.10	V Q	|	|	|	|
4+50	0.7574	3.17	V Q	|	|	|	|
4+55	0.7807	3.38	VQ	|	|	|	|
5+ 0	0.8046	3.47	VQ	|	|	|	|
5+ 5	0.8278	3.38	VQ	|	|	|	|
5+10	0.8485	3.00	Q	|	|	|	|
5+15	0.8680	2.84	Q	|	|	|	|
5+20	0.8876	2.84	Q	|	|	|	|
5+25	0.9083	3.01	VQ	|	|	|	|
5+30	0.9295	3.07	VQ	|	|	|	|
5+35	0.9512	3.16	Q	|	|	|	|
5+40	0.9744	3.37	Q	|	|	|	|
5+45	0.9982	3.46	Q	|	|	|	|
5+50	1.0223	3.49	Q	|	|	|	|
5+55	1.0466	3.52	VQ	|	|	|	|
6+ 0	1.0709	3.54	VQ	|	|	|	|
6+ 5	1.0958	3.62	Q	|	|	|	|
6+10	1.1222	3.83	Q	|	|	|	|
6+15	1.1492	3.92	Q	|	|	|	|
6+20	1.1764	3.95	Q	|	|	|	|
6+25	1.2038	3.98	Q	|	|	|	|
6+30	1.2313	3.99	Q	|	|	|	|
6+35	1.2593	4.06	Q	|	|	|	|
6+40	1.2887	4.27	Q	|	|	|	|
6+45	1.3187	4.36	Q	|	|	|	|
6+50	1.3490	4.40	Q	|	|	|	|
6+55	1.3795	4.42	Q	|	|	|	|
7+ 0	1.4100	4.44	QV	|	|	|	|
7+ 5	1.4406	4.44	QV	|	|	|	|
7+10	1.4713	4.45	QV	|	|	|	|
7+15	1.5020	4.46	QV	|	|	|	|
7+20	1.5331	4.52	Q	|	|	|	|
7+25	1.5657	4.73	QV	|	|	|	|
7+30	1.5988	4.81	QV	|	|	|	|
7+35	1.6327	4.91	QV	|	|	|	|
7+40	1.6680	5.14	Q	|	|	|	|
7+45	1.7041	5.23	Q	|	|	|	|



7+50	1.7409	5.34
7+55	1.7792	5.57
8+ 0	1.8183	5.68
8+ 5	1.8586	5.85
8+10	1.9019	6.29
8+15	1.9465	6.47
8+20	1.9917	6.56
8+25	2.0372	6.61
8+30	2.0829	6.64
8+35	2.1292	6.72
8+40	2.1770	6.94
8+45	2.2254	7.03
8+50	2.2746	7.14
8+55	2.3253	7.37
9+ 0	2.3767	7.46
9+ 5	2.4216	6.52
9+10	2.4451	3.41
9+15	2.4600	2.16
9+20	2.4719	1.73
9+25	2.4836	1.70
9+30	2.4949	1.64
9+35	2.5064	1.66
9+40	2.5194	1.88
9+45	2.5330	1.98
9+50	2.5475	2.10
9+55	2.5642	2.43
10+ 0	2.5820	2.59
10+ 5	2.6044	3.25
10+10	2.6393	5.06
10+15	2.6794	5.82
10+20	2.7218	6.16
10+25	2.7655	6.35
10+30	2.8101	6.47
10+35	2.8507	5.89
10+40	2.8771	3.84
10+45	2.8980	3.02
10+50	2.9167	2.72
10+55	2.9341	2.53
11+ 0	2.9509	2.43
11+ 5	2.9667	2.30
11+10	2.9807	2.02
11+15	2.9939	1.92
11+20	3.0068	1.88
11+25	3.0198	1.89
11+30	3.0331	1.92
11+35	3.0454	1.79
11+40	3.0546	1.33
11+45	3.0626	1.16
11+50	3.0708	1.19
11+55	3.0806	1.43
12+ 0	3.0912	1.54
12+ 5	3.1060	2.15
12+10	3.1331	3.93
12+15	3.1654	4.70
12+20	3.2007	5.13
12+25	3.2393	5.60
12+30	3.2797	5.86
12+35	3.3223	6.19
12+40	3.3692	6.81
12+45	3.4181	7.10
12+50	3.4688	7.35
12+55	3.5218	7.70
13+ 0	3.5761	7.88
13+ 5	3.6338	8.38
13+10	3.7006	9.70
13+15	3.7714	10.28
13+20	3.8441	10.56
13+25	3.9180	10.73
13+30	3.9928	10.86
13+35	4.0623	10.10
13+40	4.1136	7.44
13+45	4.1575	6.38
13+50	4.1986	5.96
13+55	4.2379	5.71
14+ 0	4.2763	5.57
14+ 5	4.3162	5.80
14+10	4.3626	6.74
14+15	4.4117	7.13
14+20	4.4614	7.21
14+25	4.5103	7.10
14+30	4.5592	7.10
14+35	4.6084	7.14
14+40	4.6578	7.18
14+45	4.7076	7.22
14+50	4.7570	7.18

14+55	4.8050	6.96
15+ 0	4.8525	6.89
15+ 5	4.8993	6.80
15+10	4.9445	6.56
15+15	4.9891	6.48
15+20	5.0330	6.38
15+25	5.0752	6.13
15+30	5.1168	6.04
15+35	5.1561	5.70
15+40	5.1885	4.71
15+45	5.2182	4.31
15+50	5.2468	4.15
15+55	5.2749	4.08
16+ 0	5.3027	4.04
16+ 5	5.3282	3.70
16+10	5.3467	2.68
16+15	5.3622	2.25
16+20	5.3764	2.06
16+25	5.3900	1.96
16+30	5.4030	1.90
16+35	5.4154	1.79
16+40	5.4261	1.56
16+45	5.4361	1.45
16+50	5.4457	1.40
16+55	5.4552	1.38
17+ 0	5.4645	1.36
17+ 5	5.4747	1.48
17+10	5.4877	1.88
17+15	5.5018	2.05
17+20	5.5163	2.11
17+25	5.5312	2.16
17+30	5.5462	2.18
17+35	5.5614	2.20
17+40	5.5766	2.21
17+45	5.5919	2.22
17+50	5.6068	2.17
17+55	5.6203	1.96
18+ 0	5.6333	1.88
18+ 5	5.6460	1.84
18+10	5.6585	1.82
18+15	5.6709	1.81
18+20	5.6833	1.80
18+25	5.6957	1.79
18+30	5.7080	1.79
18+35	5.7198	1.72
18+40	5.7303	1.52
18+45	5.7401	1.43
18+50	5.7493	1.33
18+55	5.7569	1.11
19+ 0	5.7639	1.01
19+ 5	5.7710	1.03
19+10	5.7793	1.20
19+15	5.7880	1.27
19+20	5.7974	1.36
19+25	5.8082	1.58
19+30	5.8197	1.67
19+35	5.8311	1.65
19+40	5.8412	1.47
19+45	5.8509	1.40
19+50	5.8599	1.32
19+55	5.8675	1.10
20+ 0	5.8745	1.01
20+ 5	5.8815	1.03
20+10	5.8898	1.20
20+15	5.8986	1.27
20+20	5.9075	1.29
20+25	5.9165	1.31
20+30	5.9256	1.32
20+35	5.9347	1.32
20+40	5.9439	1.33
20+45	5.9530	1.33
20+50	5.9618	1.27
20+55	5.9692	1.07
21+ 0	5.9760	0.99
21+ 5	5.9830	1.01
21+10	5.9912	1.20
21+15	5.9999	1.27
21+20	6.0084	1.23
21+25	6.0156	1.04
21+30	6.0222	0.97
21+35	6.0291	1.00
21+40	6.0373	1.19
21+45	6.0460	1.26
21+50	6.0545	1.23
21+55	6.0616	1.04

```
22+ 0       6.0683      0.97  |Q        |         |         |        V |
22+ 5       6.0752      1.00  | Q       |         |         |        V |
22+10       6.0834      1.19  |  Q      |         |         |         V|
22+15       6.0921      1.26  |  Q      |         |         |         V|
22+20       6.1005      1.23  |  Q      |         |         |         V|
22+25       6.1077      1.04  |  Q      |         |         |         V|
22+30       6.1144      0.97  |Q        |         |         |         V|
22+35       6.1208      0.94  |Q        |         |         |         V|
22+40       6.1272      0.92  |Q        |         |         |         V|
22+45       6.1334      0.91  |Q        |         |         |         V|
22+50       6.1397      0.91  |Q        |         |         |         V|
22+55       6.1459      0.90  |Q        |         |         |         V|
23+ 0       6.1520      0.90  |Q        |         |         |         V|
23+ 5       6.1582      0.89  |Q        |         |         |         V|
23+10       6.1643      0.89  |Q        |         |         |         V|
23+15       6.1705      0.89  |Q        |         |         |         V|
23+20       6.1766      0.89  |Q        |         |         |         V|
23+25       6.1828      0.89  |Q        |         |         |         V|
23+30       6.1889      0.89  |Q        |         |         |         V|
23+35       6.1950      0.89  |Q        |         |         |         V|
23+40       6.2012      0.89  |Q        |         |         |         V|
23+45       6.2073      0.89  |Q        |         |         |         V|
23+50       6.2135      0.89  |Q        |         |         |         V|
23+55       6.2196      0.89  |Q        |         |         |         V|
24+ 0       6.2258      0.89  |Q        |         |         |         V|
24+ 5       6.2310      0.76  |Q        |         |         |         V|
24+10       6.2335      0.36  Q         |         |         |         V|
24+15       6.2348      0.19  Q         |         |         |         V|
24+20       6.2356      0.12  Q         |         |         |         V|
24+25       6.2361      0.07  Q         |         |         |         V|
24+30       6.2364      0.05  Q         |         |         |         V|
24+35       6.2366      0.03  Q         |         |         |         V|
24+40       6.2367      0.02  Q         |         |         |         V|
24+45       6.2368      0.01  Q         |         |         |         V|
-------------------------------------------------------------------------
```

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
                Study date  05/12/08 File: 0727S005245.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

--------------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



--------------------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 5-YEAR

--------------------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            1.70                 106.08

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            4.25                 265.20

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    1.700(In)
Area Averaged 100-Year Rainfall =    4.250(In)

Point rain (area averaged) =    2.297(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    2.297(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    56.400           56.00          0.900
     6.000           86.00          0.000
 Total Area Entered =     62.40(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134        0.904      0.121
86.0  71.6      0.343     0.000        0.343        0.096      0.033
                                                  Sum (F) =    0.154
Area averaged mean soil loss (F) (In/Hr) =  0.154
Minimum soil loss rate ((In/Hr)) =  0.077
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
--------------------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000 Sum=	62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.018	0.273	0.003	0.02
2	0.17	0.07	0.018	0.272	0.003	0.02
3	0.25	0.07	0.018	0.271	0.003	0.02
4	0.33	0.10	0.028	0.270	0.005	0.02
5	0.42	0.10	0.028	0.269	0.005	0.02
6	0.50	0.10	0.028	0.268	0.005	0.02
7	0.58	0.10	0.028	0.267	0.005	0.02
8	0.67	0.10	0.028	0.266	0.005	0.02
9	0.75	0.10	0.028	0.265	0.005	0.02
10	0.83	0.13	0.037	0.264	0.007	0.03
11	0.92	0.13	0.037	0.263	0.007	0.03
12	1.00	0.13	0.037	0.262	0.007	0.03
13	1.08	0.10	0.028	0.261	0.005	0.02
14	1.17	0.10	0.028	0.260	0.005	0.02
15	1.25	0.10	0.028	0.259	0.005	0.02
16	1.33	0.10	0.028	0.258	0.005	0.02
17	1.42	0.10	0.028	0.257	0.005	0.02
18	1.50	0.10	0.028	0.256	0.005	0.02
19	1.58	0.10	0.028	0.255	0.005	0.02
20	1.67	0.10	0.028	0.254	0.005	0.02
21	1.75	0.10	0.028	0.253	0.005	0.02
22	1.83	0.13	0.037	0.252	0.007	0.03
23	1.92	0.13	0.037	0.251	0.007	0.03
24	2.00	0.13	0.037	0.250	0.007	0.03
25	2.08	0.13	0.037	0.249	0.007	0.03
26	2.17	0.13	0.037	0.248	0.007	0.03
27	2.25	0.13	0.037	0.247	0.007	0.03
28	2.33	0.13	0.037	0.246	0.007	0.03
29	2.42	0.13	0.037	0.245	0.007	0.03
30	2.50	0.13	0.037	0.244	0.007	0.03
31	2.58	0.17	0.046	0.243	0.008	0.04
32	2.67	0.17	0.046	0.242	0.008	0.04
33	2.75	0.17	0.046	0.241	0.008	0.04
34	2.83	0.17	0.046	0.240	0.008	0.04
35	2.92	0.17	0.046	0.239	0.008	0.04
36	3.00	0.17	0.046	0.238	0.008	0.04
37	3.08	0.17	0.046	0.237	0.008	0.04
38	3.17	0.17	0.046	0.236	0.008	0.04
39	3.25	0.17	0.046	0.235	0.008	0.04
40	3.33	0.17	0.046	0.234	0.008	0.04
41	3.42	0.17	0.046	0.233	0.008	0.04
42	3.50	0.17	0.046	0.232	0.008	0.04
43	3.58	0.17	0.046	0.231	0.008	0.04
44	3.67	0.17	0.046	0.230	0.008	0.04
45	3.75	0.17	0.046	0.229	0.008	0.04
46	3.83	0.20	0.055	0.228	0.010	0.05
47	3.92	0.20	0.055	0.227	0.010	0.05
48	4.00	0.20	0.055	0.226	0.010	0.05
49	4.08	0.20	0.055	0.225	0.010	0.05
50	4.17	0.20	0.055	0.224	0.010	0.05
51	4.25	0.20	0.055	0.223	0.010	0.05
52	4.33	0.23	0.064	0.222	0.012	0.05
53	4.42	0.23	0.064	0.221	0.012	0.05
54	4.50	0.23	0.064	0.220	0.012	0.05
55	4.58	0.23	0.064	0.219	0.012	0.05
56	4.67	0.23	0.064	0.218	0.012	0.05
57	4.75	0.23	0.064	0.217	0.012	0.05
58	4.83	0.27	0.074	0.216	0.013	0.06
59	4.92	0.27	0.074	0.216	0.013	0.06
60	5.00	0.27	0.074	0.215	0.013	0.06
61	5.08	0.20	0.055	0.214	0.010	0.05
62	5.17	0.20	0.055	0.213	0.010	0.05
63	5.25	0.20	0.055	0.212	0.010	0.05

64	5.33	0.23	0.064	0.211	0.012	0.05
65	5.42	0.23	0.064	0.210	0.012	0.05
66	5.50	0.23	0.064	0.209	0.012	0.05
67	5.58	0.27	0.074	0.208	0.013	0.06
68	5.67	0.27	0.074	0.207	0.013	0.06
69	5.75	0.27	0.074	0.206	0.013	0.06
70	5.83	0.27	0.074	0.205	0.013	0.06
71	5.92	0.27	0.074	0.204	0.013	0.06
72	6.00	0.27	0.074	0.204	0.013	0.06
73	6.08	0.30	0.083	0.203	0.015	0.07
74	6.17	0.30	0.083	0.202	0.015	0.07
75	6.25	0.30	0.083	0.201	0.015	0.07
76	6.33	0.30	0.083	0.200	0.015	0.07
77	6.42	0.30	0.083	0.199	0.015	0.07
78	6.50	0.30	0.083	0.198	0.015	0.07
79	6.58	0.33	0.092	0.197	0.017	0.08
80	6.67	0.33	0.092	0.196	0.017	0.08
81	6.75	0.33	0.092	0.196	0.017	0.08
82	6.83	0.33	0.092	0.195	0.017	0.08
83	6.92	0.33	0.092	0.194	0.017	0.08
84	7.00	0.33	0.092	0.193	0.017	0.08
85	7.08	0.33	0.092	0.192	0.017	0.08
86	7.17	0.33	0.092	0.191	0.017	0.08
87	7.25	0.33	0.092	0.190	0.017	0.08
88	7.33	0.37	0.101	0.189	0.018	0.08
89	7.42	0.37	0.101	0.189	0.018	0.08
90	7.50	0.37	0.101	0.188	0.018	0.08
91	7.58	0.40	0.110	0.187	0.020	0.09
92	7.67	0.40	0.110	0.186	0.020	0.09
93	7.75	0.40	0.110	0.185	0.020	0.09
94	7.83	0.43	0.119	0.184	0.021	0.10
95	7.92	0.43	0.119	0.183	0.021	0.10
96	8.00	0.43	0.119	0.183	0.021	0.10
97	8.08	0.50	0.138	0.182	0.025	0.11
98	8.17	0.50	0.138	0.181	0.025	0.11
99	8.25	0.50	0.138	0.180	0.025	0.11
100	8.33	0.50	0.138	0.179	0.025	0.11
101	8.42	0.50	0.138	0.178	0.025	0.11
102	8.50	0.50	0.138	0.177	0.025	0.11
103	8.58	0.53	0.147	0.177	0.026	0.12
104	8.67	0.53	0.147	0.176	0.026	0.12
105	8.75	0.53	0.147	0.175	0.026	0.12
106	8.83	0.57	0.156	0.174	0.028	0.13
107	8.92	0.57	0.156	0.173	0.028	0.13
108	9.00	0.57	0.156	0.173	0.028	0.13
109	9.08	0.63	0.175	0.172	---	0.00
110	9.17	0.63	0.175	0.171	---	0.00
111	9.25	0.63	0.175	0.170	---	0.00
112	9.33	0.67	0.184	0.169	---	0.01
113	9.42	0.67	0.184	0.168	---	0.02
114	9.50	0.67	0.184	0.168	---	0.02
115	9.58	0.70	0.193	0.167	---	0.03
116	9.67	0.70	0.193	0.166	---	0.03
117	9.75	0.70	0.193	0.165	---	0.03
118	9.83	0.73	0.202	0.164	---	0.04
119	9.92	0.73	0.202	0.164	---	0.04
120	10.00	0.73	0.202	0.163	---	0.04
121	10.08	0.50	0.138	0.162	0.025	0.11
122	10.17	0.50	0.138	0.161	0.025	0.11
123	10.25	0.50	0.138	0.161	0.025	0.11
124	10.33	0.50	0.138	0.160	0.025	0.11
125	10.42	0.50	0.138	0.159	0.025	0.11
126	10.50	0.50	0.138	0.158	0.025	0.11
127	10.58	0.67	0.184	0.157	---	0.03
128	10.67	0.67	0.184	0.157	---	0.03
129	10.75	0.67	0.184	0.156	---	0.03
130	10.83	0.67	0.184	0.155	---	0.03
131	10.92	0.67	0.184	0.154	---	0.03
132	11.00	0.67	0.184	0.154	---	0.03
133	11.08	0.63	0.175	0.153	---	0.02
134	11.17	0.63	0.175	0.152	---	0.02
135	11.25	0.63	0.175	0.151	---	0.02
136	11.33	0.63	0.175	0.151	---	0.02
137	11.42	0.63	0.175	0.150	---	0.02
138	11.50	0.63	0.175	0.149	---	0.03
139	11.58	0.57	0.156	0.148	---	0.01
140	11.67	0.57	0.156	0.148	---	0.01
141	11.75	0.57	0.156	0.147	---	0.01
142	11.83	0.60	0.165	0.146	---	0.02
143	11.92	0.60	0.165	0.145	---	0.02
144	12.00	0.60	0.165	0.145	---	0.02
145	12.08	0.83	0.230	0.144	---	0.09
146	12.17	0.83	0.230	0.143	---	0.09
147	12.25	0.83	0.230	0.143	---	0.09
148	12.33	0.87	0.239	0.142	---	0.10

149	12.42	0.87	0.239	0.141	---	0.10
150	12.50	0.87	0.239	0.140	---	0.10
151	12.58	0.93	0.257	0.140	---	0.12
152	12.67	0.93	0.257	0.139	---	0.12
153	12.75	0.93	0.257	0.138	---	0.12
154	12.83	0.97	0.266	0.138	---	0.13
155	12.92	0.97	0.266	0.137	---	0.13
156	13.00	0.97	0.266	0.136	---	0.13
157	13.08	1.13	0.312	0.136	---	0.18
158	13.17	1.13	0.312	0.135	---	0.18
159	13.25	1.13	0.312	0.134	---	0.18
160	13.33	1.13	0.312	0.133	---	0.18
161	13.42	1.13	0.312	0.133	---	0.18
162	13.50	1.13	0.312	0.132	---	0.18
163	13.58	0.77	0.211	0.131	---	0.08
164	13.67	0.77	0.211	0.131	---	0.08
165	13.75	0.77	0.211	0.130	---	0.08
166	13.83	0.77	0.211	0.129	---	0.08
167	13.92	0.77	0.211	0.129	---	0.08
168	14.00	0.77	0.211	0.128	---	0.08
169	14.08	0.90	0.248	0.127	---	0.12
170	14.17	0.90	0.248	0.127	---	0.12
171	14.25	0.90	0.248	0.126	---	0.12
172	14.33	0.87	0.239	0.126	---	0.11
173	14.42	0.87	0.239	0.125	---	0.11
174	14.50	0.87	0.239	0.124	---	0.11
175	14.58	0.87	0.239	0.124	---	0.12
176	14.67	0.87	0.239	0.123	---	0.12
177	14.75	0.87	0.239	0.122	---	0.12
178	14.83	0.83	0.230	0.122	---	0.11
179	14.92	0.83	0.230	0.121	---	0.11
180	15.00	0.83	0.230	0.120	---	0.11
181	15.08	0.80	0.221	0.120	---	0.10
182	15.17	0.80	0.221	0.119	---	0.10
183	15.25	0.80	0.221	0.119	---	0.10
184	15.33	0.77	0.211	0.118	---	0.09
185	15.42	0.77	0.211	0.117	---	0.09
186	15.50	0.77	0.211	0.117	---	0.09
187	15.58	0.63	0.175	0.116	---	0.06
188	15.67	0.63	0.175	0.116	---	0.06
189	15.75	0.63	0.175	0.115	---	0.06
190	15.83	0.63	0.175	0.114	---	0.06
191	15.92	0.63	0.175	0.114	---	0.06
192	16.00	0.63	0.175	0.113	---	0.06
193	16.08	0.13	0.037	0.113	0.007	0.03
194	16.17	0.13	0.037	0.112	0.007	0.03
195	16.25	0.13	0.037	0.112	0.007	0.03
196	16.33	0.13	0.037	0.111	0.007	0.03
197	16.42	0.13	0.037	0.110	0.007	0.03
198	16.50	0.13	0.037	0.110	0.007	0.03
199	16.58	0.10	0.028	0.109	0.005	0.02
200	16.67	0.10	0.028	0.109	0.005	0.02
201	16.75	0.10	0.028	0.108	0.005	0.02
202	16.83	0.10	0.028	0.108	0.005	0.02
203	16.92	0.10	0.028	0.107	0.005	0.02
204	17.00	0.10	0.028	0.107	0.005	0.02
205	17.08	0.17	0.046	0.106	0.008	0.04
206	17.17	0.17	0.046	0.105	0.008	0.04
207	17.25	0.17	0.046	0.105	0.008	0.04
208	17.33	0.17	0.046	0.104	0.008	0.04
209	17.42	0.17	0.046	0.104	0.008	0.04
210	17.50	0.17	0.046	0.103	0.008	0.04
211	17.58	0.17	0.046	0.103	0.008	0.04
212	17.67	0.17	0.046	0.102	0.008	0.04
213	17.75	0.17	0.046	0.102	0.008	0.04
214	17.83	0.13	0.037	0.101	0.007	0.03
215	17.92	0.13	0.037	0.101	0.007	0.03
216	18.00	0.13	0.037	0.100	0.007	0.03
217	18.08	0.13	0.037	0.100	0.007	0.03
218	18.17	0.13	0.037	0.099	0.007	0.03
219	18.25	0.13	0.037	0.099	0.007	0.03
220	18.33	0.13	0.037	0.098	0.007	0.03
221	18.42	0.13	0.037	0.098	0.007	0.03
222	18.50	0.13	0.037	0.097	0.007	0.03
223	18.58	0.10	0.028	0.097	0.005	0.02
224	18.67	0.10	0.028	0.096	0.005	0.02
225	18.75	0.10	0.028	0.096	0.005	0.02
226	18.83	0.07	0.018	0.096	0.003	0.02
227	18.92	0.07	0.018	0.095	0.003	0.02
228	19.00	0.07	0.018	0.095	0.003	0.02
229	19.08	0.10	0.028	0.094	0.005	0.02
230	19.17	0.10	0.028	0.094	0.005	0.02
231	19.25	0.10	0.028	0.093	0.005	0.02
232	19.33	0.13	0.037	0.093	0.007	0.03
233	19.42	0.13	0.037	0.092	0.007	0.03

234	19.50	0.13	0.037	0.092	0.007	0.03
235	19.58	0.10	0.028	0.092	0.005	0.02
236	19.67	0.10	0.028	0.091	0.005	0.02
237	19.75	0.10	0.028	0.091	0.005	0.02
238	19.83	0.07	0.018	0.090	0.003	0.02
239	19.92	0.07	0.018	0.090	0.003	0.02
240	20.00	0.07	0.018	0.090	0.003	0.02
241	20.08	0.10	0.028	0.089	0.005	0.02
242	20.17	0.10	0.028	0.089	0.005	0.02
243	20.25	0.10	0.028	0.088	0.005	0.02
244	20.33	0.10	0.028	0.088	0.005	0.02
245	20.42	0.10	0.028	0.088	0.005	0.02
246	20.50	0.10	0.028	0.087	0.005	0.02
247	20.58	0.10	0.028	0.087	0.005	0.02
248	20.67	0.10	0.028	0.087	0.005	0.02
249	20.75	0.10	0.028	0.086	0.005	0.02
250	20.83	0.07	0.018	0.086	0.003	0.02
251	20.92	0.07	0.018	0.085	0.003	0.02
252	21.00	0.07	0.018	0.085	0.003	0.02
253	21.08	0.10	0.028	0.085	0.005	0.02
254	21.17	0.10	0.028	0.084	0.005	0.02
255	21.25	0.10	0.028	0.084	0.005	0.02
256	21.33	0.07	0.018	0.084	0.003	0.02
257	21.42	0.07	0.018	0.083	0.003	0.02
258	21.50	0.07	0.018	0.083	0.003	0.02
259	21.58	0.10	0.028	0.083	0.005	0.02
260	21.67	0.10	0.028	0.083	0.005	0.02
261	21.75	0.10	0.028	0.082	0.005	0.02
262	21.83	0.07	0.018	0.082	0.003	0.02
263	21.92	0.07	0.018	0.082	0.003	0.02
264	22.00	0.07	0.018	0.081	0.003	0.02
265	22.08	0.10	0.028	0.081	0.005	0.02
266	22.17	0.10	0.028	0.081	0.005	0.02
267	22.25	0.10	0.028	0.081	0.005	0.02
268	22.33	0.07	0.018	0.080	0.003	0.02
269	22.42	0.07	0.018	0.080	0.003	0.02
270	22.50	0.07	0.018	0.080	0.003	0.02
271	22.58	0.07	0.018	0.080	0.003	0.02
272	22.67	0.07	0.018	0.079	0.003	0.02
273	22.75	0.07	0.018	0.079	0.003	0.02
274	22.83	0.07	0.018	0.079	0.003	0.02
275	22.92	0.07	0.018	0.079	0.003	0.02
276	23.00	0.07	0.018	0.079	0.003	0.02
277	23.08	0.07	0.018	0.078	0.003	0.02
278	23.17	0.07	0.018	0.078	0.003	0.02
279	23.25	0.07	0.018	0.078	0.003	0.02
280	23.33	0.07	0.018	0.078	0.003	0.02
281	23.42	0.07	0.018	0.078	0.003	0.02
282	23.50	0.07	0.018	0.078	0.003	0.02
283	23.58	0.07	0.018	0.078	0.003	0.02
284	23.67	0.07	0.018	0.077	0.003	0.02
285	23.75	0.07	0.018	0.077	0.003	0.02
286	23.83	0.07	0.018	0.077	0.003	0.02
287	23.92	0.07	0.018	0.077	0.003	0.02
288	24.00	0.07	0.018	0.077	0.003	0.02
	Sum =	100.0			Sum =	14.7

Flood volume = Effective rainfall 1.23(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 6.4(Ac.Ft)
Total soil loss = 1.07(In)
Total soil loss = 5.559(Ac.Ft)
Total rainfall = 2.30(In)
Flood volume = 278163.4 Cubic Feet
Total soil loss = 242132.8 Cubic Feet

Peak flow rate of this hydrograph = 11.202(CFS)

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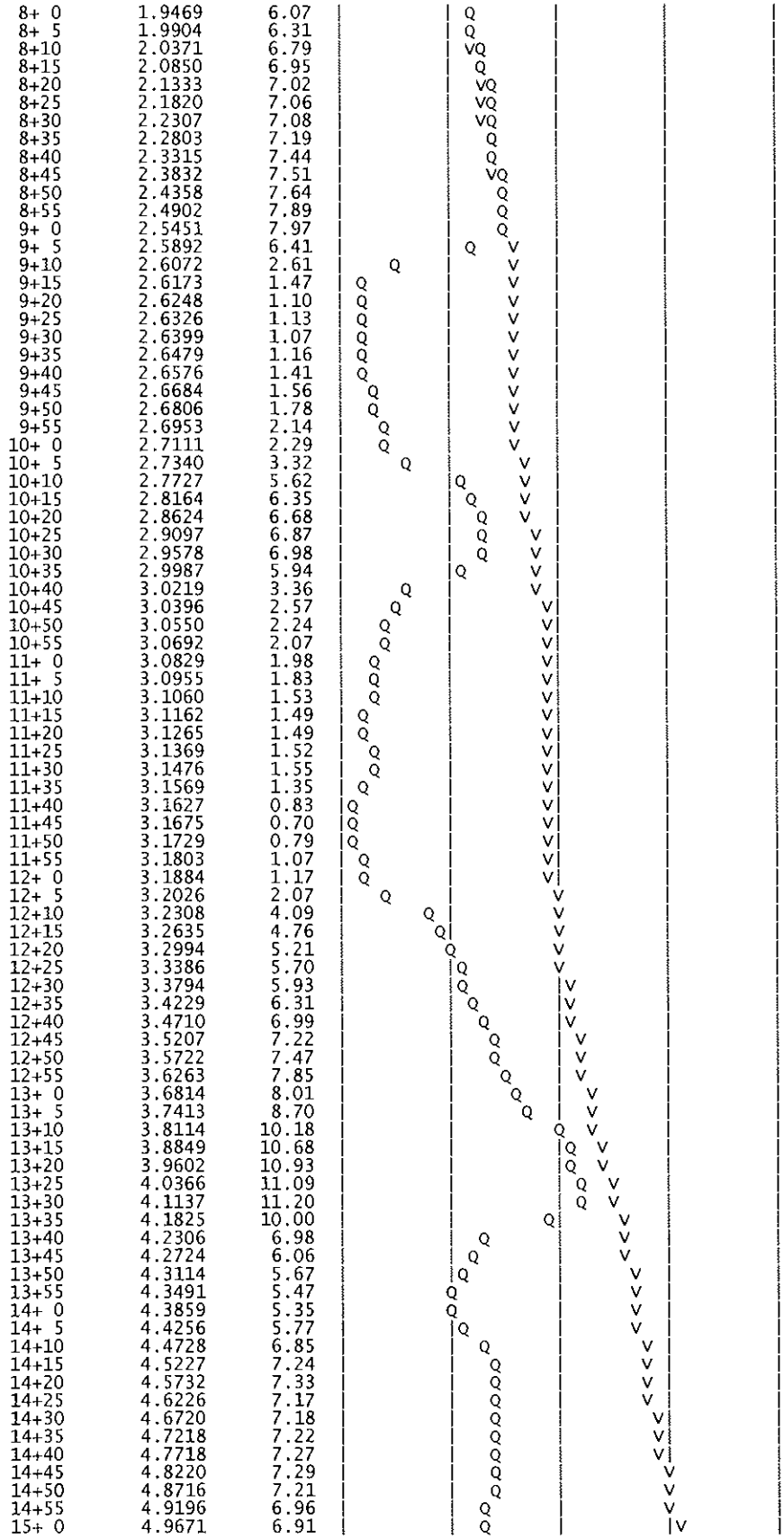
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0013	0.19	Q	|	|	|	|
0+10	0.0058	0.65	VQ	|	|	|	|
0+15	0.0113	0.80	VQ	|	|	|	|
0+20	0.0179	0.96	VQ	|	|	|	|
0+25	0.0264	1.23	V Q	|	|	|	|
0+30	0.0355	1.32	V Q	|	|	|	|
0+35	0.0449	1.37	V Q	|	|	|	|
0+40	0.0545	1.40	V Q	|	|	|	|
0+45	0.0642	1.41	V Q	|	|	|	|
0+50	0.0746	1.51	V Q	|	|	|	|

0+55	0.0867	1.75	V Q	|	|	|	|
1+ 0	0.0992	1.82	V Q	|	|	|	|
1+ 5	0.1113	1.76	V Q	|	|	|	|
1+10	0.1219	1.54	V Q	|	|	|	|
1+15	0.1322	1.48	V Q	|	|	|	|
1+20	0.1422	1.46	V Q	|	|	|	|
1+25	0.1522	1.45	V Q	|	|	|	|
1+30	0.1621	1.44	|VQ	|	|	|	|
1+35	0.1719	1.43	|VQ	|	|	|	|
1+40	0.1817	1.42	|VQ	|	|	|	|
1+45	0.1915	1.42	|VQ	|	|	|	|
1+50	0.2019	1.52	|V Q	|	|	|	|
1+55	0.2140	1.75	|V Q	|	|	|	|
2+ 0	0.2265	1.82	|V Q	|	|	|	|
2+ 5	0.2393	1.85	|V Q	|	|	|	|
2+10	0.2522	1.87	|V Q	|	|	|	|
2+15	0.2651	1.88	|V Q	|	|	|	|
2+20	0.2782	1.89	|V Q	|	|	|	|
2+25	0.2912	1.90	|V Q	|	|	|	|
2+30	0.3043	1.90	|V Q	|	|	|	|
2+35	0.3180	1.99	|V Q	|	|	|	|
2+40	0.3333	2.22	| V Q	|	|	|	|
2+45	0.3491	2.29	| V Q	|	|	|	|
2+50	0.3651	2.33	| V Q	|	|	|	|
2+55	0.3813	2.35	| V Q	|	|	|	|
3+ 0	0.3975	2.36	| V Q	|	|	|	|
3+ 5	0.4138	2.36	| V Q	|	|	|	|
3+10	0.4301	2.37	| V Q	|	|	|	|
3+15	0.4465	2.37	| V Q	|	|	|	|
3+20	0.4628	2.37	| V Q	|	|	|	|
3+25	0.4791	2.37	| VQ	|	|	|	|
3+30	0.4954	2.37	| VQ	|	|	|	|
3+35	0.5118	2.37	| VQ	|	|	|	|
3+40	0.5281	2.37	| VQ	|	|	|	|
3+45	0.5444	2.37	| VQ	|	|	|	|
3+50	0.5614	2.47	| VQ	|	|	|	|
3+55	0.5800	2.70	| V Q	|	|	|	|
4+ 0	0.5990	2.77	| V Q	|	|	|	|
4+ 5	0.6183	2.80	| V Q	|	|	|	|
4+10	0.6377	2.82	| V Q	|	|	|	|
4+15	0.6572	2.83	| VQ	|	|	|	|
4+20	0.6775	2.93	| VQ	|	|	|	|
4+25	0.6993	3.17	| V Q	|	|	|	|
4+30	0.7216	3.24	| V Q	|	|	|	|
4+35	0.7442	3.28	| V Q	|	|	|	|
4+40	0.7669	3.29	| V Q	|	|	|	|
4+45	0.7896	3.31	| V Q	|	|	|	|
4+50	0.8131	3.41	| VQ	|	|	|	|
4+55	0.8382	3.65	| V Q	|	|	|	|
5+ 0	0.8638	3.72	| V Q	|	|	|	|
5+ 5	0.8883	3.56	| V Q	|	|	|	|
5+10	0.9097	3.11	| VQ	|	|	|	|
5+15	0.9303	2.98	| Q	|	|	|	|
5+20	0.9511	3.02	| VQ	|	|	|	|
5+25	0.9733	3.22	| Q	|	|	|	|
5+30	0.9958	3.27	| Q	|	|	|	|
5+35	1.0191	3.38	| Q	|	|	|	|
5+40	1.0440	3.62	| VQ	|	|	|	|
5+45	1.0695	3.70	| VQ	|	|	|	|
5+50	1.0953	3.74	| VQ	|	|	|	|
5+55	1.1213	3.77	| Q	|	|	|	|
6+ 0	1.1473	3.78	| Q	|	|	|	|
6+ 5	1.1740	3.88	| Q	|	|	|	|
6+10	1.2024	4.12	| VQ	|	|	|	|
6+15	1.2313	4.19	| VQ	|	|	|	|
6+20	1.2603	4.22	| VQ	|	|	|	|
6+25	1.2896	4.24	| Q	|	|	|	|
6+30	1.3189	4.25	| Q	|	|	|	|
6+35	1.3489	4.36	| Q	|	|	|	|
6+40	1.3805	4.59	| VQ	|	|	|	|
6+45	1.4126	4.66	| VQ	|	|	|	|
6+50	1.4450	4.70	| Q	|	|	|	|
6+55	1.4774	4.72	| Q	|	|	|	|
7+ 0	1.5100	4.73	| Q	|	|	|	|
7+ 5	1.5426	4.73	| Q	|	|	|	|
7+10	1.5753	4.74	| Q	|	|	|	|
7+15	1.6079	4.74	| QV	|	|	|	|
7+20	1.6412	4.84	| QV	|	|	|	|
7+25	1.6761	5.07	| Q	|	|	|	|
7+30	1.7115	5.14	| Q	|	|	|	|
7+35	1.7478	5.27	| Q	|	|	|	|
7+40	1.7858	5.52	| |Q	|	|	|	|
7+45	1.8243	5.60	| |Q	|	|	|	|
7+50	1.8639	5.74	| |Q	|	|	|	|
7+55	1.9051	5.99	| |Q	|	|	|	|



8+ 0	1.9469	6.07	
8+ 5	1.9904	6.31	
8+10	2.0371	6.79	
8+15	2.0850	6.95	
8+20	2.1333	7.02	
8+25	2.1820	7.06	
8+30	2.2307	7.08	
8+35	2.2803	7.19	
8+40	2.3315	7.44	
8+45	2.3832	7.51	
8+50	2.4358	7.64	
8+55	2.4902	7.89	
9+ 0	2.5451	7.97	
9+ 5	2.5892	6.41	
9+10	2.6072	2.61	
9+15	2.6173	1.47	
9+20	2.6248	1.10	
9+25	2.6326	1.13	
9+30	2.6399	1.07	
9+35	2.6479	1.16	
9+40	2.6576	1.41	
9+45	2.6684	1.56	
9+50	2.6806	1.78	
9+55	2.6953	2.14	
10+ 0	2.7111	2.29	
10+ 5	2.7340	3.32	
10+10	2.7727	5.62	
10+15	2.8164	6.35	
10+20	2.8624	6.68	
10+25	2.9097	6.87	
10+30	2.9578	6.98	
10+35	2.9987	5.94	
10+40	3.0219	3.36	
10+45	3.0396	2.57	
10+50	3.0550	2.24	
10+55	3.0692	2.07	
11+ 0	3.0829	1.98	
11+ 5	3.0955	1.83	
11+10	3.1060	1.53	
11+15	3.1162	1.49	
11+20	3.1265	1.49	
11+25	3.1369	1.52	
11+30	3.1476	1.55	
11+35	3.1569	1.35	
11+40	3.1627	0.83	
11+45	3.1675	0.70	
11+50	3.1729	0.79	
11+55	3.1803	1.07	
12+ 0	3.1884	1.17	
12+ 5	3.2026	2.07	
12+10	3.2308	4.09	
12+15	3.2635	4.76	
12+20	3.2994	5.21	
12+25	3.3386	5.70	
12+30	3.3794	5.93	
12+35	3.4229	6.31	
12+40	3.4710	6.99	
12+45	3.5207	7.22	
12+50	3.5722	7.47	
12+55	3.6263	7.85	
13+ 0	3.6814	8.01	
13+ 5	3.7413	8.70	
13+10	3.8114	10.18	
13+15	3.8849	10.68	
13+20	3.9602	10.93	
13+25	4.0366	11.09	
13+30	4.1137	11.20	
13+35	4.1825	10.00	
13+40	4.2306	6.98	
13+45	4.2724	6.06	
13+50	4.3114	5.67	
13+55	4.3491	5.47	
14+ 0	4.3859	5.35	
14+ 5	4.4256	5.77	
14+10	4.4728	6.85	
14+15	4.5227	7.24	
14+20	4.5732	7.33	
14+25	4.6226	7.17	
14+30	4.6720	7.18	
14+35	4.7218	7.22	
14+40	4.7718	7.27	
14+45	4.8220	7.29	
14+50	4.8716	7.21	
14+55	4.9196	6.96	
15+ 0	4.9671	6.91	

15+ 5	5.0139	6.79	Q	V
15+10	5.0588	6.53	Q	V
15+15	5.1034	6.46	Q	V
15+20	5.1470	6.34	Q	V
15+25	5.1888	6.06	Q	V
15+30	5.2301	6.00	Q	V
15+35	5.2681	5.52	Q	V
15+40	5.2984	4.40	Q	V
15+45	5.3265	4.08	Q	V
15+50	5.3537	3.95	Q	V
15+55	5.3805	3.89	Q	V
16+ 0	5.4071	3.87	Q	V
16+ 5	5.4310	3.46	Q	V
16+10	5.4481	2.49	Q	V
16+15	5.4633	2.20	Q	V
16+20	5.4776	2.07	Q	V
16+25	5.4913	2.00	Q	V
16+30	5.5047	1.95	Q	V
16+35	5.5173	1.82	Q	V
16+40	5.5281	1.57	Q	V
16+45	5.5384	1.50	Q	V
16+50	5.5485	1.47	Q	V
16+55	5.5585	1.45	Q	V
17+ 0	5.5684	1.44	Q	V
17+ 5	5.5795	1.62	Q	V
17+10	5.5938	2.08	Q	V
17+15	5.6091	2.22	Q	V
17+20	5.6248	2.28	Q	V
17+25	5.6408	2.32	Q	V
17+30	5.6570	2.34	Q	V
17+35	5.6732	2.36	Q	V
17+40	5.6895	2.37	Q	V
17+45	5.7059	2.37	Q	V
17+50	5.7215	2.27	Q	V
17+55	5.7356	2.04	Q	V
18+ 0	5.7492	1.97	Q	V
18+ 5	5.7625	1.94	Q	V
18+10	5.7758	1.92	Q	V
18+15	5.7889	1.91	Q	V
18+20	5.8020	1.90	Q	V
18+25	5.8151	1.90	Q	V
18+30	5.8281	1.90	Q	V
18+35	5.8405	1.80	Q	V
18+40	5.8513	1.57	Q	V
18+45	5.8616	1.50	Q	V
18+50	5.8711	1.37	Q	V
18+55	5.8788	1.12	Q	V
19+ 0	5.8859	1.04	Q	V
19+ 5	5.8935	1.09	Q	V
19+10	5.9024	1.30	Q	V
19+15	5.9118	1.36	Q	V
19+20	5.9220	1.48	Q	V
19+25	5.9339	1.72	Q	V
19+30	5.9463	1.81	Q	V
19+35	5.9584	1.75	Q	V
19+40	5.9690	1.54	Q	V
19+45	5.9792	1.48	Q	V
19+50	5.9886	1.36	Q	V
19+55	5.9963	1.12	Q	V
20+ 0	6.0035	1.04	Q	V
20+ 5	6.0110	1.09	Q	V
20+10	6.0199	1.30	Q	V
20+15	6.0293	1.36	Q	V
20+20	6.0388	1.39	Q	V
20+25	6.0485	1.40	Q	V
20+30	6.0582	1.41	Q	V
20+35	6.0679	1.42	Q	V
20+40	6.0777	1.42	Q	V
20+45	6.0875	1.42	Q	V
20+50	6.0966	1.33	Q	V
20+55	6.1042	1.10	Q	V
21+ 0	6.1112	1.02	Q	V
21+ 5	6.1187	1.09	Q	V
21+10	6.1277	1.30	Q	V
21+15	6.1370	1.36	Q	V
21+20	6.1459	1.29	Q	V
21+25	6.1533	1.07	Q	V
21+30	6.1603	1.01	Q	V
21+35	6.1677	1.08	Q	V
21+40	6.1767	1.30	Q	V
21+45	6.1860	1.36	Q	V
21+50	6.1949	1.29	Q	V
21+55	6.2023	1.07	Q	V
22+ 0	6.2092	1.01	Q	V
22+ 5	6.2167	1.08	Q	V

22+10	6.2256	1.30	Q				V
22+15	6.2350	1.36	Q				V
22+20	6.2439	1.29	Q				V
22+25	6.2512	1.07	Q				V
22+30	6.2582	1.01	Q				V
22+35	6.2650	0.99	Q				V
22+40	6.2717	0.97	Q				V
22+45	6.2783	0.96	Q				V
22+50	6.2849	0.95	Q				V
22+55	6.2914	0.95	Q				V
23+ 0	6.2979	0.95	Q				V
23+ 5	6.3045	0.95	Q				V
23+10	6.3110	0.95	Q				V
23+15	6.3175	0.95	Q				V
23+20	6.3240	0.95	Q				V
23+25	6.3306	0.95	Q				V
23+30	6.3371	0.95	Q				V
23+35	6.3436	0.95	Q				V
23+40	6.3502	0.95	Q				V
23+45	6.3567	0.95	Q				V
23+50	6.3632	0.95	Q				V
23+55	6.3698	0.95	Q				V
24+ 0	6.3763	0.95	Q				V
24+ 5	6.3815	0.76	Q				V
24+10	6.3835	0.29	Q				V
24+15	6.3846	0.15	Q				V
24+20	6.3851	0.09	Q				V
24+25	6.3855	0.05	Q				V
24+30	6.3857	0.03	Q				V
24+35	6.3858	0.01	Q				V

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727N00565.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

--------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



--------------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 5-YEAR

--------------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            1.10                 64.57

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            2.50                146.75

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    1.100(In)
Area Averaged 100-Year Rainfall =    2.500(In)

Point rain (area averaged) =    1.428(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    1.428(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    55.300           56.00          0.900
     3.400           86.00          0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134       0.942      0.126
86.0  71.6      0.343     0.000        0.343       0.058      0.020
                                                 Sum (F) =   0.146
Area averaged mean soil loss (F) (In/Hr) =  0.146
Minimum soil loss rate ((In/Hr)) =  0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
--------------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000 Sum=	59.159

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.086	0.146	0.015	0.07
2	0.17	0.60	0.103	0.146	0.019	0.08
3	0.25	0.60	0.103	0.146	0.019	0.08
4	0.33	0.60	0.103	0.146	0.019	0.08
5	0.42	0.60	0.103	0.146	0.019	0.08
6	0.50	0.70	0.120	0.146	0.022	0.10
7	0.58	0.70	0.120	0.146	0.022	0.10
8	0.67	0.70	0.120	0.146	0.022	0.10
9	0.75	0.70	0.120	0.146	0.022	0.10
10	0.83	0.70	0.120	0.146	0.022	0.10
11	0.92	0.70	0.120	0.146	0.022	0.10
12	1.00	0.80	0.137	0.146	0.025	0.11
13	1.08	0.80	0.137	0.146	0.025	0.11
14	1.17	0.80	0.137	0.146	0.025	0.11
15	1.25	0.80	0.137	0.146	0.025	0.11
16	1.33	0.80	0.137	0.146	0.025	0.11
17	1.42	0.80	0.137	0.146	0.025	0.11
18	1.50	0.80	0.137	0.146	0.025	0.11
19	1.58	0.80	0.137	0.146	0.025	0.11
20	1.67	0.80	0.137	0.146	0.025	0.11
21	1.75	0.80	0.137	0.146	0.025	0.11
22	1.83	0.80	0.137	0.146	0.025	0.11
23	1.92	0.80	0.137	0.146	0.025	0.11
24	2.00	0.90	0.154	0.146	---	0.01
25	2.08	0.80	0.137	0.146	0.025	0.11
26	2.17	0.90	0.154	0.146	---	0.01
27	2.25	0.90	0.154	0.146	---	0.01
28	2.33	0.90	0.154	0.146	---	0.01
29	2.42	0.90	0.154	0.146	---	0.01
30	2.50	0.90	0.154	0.146	---	0.01
31	2.58	0.90	0.154	0.146	---	0.01
32	2.67	0.90	0.154	0.146	---	0.01
33	2.75	1.00	0.171	0.146	---	0.03
34	2.83	1.00	0.171	0.146	---	0.03
35	2.92	1.00	0.171	0.146	---	0.03
36	3.00	1.00	0.171	0.146	---	0.03
37	3.08	1.00	0.171	0.146	---	0.03
38	3.17	1.10	0.188	0.146	---	0.04
39	3.25	1.10	0.188	0.146	---	0.04
40	3.33	1.10	0.188	0.146	---	0.04
41	3.42	1.20	0.206	0.146	---	0.06
42	3.50	1.30	0.223	0.146	---	0.08
43	3.58	1.40	0.240	0.146	---	0.09
44	3.67	1.40	0.240	0.146	---	0.09
45	3.75	1.50	0.257	0.146	---	0.11
46	3.83	1.50	0.257	0.146	---	0.11
47	3.92	1.60	0.274	0.146	---	0.13
48	4.00	1.60	0.274	0.146	---	0.13
49	4.08	1.70	0.291	0.146	---	0.14
50	4.17	1.80	0.308	0.146	---	0.16
51	4.25	1.90	0.325	0.146	---	0.18
52	4.33	2.00	0.343	0.146	---	0.20
53	4.42	2.10	0.360	0.146	---	0.21
54	4.50	2.10	0.360	0.146	---	0.21
55	4.58	2.20	0.377	0.146	---	0.23
56	4.67	2.30	0.394	0.146	---	0.25
57	4.75	2.40	0.411	0.146	---	0.26
58	4.83	2.40	0.411	0.146	---	0.26
59	4.92	2.50	0.428	0.146	---	0.28
60	5.00	2.60	0.445	0.146	---	0.30
61	5.08	3.10	0.531	0.146	---	0.38

62	5.17	3.60	0.617	0.146	---	0.47
63	5.25	3.90	0.668	0.146	---	0.52
64	5.33	4.20	0.720	0.146	---	0.57
65	5.42	4.70	0.805	0.146	---	0.66
66	5.50	5.60	0.959	0.146	---	0.81
67	5.58	1.90	0.325	0.146	---	0.18
68	5.67	0.90	0.154	0.146	---	0.01
69	5.75	0.60	0.103	0.146	0.019	0.08
70	5.83	0.50	0.086	0.146	0.015	0.07
71	5.92	0.30	0.051	0.146	0.009	0.04
72	6.00	0.20	0.034	0.146	0.006	0.03
Sum =		100.0			Sum =	10.1

Flood volume = Effective rainfall 0.84(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 4.1(Ac.Ft)
Total soil loss = 0.59(In)
Total soil loss = 2.863(Ac.Ft)
Total rainfall = 1.43(In)
Flood volume = 179481.2 Cubic Feet
Total soil loss = 124718.8 Cubic Feet

Peak flow rate of this hydrograph = 36.894(CFS)

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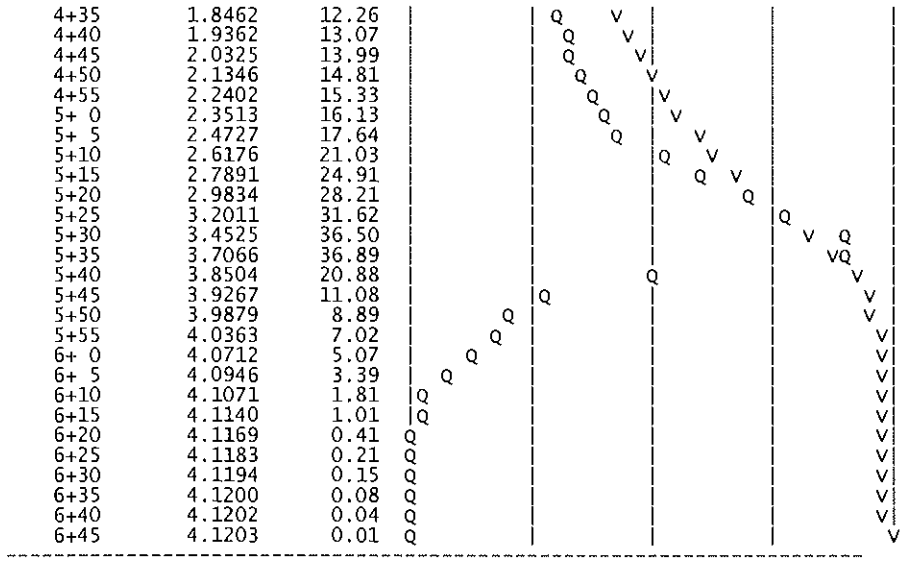
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0041	0.60	Q				
0+10	0.0221	2.61	V Q				
0+15	0.0481	3.78	V Q				
0+20	0.0775	4.27	V Q				
0+25	0.1088	4.53	V Q				
0+30	0.1419	4.82	V Q				
0+35	0.1785	5.31	V Q				
0+40	0.2167	5.54	V Q				
0+45	0.2556	5.66	V Q				
0+50	0.2952	5.74	V Q				
0+55	0.3350	5.78	V Q				
1+ 0	0.3757	5.91	V Q				
1+ 5	0.4191	6.30	V Q				
1+10	0.4637	6.47	V Q				
1+15	0.5087	6.54	V Q				
1+20	0.5541	6.58	VQ				
1+25	0.5996	6.61	VQ				
1+30	0.6452	6.62	Q				
1+35	0.6909	6.64	Q				
1+40	0.7367	6.64	QV				
1+45	0.7825	6.65	QV				
1+50	0.8283	6.65	Q V				
1+55	0.8741	6.65	Q V				
2+ 0	0.9138	5.76	Q V				
2+ 5	0.9402	3.83	Q V				
2+10	0.9718	4.60	Q V				
2+15	0.9887	2.45	Q V				
2+20	0.9989	1.48	Q V				
2+25	1.0064	1.10	Q V				
2+30	1.0123	0.85	Q V				
2+35	1.0172	0.71	Q V				
2+40	1.0214	0.61	Q V				
2+45	1.0261	0.67	Q V				
2+50	1.0339	1.13	Q V				
2+55	1.0426	1.27	Q V				
3+ 0	1.0519	1.35	Q V				
3+ 5	1.0616	1.40	Q V				
3+10	1.0724	1.58	Q V				
3+15	1.0866	2.06	Q V				
3+20	1.1022	2.27	Q V				
3+25	1.1194	2.50	Q V				
3+30	1.1412	3.17	Q V				
3+35	1.1688	4.00	Q V				
3+40	1.2015	4.75	Q V				
3+45	1.2376	5.24	Q V				
3+50	1.2780	5.87	Q V				
3+55	1.3215	6.31	Q V				
4+ 0	1.3692	6.92	Q V				
4+ 5	1.4198	7.35	Q V				
4+10	1.4756	8.11	Q V				
4+15	1.5376	9.00	Q V				
4+20	1.6060	9.93	Q V				
4+25	1.6810	10.89	Q V				
4+30	1.7618	11.73	Q V				



4+35	1.8462	12.26	
4+40	1.9362	13.07	
4+45	2.0325	13.99	
4+50	2.1346	14.81	
4+55	2.2402	15.33	
5+ 0	2.3513	16.13	
5+ 5	2.4727	17.64	
5+10	2.6176	21.03	
5+15	2.7891	24.91	
5+20	2.9834	28.21	
5+25	3.2011	31.62	
5+30	3.4525	36.50	
5+35	3.7066	36.89	
5+40	3.8504	20.88	
5+45	3.9267	11.08	
5+50	3.9879	8.89	
5+55	4.0363	7.02	
6+ 0	4.0712	5.07	
6+ 5	4.0946	3.39	
6+10	4.1071	1.81	
6+15	4.1140	1.01	
6+20	4.1169	0.41	
6+25	4.1183	0.21	
6+30	4.1194	0.15	
6+35	4.1200	0.08	
6+40	4.1202	0.04	
6+45	4.1203	0.01	

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727S00565.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



------------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 5-YEAR

------------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            1.10                  68.64

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            2.50                 156.00

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    1.100(In)
Area Averaged 100-Year Rainfall =    2.500(In)

Point rain (area averaged) =    1.428(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    1.428(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    56.400           56.00          0.900
     6.000           86.00          0.000
 Total Area Entered =     62.40(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134       0.904      0.121
86.0  71.6      0.343     0.000        0.343       0.096      0.033
                                                  Sum (F) =    0.154
Area averaged mean soil loss (F) (In/Hr) =  0.154
Minimum soil loss rate ((In/Hr)) =  0.077
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
------------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000	Sum= 62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.086	0.154	0.015	0.07
2	0.17	0.60	0.103	0.154	0.019	0.08
3	0.25	0.60	0.103	0.154	0.019	0.08
4	0.33	0.60	0.103	0.154	0.019	0.08
5	0.42	0.60	0.103	0.154	0.019	0.08
6	0.50	0.70	0.120	0.154	0.022	0.10
7	0.58	0.70	0.120	0.154	0.022	0.10
8	0.67	0.70	0.120	0.154	0.022	0.10
9	0.75	0.70	0.120	0.154	0.022	0.10
10	0.83	0.70	0.120	0.154	0.022	0.10
11	0.92	0.70	0.120	0.154	0.022	0.10
12	1.00	0.80	0.137	0.154	0.025	0.11
13	1.08	0.80	0.137	0.154	0.025	0.11
14	1.17	0.80	0.137	0.154	0.025	0.11
15	1.25	0.80	0.137	0.154	0.025	0.11
16	1.33	0.80	0.137	0.154	0.025	0.11
17	1.42	0.80	0.137	0.154	0.025	0.11
18	1.50	0.80	0.137	0.154	0.025	0.11
19	1.58	0.80	0.137	0.154	0.025	0.11
20	1.67	0.80	0.137	0.154	0.025	0.11
21	1.75	0.80	0.137	0.154	0.025	0.11
22	1.83	0.80	0.137	0.154	0.025	0.11
23	1.92	0.80	0.137	0.154	0.025	0.11
24	2.00	0.90	0.154	0.154	0.028	0.13
25	2.08	0.80	0.137	0.154	0.025	0.11
26	2.17	0.90	0.154	0.154	0.028	0.13
27	2.25	0.90	0.154	0.154	0.028	0.13
28	2.33	0.90	0.154	0.154	0.028	0.13
29	2.42	0.90	0.154	0.154	0.028	0.13
30	2.50	0.90	0.154	0.154	0.028	0.13
31	2.58	0.90	0.154	0.154	0.028	0.13
32	2.67	0.90	0.154	0.154	0.028	0.13
33	2.75	1.00	0.171	0.154	---	0.02
34	2.83	1.00	0.171	0.154	---	0.02
35	2.92	1.00	0.171	0.154	---	0.02
36	3.00	1.00	0.171	0.154	---	0.02
37	3.08	1.00	0.171	0.154	---	0.02
38	3.17	1.10	0.188	0.154	---	0.03
39	3.25	1.10	0.188	0.154	---	0.03
40	3.33	1.10	0.188	0.154	---	0.03
41	3.42	1.20	0.206	0.154	---	0.05
42	3.50	1.30	0.223	0.154	---	0.07
43	3.58	1.40	0.240	0.154	---	0.09
44	3.67	1.40	0.240	0.154	---	0.09
45	3.75	1.50	0.257	0.154	---	0.10
46	3.83	1.50	0.257	0.154	---	0.10
47	3.92	1.60	0.274	0.154	---	0.12
48	4.00	1.60	0.274	0.154	---	0.12
49	4.08	1.70	0.291	0.154	---	0.14
50	4.17	1.80	0.308	0.154	---	0.15
51	4.25	1.90	0.325	0.154	---	0.17
52	4.33	2.00	0.343	0.154	---	0.19
53	4.42	2.10	0.360	0.154	---	0.21
54	4.50	2.10	0.360	0.154	---	0.21
55	4.58	2.20	0.377	0.154	---	0.22
56	4.67	2.30	0.394	0.154	---	0.24
57	4.75	2.40	0.411	0.154	---	0.26
58	4.83	2.40	0.411	0.154	---	0.26
59	4.92	2.50	0.428	0.154	---	0.27
60	5.00	2.60	0.445	0.154	---	0.29
61	5.08	3.10	0.531	0.154	---	0.38
62	5.17	3.60	0.617	0.154	---	0.46
63	5.25	3.90	0.668	0.154	---	0.51

64	5.33	4.20	0.720	0.154	---	0.57
65	5.42	4.70	0.805	0.154	---	0.65
66	5.50	5.60	0.959	0.154	---	0.81
67	5.58	1.90	0.325	0.154	---	0.17
68	5.67	0.90	0.154	0.154	0.028	0.13
69	5.75	0.60	0.103	0.154	0.019	0.08
70	5.83	0.50	0.086	0.154	0.015	0.07
71	5.92	0.30	0.051	0.154	0.009	0.04
72	6.00	0.20	0.034	0.154	0.006	0.03
Sum =		100.0			Sum =	10.9

Flood volume = Effective rainfall 0.91(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 4.7(Ac.Ft)
Total soil loss = 0.52(In)
Total soil loss = 2.703(Ac.Ft)
Total rainfall = 1.43(In)
Flood volume = 205641.7 Cubic Feet
Total soil loss = 117728.6 Cubic Feet

Peak flow rate of this hydrograph = 40.001(CFS)

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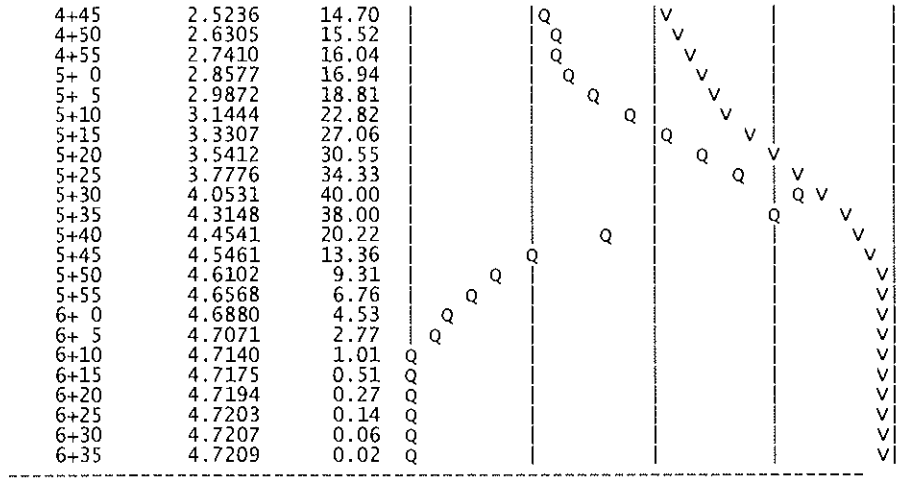
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0062	0.90	Q				
0+10	0.0284	3.23	V Q				
0+15	0.0582	4.32	V Q				
0+20	0.0910	4.76	V Q				
0+25	0.1254	4.99	V Q				
0+30	0.1620	5.31	V Q				
0+35	0.2021	5.83	V Q				
0+40	0.2437	6.03	V Q				
0+45	0.2858	6.11	V Q				
0+50	0.3280	6.14	V Q				
0+55	0.3705	6.16	VQ				
1+ 0	0.4143	6.36	V Q				
1+ 5	0.4611	6.80	V Q				
1+10	0.5088	6.93	VQ				
1+15	0.5569	6.99	VQ				
1+20	0.6053	7.02	Q				
1+25	0.6539	7.05	Q				
1+30	0.7025	7.06	Q				
1+35	0.7512	7.07	QV				
1+40	0.7999	7.07	QV				
1+45	0.8486	7.07	Q V				
1+50	0.8973	7.07	Q V				
1+55	0.9460	7.07	Q V				
2+ 0	0.9959	7.25	Q V				
2+ 5	1.0476	7.50	Q V				
2+10	1.0984	7.38	Q V				
2+15	1.1517	7.74	Q V				
2+20	1.2058	7.85	Q V				
2+25	1.2602	7.90	Q V				
2+30	1.3147	7.92	Q V				
2+35	1.3694	7.94	Q V				
2+40	1.4241	7.94	Q V				
2+45	1.4693	6.56	Q V				
2+50	1.4914	3.21	Q V				
2+55	1.5063	2.17	Q V				
3+ 0	1.5180	1.70	Q V				
3+ 5	1.5279	1.43	Q V				
3+10	1.5381	1.48	Q V				
3+15	1.5513	1.91	Q V				
3+20	1.5649	1.98	Q V				
3+25	1.5806	2.27	Q V				
3+30	1.6016	3.06	Q V				
3+35	1.6291	3.99	Q V				
3+40	1.6620	4.77	Q V				
3+45	1.6983	5.28	Q V				
3+50	1.7393	5.95	Q V				
3+55	1.7834	6.41	Q V				
4+ 0	1.8321	7.07	Q V				
4+ 5	1.8839	7.52	Q V				
4+10	1.9416	8.38	Q V				
4+15	2.0059	9.34	Q V				
4+20	2.0772	10.36	Q V				
4+25	2.1557	11.40	Q V				
4+30	2.2400	12.24	Q V				
4+35	2.3281	12.78	Q V				
4+40	2.4224	13.70	Q V				


4+45 2.5236 14.70
4+50 2.6305 15.52
4+55 2.7410 16.04
5+ 0 2.8577 16.94
5+ 5 2.9872 18.81
5+10 3.1444 22.82
5+15 3.3307 27.06
5+20 3.5412 30.55
5+25 3.7776 34.33
5+30 4.0531 40.00
5+35 4.3148 38.00
5+40 4.4541 20.22
5+45 4.5461 13.36
5+50 4.6102 9.31
5+55 4.6568 6.76
6+ 0 4.6880 4.53
6+ 5 4.7071 2.77
6+10 4.7140 1.01
6+15 4.7175 0.51
6+20 4.7194 0.27
6+25 4.7203 0.14
6+30 4.7207 0.06
6+35 4.7209 0.02

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727N00535.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 5-YEAR

Drainage Area = 58.70(Ac.) = 0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 58.70(Ac.) = 0.092 Sq. Mi.
Length along longest watercourse = 3750.00(Ft.)
Length along longest watercourse measured to centroid = 1875.00(Ft.)
Length along longest watercourse = 0.710 Mi.
Length along longest watercourse measured to centroid = 0.355 Mi.
Difference in elevation = 39.50(Ft.)
Slope along watercourse = 55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.099 Hr.
Lag time = 5.96 Min.
25% of lag time = 1.49 Min.
40% of lag time = 2.39 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	0.80	46.96

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
58.70	1.85	108.60

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 1.046(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.046(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
55.300	56.00	0.900
3.400	86.00	0.000

Total Area Entered = 58.70(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	36.0	0.706	0.900	0.134	0.942	0.126
86.0	71.6	0.343	0.000	0.343	0.058	0.020
					Sum (F) =	0.146

Area averaged mean soil loss (F) (In/Hr) = 0.146
Minimum soil loss rate ((In/Hr)) = 0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000 Sum=	59.159

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.163	0.146	---	0.02
2	0.17	1.30	0.163	0.146	---	0.02
3	0.25	1.10	0.138	0.146	0.025	0.11
4	0.33	1.50	0.188	0.146	---	0.04
5	0.42	1.50	0.188	0.146	---	0.04
6	0.50	1.80	0.226	0.146	---	0.08
7	0.58	1.50	0.188	0.146	---	0.04
8	0.67	1.80	0.226	0.146	---	0.08
9	0.75	1.80	0.226	0.146	---	0.08
10	0.83	1.50	0.188	0.146	---	0.04
11	0.92	1.60	0.201	0.146	---	0.05
12	1.00	1.80	0.226	0.146	---	0.08
13	1.08	2.20	0.276	0.146	---	0.13
14	1.17	2.20	0.276	0.146	---	0.13
15	1.25	2.20	0.276	0.146	---	0.13
16	1.33	2.00	0.251	0.146	---	0.10
17	1.42	2.60	0.326	0.146	---	0.18
18	1.50	2.70	0.339	0.146	---	0.19
19	1.58	2.40	0.301	0.146	---	0.15
20	1.67	2.70	0.339	0.146	---	0.19
21	1.75	3.30	0.414	0.146	---	0.27
22	1.83	3.10	0.389	0.146	---	0.24
23	1.92	2.90	0.364	0.146	---	0.22
24	2.00	3.00	0.376	0.146	---	0.23
25	2.08	3.10	0.389	0.146	---	0.24
26	2.17	4.20	0.527	0.146	---	0.38
27	2.25	5.00	0.627	0.146	---	0.48
28	2.33	3.50	0.439	0.146	---	0.29
29	2.42	6.80	0.853	0.146	---	0.71
30	2.50	7.30	0.916	0.146	---	0.77
31	2.58	8.20	1.029	0.146	---	0.88
32	2.67	5.90	0.740	0.146	---	0.59
33	2.75	2.00	0.251	0.146	---	0.10
34	2.83	1.80	0.226	0.146	---	0.08
35	2.92	1.80	0.226	0.146	---	0.08
36	3.00	0.60	0.075	0.146	0.014	0.06
Sum =		100.0			Sum =	7.5

Flood volume = Effective rainfall 0.63(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 3.1(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 2.043(Ac.Ft)
Total rainfall = 1.05(In)
Flood volume = 133837.8 Cubic Feet
Total soil loss = 88973.9 Cubic Feet

Peak flow rate of this hydrograph = 43.442(CFS)

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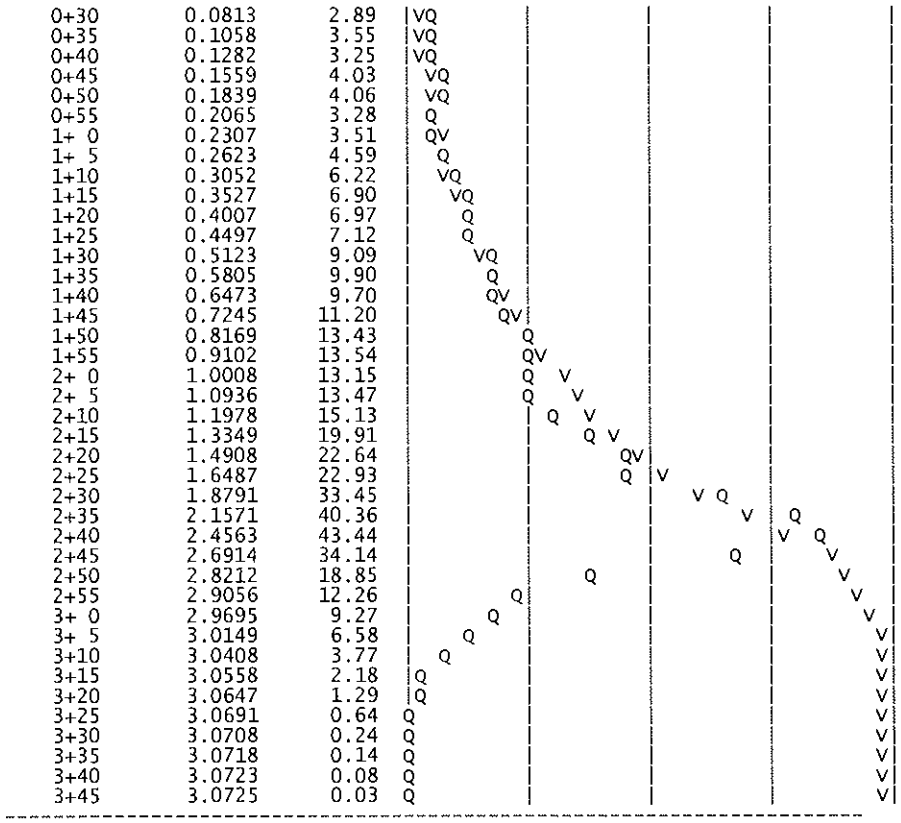
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0010	0.14	Q	|	|	|	|
0+10	0.0051	0.60	Q	|	|	|	|
0+15	0.0162	1.61	VQ	|	|	|	|
0+20	0.0416	3.68	V Q	|	|	|	|
0+25	0.0614	2.88	V Q	|	|	|	|


0+30 0.0813 2.89
0+35 0.1058 3.55
0+40 0.1282 3.25
0+45 0.1559 4.03
0+50 0.1839 4.06
0+55 0.2065 3.28
1+ 0 0.2307 3.51
1+ 5 0.2623 4.59
1+10 0.3052 6.22
1+15 0.3527 6.90
1+20 0.4007 6.97
1+25 0.4497 7.12
1+30 0.5123 9.09
1+35 0.5805 9.90
1+40 0.6473 9.70
1+45 0.7245 11.20
1+50 0.8169 13.43
1+55 0.9102 13.54
2+ 0 1.0008 13.15
2+ 5 1.0936 13.47
2+10 1.1978 15.13
2+15 1.3349 19.91
2+20 1.4908 22.64
2+25 1.6487 22.93
2+30 1.8791 33.45
2+35 2.1571 40.36
2+40 2.4563 43.44
2+45 2.6914 34.14
2+50 2.8212 18.85
2+55 2.9056 12.26
3+ 0 2.9695 9.27
3+ 5 3.0149 6.58
3+10 3.0408 3.77
3+15 3.0558 2.18
3+20 3.0647 1.29
3+25 3.0691 0.64
3+30 3.0708 0.24
3+35 3.0718 0.14
3+40 3.0723 0.08
3+45 3.0725 0.03

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727S00535.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 5-YEAR

Drainage Area = 62.40(Ac.) = 0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 62.40(Ac.) = 0.098 Sq. Mi.
Length along longest watercourse = 3060.00(Ft.)
Length along longest watercourse measured to centroid = 1530.00(Ft.)
Length along longest watercourse = 0.580 Mi.
Length along longest watercourse measured to centroid = 0.290 Mi.
Difference in elevation = 43.66(Ft.)
Slope along watercourse = 75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.080 Hr.
Lag time = 4.82 Min.
25% of lag time = 1.21 Min.
40% of lag time = 1.93 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	0.80	49.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	1.85	115.44

STORM EVENT (YEAR) = 5.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.850(In)

Point rain (area averaged) = 1.046(In)
Areal adjustment factor = 99.97 %
Adjusted average point rain = 1.046(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
56.400	56.00	0.900
6.000	86.00	0.000

Total Area Entered = 62.40(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	36.0	0.706	0.900	0.134	0.904	0.121
86.0	71.6	0.343	0.000	0.343	0.096	0.033
					Sum (F) =	0.154

Area averaged mean soil loss (F) (In/Hr) = 0.154
Minimum soil loss rate ((In/Hr)) = 0.077
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
		Sum = 100.000	Sum=	62.888

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.163	0.154	---	0.01
2	0.17	1.30	0.163	0.154	---	0.01
3	0.25	1.10	0.138	0.154	0.025	0.11
4	0.33	1.50	0.188	0.154	---	0.03
5	0.42	1.50	0.188	0.154	---	0.03
6	0.50	1.80	0.226	0.154	---	0.07
7	0.58	1.50	0.188	0.154	---	0.03
8	0.67	1.80	0.226	0.154	---	0.07
9	0.75	1.80	0.226	0.154	---	0.07
10	0.83	1.50	0.188	0.154	---	0.03
11	0.92	1.60	0.201	0.154	---	0.05
12	1.00	1.80	0.226	0.154	---	0.07
13	1.08	2.20	0.276	0.154	---	0.12
14	1.17	2.20	0.276	0.154	---	0.12
15	1.25	2.20	0.276	0.154	---	0.12
16	1.33	2.00	0.251	0.154	---	0.10
17	1.42	2.60	0.326	0.154	---	0.17
18	1.50	2.70	0.339	0.154	---	0.18
19	1.58	2.40	0.301	0.154	---	0.15
20	1.67	2.70	0.339	0.154	---	0.18
21	1.75	3.30	0.414	0.154	---	0.26
22	1.83	3.10	0.389	0.154	---	0.23
23	1.92	2.90	0.364	0.154	---	0.21
24	2.00	3.00	0.376	0.154	---	0.22
25	2.08	3.10	0.389	0.154	---	0.23
26	2.17	4.20	0.527	0.154	---	0.37
27	2.25	5.00	0.627	0.154	---	0.47
28	2.33	3.50	0.439	0.154	---	0.28
29	2.42	6.80	0.853	0.154	---	0.70
30	2.50	7.30	0.916	0.154	---	0.76
31	2.58	8.20	1.029	0.154	---	0.87
32	2.67	5.90	0.740	0.154	---	0.59
33	2.75	2.00	0.251	0.154	---	0.10
34	2.83	1.80	0.226	0.154	---	0.07
35	2.92	1.80	0.226	0.154	---	0.07
36	3.00	0.60	0.075	0.154	0.014	0.06
Sum =		100.0			Sum =	7.3

Flood volume = Effective rainfall 0.61(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 3.1(Ac.Ft)
Total soil loss = 0.44(In)
Total soil loss = 2.289(Ac.Ft)
Total rainfall = 1.05(In)
Flood volume = 137142.4 Cubic Feet
Total soil loss = 99709.8 Cubic Feet

Peak flow rate of this hydrograph = 46.482(CFS)

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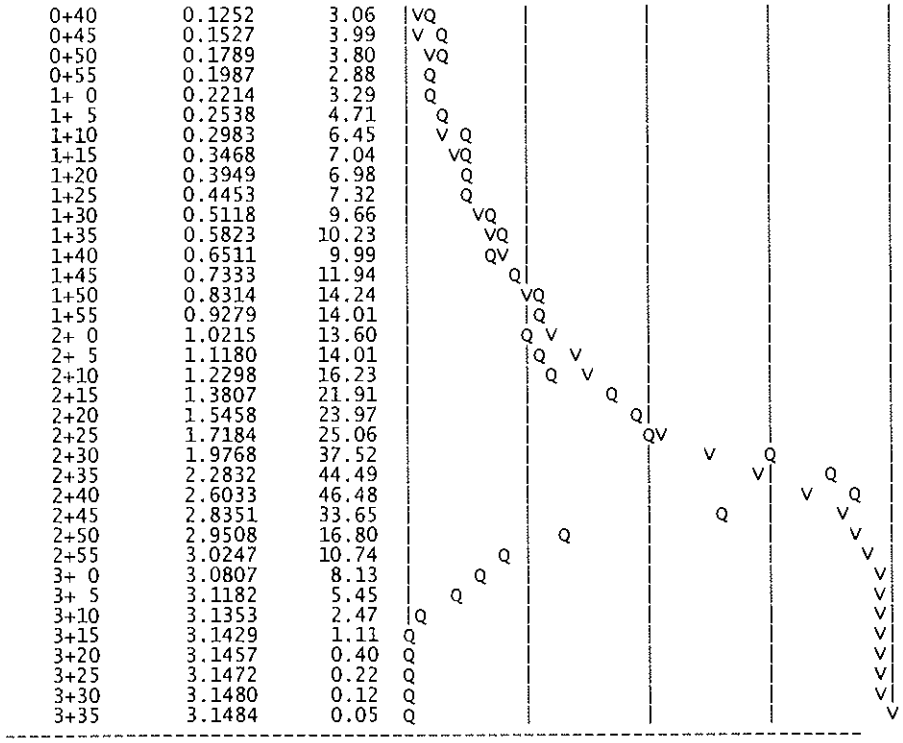
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 12.5 25.0 37.5 50.0
0+ 5	0.0008	0.11	Q
0+10	0.0034	0.39	Q
0+15	0.0159	1.80	VQ
0+20	0.0435	4.02	V Q
0+25	0.0615	2.61	V Q
0+30	0.0808	2.80	|VQ
0+35	0.1042	3.39	|VQ


0+40 0.1252 3.06
0+45 0.1527 3.99
0+50 0.1789 3.80
0+55 0.1987 2.88
1+ 0 0.2214 3.29
1+ 5 0.2538 4.71
1+10 0.2983 6.45
1+15 0.3468 7.04
1+20 0.3949 6.98
1+25 0.4453 7.32
1+30 0.5118 9.66
1+35 0.5823 10.23
1+40 0.6511 9.99
1+45 0.7333 11.94
1+50 0.8314 14.24
1+55 0.9279 14.01
2+ 0 1.0215 13.60
2+ 5 1.1180 14.01
2+10 1.2298 16.23
2+15 1.3807 21.91
2+20 1.5458 23.97
2+25 1.7184 25.06
2+30 1.9768 37.52
2+35 2.2832 44.49
2+40 2.6033 46.48
2+45 2.8351 33.65
2+50 2.9508 16.80
2+55 3.0247 10.74
3+ 0 3.0807 8.13
3+ 5 3.1182 5.45
3+10 3.1353 2.47
3+15 3.1429 1.11
3+20 3.1457 0.40
3+25 3.1472 0.22
3+30 3.1480 0.12
3+35 3.1484 0.05

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727N00515.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 5-YEAR

-----------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            0.48                  28.18

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            1.20                  70.44

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    0.480(In)
Area Averaged 100-Year Rainfall =    1.200(In)

Point rain (area averaged) =    0.649(In)
Areal adjustment factor =   99.95 %
Adjusted average point rain =    0.648(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    55.300            56.00          0.900
     3.400            86.00          0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134        0.942      0.126
86.0  71.6      0.343     0.000        0.343        0.058      0.020
                                                   Sum (F) =    0.146
Area averaged mean soil loss (F) (In/Hr) =  0.146
Minimum soil loss rate ((In/Hr)) =  0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-----------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5000
```

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000	Sum= 59.159

Unit Time		Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	4.20	0.327	0.146	---	0.18
2	0.17	4.30	0.335	0.146	---	0.19
3	0.25	5.00	0.389	0.146	---	0.24
4	0.33	5.00	0.389	0.146	---	0.24
5	0.42	5.80	0.451	0.146	---	0.30
6	0.50	6.50	0.506	0.146	---	0.36
7	0.58	7.40	0.576	0.146	---	0.43
8	0.67	8.60	0.669	0.146	---	0.52
9	0.75	12.30	0.957	0.146	---	0.81
10	0.83	29.10	2.264	0.146	---	2.12
11	0.92	6.80	0.529	0.146	---	0.38
12	1.00	5.00	0.389	0.146	---	0.24
Sum =		100.0			Sum =	6.0

Flood volume = Effective rainfall 0.50(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 2.5(Ac.Ft)
Total soil loss = 0.15(In)
Total soil loss = 0.715(Ac.Ft)
Total rainfall = 0.65(In)
Flood volume = 106977.7 Cubic Feet
Total soil loss = 31161.9 Cubic Feet

Peak flow rate of this hydrograph = 74.643(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	20.0	40.0	60.0	80.0
0+ 5	0.0106	1.54	Q				
0+10	0.0552	6.48	V Q				
0+15	0.1183	9.17	V Q				
0+20	0.1981	11.58	V Q				
0+25	0.2894	13.26	V Q				
0+30	0.3997	16.01	V Q				
0+35	0.5316	19.16	VQ				
0+40	0.6901	23.01	Q				
0+45	0.8924	29.37	Q				
0+50	1.2371	50.05	V Q				
0+55	1.7512	74.64	V Q				
1+ 0	2.0481	43.11	Q V				
1+ 5	2.2217	25.21	Q V				
1+10	2.3133	13.31	Q V				
1+15	2.3673	7.84	Q V				
1+20	2.4034	5.23	Q V				
1+25	2.4270	3.43	Q V				
1+30	2.4423	2.23	Q V				
1+35	2.4527	1.51	Q V				
1+40	2.4550	0.33	Q V				
1+45	2.4559	0.13	Q V				

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        U n i t   H y d r o g r a p h   A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 5-YEAR

-----------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            0.48                  29.95

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            1.20                  74.88

STORM EVENT (YEAR) =    5.00
Area Averaged 2-Year Rainfall =    0.480(In)
Area Averaged 100-Year Rainfall =    1.200(In)

Point rain (area averaged) =    0.649(In)
Areal adjustment factor =   99.94 %
Adjusted average point rain =    0.648(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    56.400            56.00          0.900
     6.000            86.00          0.000
 Total Area Entered =     62.40(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134       0.904      0.121
86.0  71.6      0.343     0.000        0.343       0.096      0.033
                                                  Sum (F) =   0.154
Area averaged mean soil loss (F) (In/Hr) =  0.154
Minimum soil loss rate ((In/Hr)) =  0.077
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-----------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5000
```

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
		Sum = 100.000	Sum=	62.888

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.327	0.154	---	0.17
2	0.17	4.30	0.335	0.154	---	0.18
3	0.25	5.00	0.389	0.154	---	0.23
4	0.33	5.00	0.389	0.154	---	0.23
5	0.42	5.80	0.451	0.154	---	0.30
6	0.50	6.50	0.506	0.154	---	0.35
7	0.58	7.40	0.576	0.154	---	0.42
8	0.67	8.60	0.669	0.154	---	0.51
9	0.75	12.30	0.957	0.154	---	0.80
10	0.83	29.10	2.264	0.154	---	2.11
11	0.92	6.80	0.529	0.154	---	0.37
12	1.00	5.00	0.389	0.154	---	0.23
Sum =		100.0			Sum =	5.9

Flood volume = Effective rainfall 0.49(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 2.6(Ac.Ft)
Total soil loss = 0.15(In)
Total soil loss = 0.802(Ac.Ft)
Total rainfall = 0.65(In)
Flood volume = 111906.1 Cubic Feet
Total soil loss = 34935.9 Cubic Feet

Peak flow rate of this hydrograph = 81.228(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	22.5	45.0	67.5	90.0
0+ 5	0.0152	2.21	Q				
0+10	0.0674	7.58	V Q				
0+15	0.1374	10.16	V Q				
0+20	0.2244	12.64	V Q				
0+25	0.3237	14.41	VQ				
0+30	0.4444	17.53	VQ				
0+35	0.5889	20.99	Q				
0+40	0.7634	25.34	Q				
0+45	0.9906	32.99	QV				
0+50	1.4036	59.96	V Q				
0+55	1.9630	81.23	V Q				
1+ 0	2.2416	40.46	Q V				
1+ 5	2.4020	23.28	Q V				
1+10	2.4778	11.01	Q V				
1+15	2.5216	6.36	Q V				
1+20	2.5475	3.77	Q V				
1+25	2.5641	2.41	Q V				
1+30	2.5677	0.52	Q V				
1+35	2.5690	0.19	Q V				

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        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727N002242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 2-YEAR

-------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            1.70                  99.79

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            4.25                 249.48

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.700(In)
Area Averaged 100-Year Rainfall =    4.250(In)

Point rain (area averaged) =    1.700(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    1.700(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    55.300           56.00         0.900
     3.400           86.00         0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134        0.942      0.126
86.0  71.6      0.343     0.000        0.343        0.058      0.020
                                                   Sum (F) =    0.146
Area averaged mean soil loss (F) (In/Hr) =  0.146
Minimum soil loss rate ((In/Hr)) =  0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000 Sum=	59.159

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.014	0.259	0.002	0.01
2	0.17	0.07	0.014	0.258	0.002	0.01
3	0.25	0.07	0.014	0.257	0.002	0.01
4	0.33	0.10	0.020	0.256	0.004	0.02
5	0.42	0.10	0.020	0.255	0.004	0.02
6	0.50	0.10	0.020	0.254	0.004	0.02
7	0.58	0.10	0.020	0.253	0.004	0.02
8	0.67	0.10	0.020	0.252	0.004	0.02
9	0.75	0.10	0.020	0.251	0.004	0.02
10	0.83	0.13	0.027	0.250	0.005	0.02
11	0.92	0.13	0.027	0.249	0.005	0.02
12	1.00	0.13	0.027	0.248	0.005	0.02
13	1.08	0.10	0.020	0.247	0.004	0.02
14	1.17	0.10	0.020	0.246	0.004	0.02
15	1.25	0.10	0.020	0.245	0.004	0.02
16	1.33	0.10	0.020	0.244	0.004	0.02
17	1.42	0.10	0.020	0.243	0.004	0.02
18	1.50	0.10	0.020	0.242	0.004	0.02
19	1.58	0.10	0.020	0.242	0.004	0.02
20	1.67	0.10	0.020	0.241	0.004	0.02
21	1.75	0.10	0.020	0.240	0.004	0.02
22	1.83	0.13	0.027	0.239	0.005	0.02
23	1.92	0.13	0.027	0.238	0.005	0.02
24	2.00	0.13	0.027	0.237	0.005	0.02
25	2.08	0.13	0.027	0.236	0.005	0.02
26	2.17	0.13	0.027	0.235	0.005	0.02
27	2.25	0.13	0.027	0.234	0.005	0.02
28	2.33	0.13	0.027	0.233	0.005	0.02
29	2.42	0.13	0.027	0.232	0.005	0.02
30	2.50	0.13	0.027	0.231	0.005	0.02
31	2.58	0.17	0.034	0.230	0.006	0.03
32	2.67	0.17	0.034	0.229	0.006	0.03
33	2.75	0.17	0.034	0.228	0.006	0.03
34	2.83	0.17	0.034	0.227	0.006	0.03
35	2.92	0.17	0.034	0.226	0.006	0.03
36	3.00	0.17	0.034	0.225	0.006	0.03
37	3.08	0.17	0.034	0.224	0.006	0.03
38	3.17	0.17	0.034	0.223	0.006	0.03
39	3.25	0.17	0.034	0.223	0.006	0.03
40	3.33	0.17	0.034	0.222	0.006	0.03
41	3.42	0.17	0.034	0.221	0.006	0.03
42	3.50	0.17	0.034	0.220	0.006	0.03
43	3.58	0.17	0.034	0.219	0.006	0.03
44	3.67	0.17	0.034	0.218	0.006	0.03
45	3.75	0.17	0.034	0.217	0.006	0.03
46	3.83	0.20	0.041	0.216	0.007	0.03
47	3.92	0.20	0.041	0.215	0.007	0.03
48	4.00	0.20	0.041	0.214	0.007	0.03
49	4.08	0.20	0.041	0.213	0.007	0.03
50	4.17	0.20	0.041	0.212	0.007	0.03
51	4.25	0.20	0.041	0.212	0.007	0.03
52	4.33	0.23	0.048	0.211	0.009	0.04
53	4.42	0.23	0.048	0.210	0.009	0.04
54	4.50	0.23	0.048	0.209	0.009	0.04
55	4.58	0.23	0.048	0.208	0.009	0.04
56	4.67	0.23	0.048	0.207	0.009	0.04
57	4.75	0.23	0.048	0.206	0.009	0.04
58	4.83	0.27	0.054	0.205	0.010	0.04
59	4.92	0.27	0.054	0.204	0.010	0.04
60	5.00	0.27	0.054	0.203	0.010	0.04
61	5.08	0.20	0.041	0.203	0.007	0.03

62	5.17	0.20	0.041	0.202	0.007	0.03
63	5.25	0.20	0.041	0.201	0.007	0.03
64	5.33	0.23	0.048	0.200	0.009	0.04
65	5.42	0.23	0.048	0.199	0.009	0.04
66	5.50	0.23	0.048	0.198	0.009	0.04
67	5.58	0.27	0.054	0.197	0.010	0.04
68	5.67	0.27	0.054	0.196	0.010	0.04
69	5.75	0.27	0.054	0.196	0.010	0.04
70	5.83	0.27	0.054	0.195	0.010	0.04
71	5.92	0.27	0.054	0.194	0.010	0.04
72	6.00	0.27	0.054	0.193	0.010	0.04
73	6.08	0.30	0.061	0.192	0.011	0.05
74	6.17	0.30	0.061	0.191	0.011	0.05
75	6.25	0.30	0.061	0.190	0.011	0.05
76	6.33	0.30	0.061	0.190	0.011	0.05
77	6.42	0.30	0.061	0.189	0.011	0.05
78	6.50	0.30	0.061	0.188	0.011	0.05
79	6.58	0.33	0.068	0.187	0.012	0.06
80	6.67	0.33	0.068	0.186	0.012	0.06
81	6.75	0.33	0.068	0.185	0.012	0.06
82	6.83	0.33	0.068	0.185	0.012	0.06
83	6.92	0.33	0.068	0.184	0.012	0.06
84	7.00	0.33	0.068	0.183	0.012	0.06
85	7.08	0.33	0.068	0.182	0.012	0.06
86	7.17	0.33	0.068	0.181	0.012	0.06
87	7.25	0.33	0.068	0.180	0.012	0.06
88	7.33	0.37	0.075	0.180	0.013	0.06
89	7.42	0.37	0.075	0.179	0.013	0.06
90	7.50	0.37	0.075	0.178	0.013	0.06
91	7.58	0.40	0.082	0.177	0.015	0.07
92	7.67	0.40	0.082	0.176	0.015	0.07
93	7.75	0.40	0.082	0.175	0.015	0.07
94	7.83	0.43	0.088	0.175	0.016	0.07
95	7.92	0.43	0.088	0.174	0.016	0.07
96	8.00	0.43	0.088	0.173	0.016	0.07
97	8.08	0.50	0.102	0.172	0.018	0.08
98	8.17	0.50	0.102	0.171	0.018	0.08
99	8.25	0.50	0.102	0.171	0.018	0.08
100	8.33	0.50	0.102	0.170	0.018	0.08
101	8.42	0.50	0.102	0.169	0.018	0.08
102	8.50	0.50	0.102	0.168	0.018	0.08
103	8.58	0.53	0.109	0.167	0.020	0.09
104	8.67	0.53	0.109	0.167	0.020	0.09
105	8.75	0.53	0.109	0.166	0.020	0.09
106	8.83	0.57	0.116	0.165	0.021	0.09
107	8.92	0.57	0.116	0.164	0.021	0.09
108	9.00	0.57	0.116	0.164	0.021	0.09
109	9.08	0.63	0.129	0.163	0.023	0.11
110	9.17	0.63	0.129	0.162	0.023	0.11
111	9.25	0.63	0.129	0.161	0.023	0.11
112	9.33	0.67	0.136	0.160	0.024	0.11
113	9.42	0.67	0.136	0.160	0.024	0.11
114	9.50	0.67	0.136	0.159	0.024	0.11
115	9.58	0.70	0.143	0.158	0.026	0.12
116	9.67	0.70	0.143	0.157	0.026	0.12
117	9.75	0.70	0.143	0.157	0.026	0.12
118	9.83	0.73	0.150	0.156	0.027	0.12
119	9.92	0.73	0.150	0.155	0.027	0.12
120	10.00	0.73	0.150	0.154	0.027	0.12
121	10.08	0.50	0.102	0.154	0.018	0.08
122	10.17	0.50	0.102	0.153	0.018	0.08
123	10.25	0.50	0.102	0.152	0.018	0.08
124	10.33	0.50	0.102	0.151	0.018	0.08
125	10.42	0.50	0.102	0.151	0.018	0.08
126	10.50	0.50	0.102	0.150	0.018	0.08
127	10.58	0.67	0.136	0.149	0.024	0.11
128	10.67	0.67	0.136	0.149	0.024	0.11
129	10.75	0.67	0.136	0.148	0.024	0.11
130	10.83	0.67	0.136	0.147	0.024	0.11
131	10.92	0.67	0.136	0.146	0.024	0.11
132	11.00	0.67	0.136	0.146	0.024	0.11
133	11.08	0.63	0.129	0.145	0.023	0.11
134	11.17	0.63	0.129	0.144	0.023	0.11
135	11.25	0.63	0.129	0.143	0.023	0.11
136	11.33	0.63	0.129	0.143	0.023	0.11
137	11.42	0.63	0.129	0.142	0.023	0.11
138	11.50	0.63	0.129	0.141	0.023	0.11
139	11.58	0.57	0.116	0.141	0.021	0.09
140	11.67	0.57	0.116	0.140	0.021	0.09
141	11.75	0.57	0.116	0.139	0.021	0.09
142	11.83	0.60	0.122	0.139	0.022	0.10
143	11.92	0.60	0.122	0.138	0.022	0.10
144	12.00	0.60	0.122	0.137	0.022	0.10
145	12.08	0.83	0.170	0.137	---	0.03
146	12.17	0.83	0.170	0.136	---	0.03

147	12.25	0.83	0.170	0.135	---	0.03
148	12.33	0.87	0.177	0.134	---	0.04
149	12.42	0.87	0.177	0.134	---	0.04
150	12.50	0.87	0.177	0.133	---	0.04
151	12.58	0.93	0.190	0.132	---	0.06
152	12.67	0.93	0.190	0.132	---	0.06
153	12.75	0.93	0.190	0.131	---	0.06
154	12.83	0.97	0.197	0.130	---	0.07
155	12.92	0.97	0.197	0.130	---	0.07
156	13.00	0.97	0.197	0.129	---	0.07
157	13.08	1.13	0.231	0.128	---	0.10
158	13.17	1.13	0.231	0.128	---	0.10
159	13.25	1.13	0.231	0.127	---	0.10
160	13.33	1.13	0.231	0.127	---	0.10
161	13.42	1.13	0.231	0.126	---	0.11
162	13.50	1.13	0.231	0.125	---	0.11
163	13.58	0.77	0.156	0.125	---	0.03
164	13.67	0.77	0.156	0.124	---	0.03
165	13.75	0.77	0.156	0.123	---	0.03
166	13.83	0.77	0.156	0.123	---	0.03
167	13.92	0.77	0.156	0.122	---	0.03
168	14.00	0.77	0.156	0.121	---	0.03
169	14.08	0.90	0.184	0.121	---	0.06
170	14.17	0.90	0.184	0.120	---	0.06
171	14.25	0.90	0.184	0.120	---	0.06
172	14.33	0.87	0.177	0.119	---	0.06
173	14.42	0.87	0.177	0.118	---	0.06
174	14.50	0.87	0.177	0.118	---	0.06
175	14.58	0.87	0.177	0.117	---	0.06
176	14.67	0.87	0.177	0.117	---	0.06
177	14.75	0.87	0.177	0.116	---	0.06
178	14.83	0.83	0.170	0.115	---	0.05
179	14.92	0.83	0.170	0.115	---	0.06
180	15.00	0.83	0.170	0.114	---	0.06
181	15.08	0.80	0.163	0.114	---	0.05
182	15.17	0.80	0.163	0.113	---	0.05
183	15.25	0.80	0.163	0.112	---	0.05
184	15.33	0.77	0.156	0.112	---	0.04
185	15.42	0.77	0.156	0.111	---	0.05
186	15.50	0.77	0.156	0.111	---	0.05
187	15.58	0.63	0.129	0.110	---	0.02
188	15.67	0.63	0.129	0.110	---	0.02
189	15.75	0.63	0.129	0.109	---	0.02
190	15.83	0.63	0.129	0.109	---	0.02
191	15.92	0.63	0.129	0.108	---	0.02
192	16.00	0.63	0.129	0.107	---	0.02
193	16.08	0.13	0.027	0.107	0.005	0.02
194	16.17	0.13	0.027	0.106	0.005	0.02
195	16.25	0.13	0.027	0.106	0.005	0.02
196	16.33	0.13	0.027	0.105	0.005	0.02
197	16.42	0.13	0.027	0.105	0.005	0.02
198	16.50	0.13	0.027	0.104	0.005	0.02
199	16.58	0.10	0.020	0.104	0.004	0.02
200	16.67	0.10	0.020	0.103	0.004	0.02
201	16.75	0.10	0.020	0.103	0.004	0.02
202	16.83	0.10	0.020	0.102	0.004	0.02
203	16.92	0.10	0.020	0.102	0.004	0.02
204	17.00	0.10	0.020	0.101	0.004	0.02
205	17.08	0.17	0.034	0.101	0.006	0.03
206	17.17	0.17	0.034	0.100	0.006	0.03
207	17.25	0.17	0.034	0.099	0.006	0.03
208	17.33	0.17	0.034	0.099	0.006	0.03
209	17.42	0.17	0.034	0.099	0.006	0.03
210	17.50	0.17	0.034	0.098	0.006	0.03
211	17.58	0.17	0.034	0.098	0.006	0.03
212	17.67	0.17	0.034	0.097	0.006	0.03
213	17.75	0.17	0.034	0.097	0.006	0.03
214	17.83	0.13	0.027	0.096	0.005	0.02
215	17.92	0.13	0.027	0.096	0.005	0.02
216	18.00	0.13	0.027	0.095	0.005	0.02
217	18.08	0.13	0.027	0.095	0.005	0.02
218	18.17	0.13	0.027	0.094	0.005	0.02
219	18.25	0.13	0.027	0.094	0.005	0.02
220	18.33	0.13	0.027	0.093	0.005	0.02
221	18.42	0.13	0.027	0.093	0.005	0.02
222	18.50	0.13	0.027	0.092	0.005	0.02
223	18.58	0.10	0.020	0.092	0.004	0.02
224	18.67	0.10	0.020	0.091	0.004	0.02
225	18.75	0.10	0.020	0.091	0.004	0.02
226	18.83	0.07	0.014	0.091	0.002	0.01
227	18.92	0.07	0.014	0.090	0.002	0.01
228	19.00	0.07	0.014	0.090	0.002	0.01
229	19.08	0.10	0.020	0.089	0.004	0.02
230	19.17	0.10	0.020	0.089	0.004	0.02
231	19.25	0.10	0.020	0.088	0.004	0.02

232	19.33	0.13	0.027	0.088	0.005	0.02
233	19.42	0.13	0.027	0.088	0.005	0.02
234	19.50	0.13	0.027	0.087	0.005	0.02
235	19.58	0.10	0.020	0.087	0.004	0.02
236	19.67	0.10	0.020	0.086	0.004	0.02
237	19.75	0.10	0.020	0.086	0.004	0.02
238	19.83	0.07	0.014	0.086	0.002	0.01
239	19.92	0.07	0.014	0.085	0.002	0.01
240	20.00	0.07	0.014	0.085	0.002	0.01
241	20.08	0.10	0.020	0.085	0.004	0.02
242	20.17	0.10	0.020	0.084	0.004	0.02
243	20.25	0.10	0.020	0.084	0.004	0.02
244	20.33	0.10	0.020	0.083	0.004	0.02
245	20.42	0.10	0.020	0.083	0.004	0.02
246	20.50	0.10	0.020	0.083	0.004	0.02
247	20.58	0.10	0.020	0.082	0.004	0.02
248	20.67	0.10	0.020	0.082	0.004	0.02
249	20.75	0.10	0.020	0.082	0.004	0.02
250	20.83	0.07	0.014	0.081	0.002	0.01
251	20.92	0.07	0.014	0.081	0.002	0.01
252	21.00	0.07	0.014	0.081	0.002	0.01
253	21.08	0.10	0.020	0.080	0.004	0.02
254	21.17	0.10	0.020	0.080	0.004	0.02
255	21.25	0.10	0.020	0.080	0.004	0.02
256	21.33	0.07	0.014	0.079	0.002	0.01
257	21.42	0.07	0.014	0.079	0.002	0.01
258	21.50	0.07	0.014	0.079	0.002	0.01
259	21.58	0.10	0.020	0.079	0.004	0.02
260	21.67	0.10	0.020	0.078	0.004	0.02
261	21.75	0.10	0.020	0.078	0.004	0.02
262	21.83	0.07	0.014	0.078	0.002	0.01
263	21.92	0.07	0.014	0.077	0.002	0.01
264	22.00	0.07	0.014	0.077	0.002	0.01
265	22.08	0.10	0.020	0.077	0.004	0.02
266	22.17	0.10	0.020	0.077	0.004	0.02
267	22.25	0.10	0.020	0.076	0.004	0.02
268	22.33	0.07	0.014	0.076	0.002	0.01
269	22.42	0.07	0.014	0.076	0.002	0.01
270	22.50	0.07	0.014	0.076	0.002	0.01
271	22.58	0.07	0.014	0.076	0.002	0.01
272	22.67	0.07	0.014	0.075	0.002	0.01
273	22.75	0.07	0.014	0.075	0.002	0.01
274	22.83	0.07	0.014	0.075	0.002	0.01
275	22.92	0.07	0.014	0.075	0.002	0.01
276	23.00	0.07	0.014	0.075	0.002	0.01
277	23.08	0.07	0.014	0.074	0.002	0.01
278	23.17	0.07	0.014	0.074	0.002	0.01
279	23.25	0.07	0.014	0.074	0.002	0.01
280	23.33	0.07	0.014	0.074	0.002	0.01
281	23.42	0.07	0.014	0.074	0.002	0.01
282	23.50	0.07	0.014	0.074	0.002	0.01
283	23.58	0.07	0.014	0.074	0.002	0.01
284	23.67	0.07	0.014	0.073	0.002	0.01
285	23.75	0.07	0.014	0.073	0.002	0.01
286	23.83	0.07	0.014	0.073	0.002	0.01
287	23.92	0.07	0.014	0.073	0.002	0.01
288	24.00	0.07	0.014	0.073	0.002	0.01
Sum =		100.0			Sum =	12.4

Flood volume = Effective rainfall 1.03(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 5.1(Ac.Ft)
Total soil loss = 0.67(In)
Total soil loss = 3.258(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 220288.7 Cubic Feet
Total soil loss = 141907.4 Cubic Feet

Peak flow rate of this hydrograph = 7.170(CFS)

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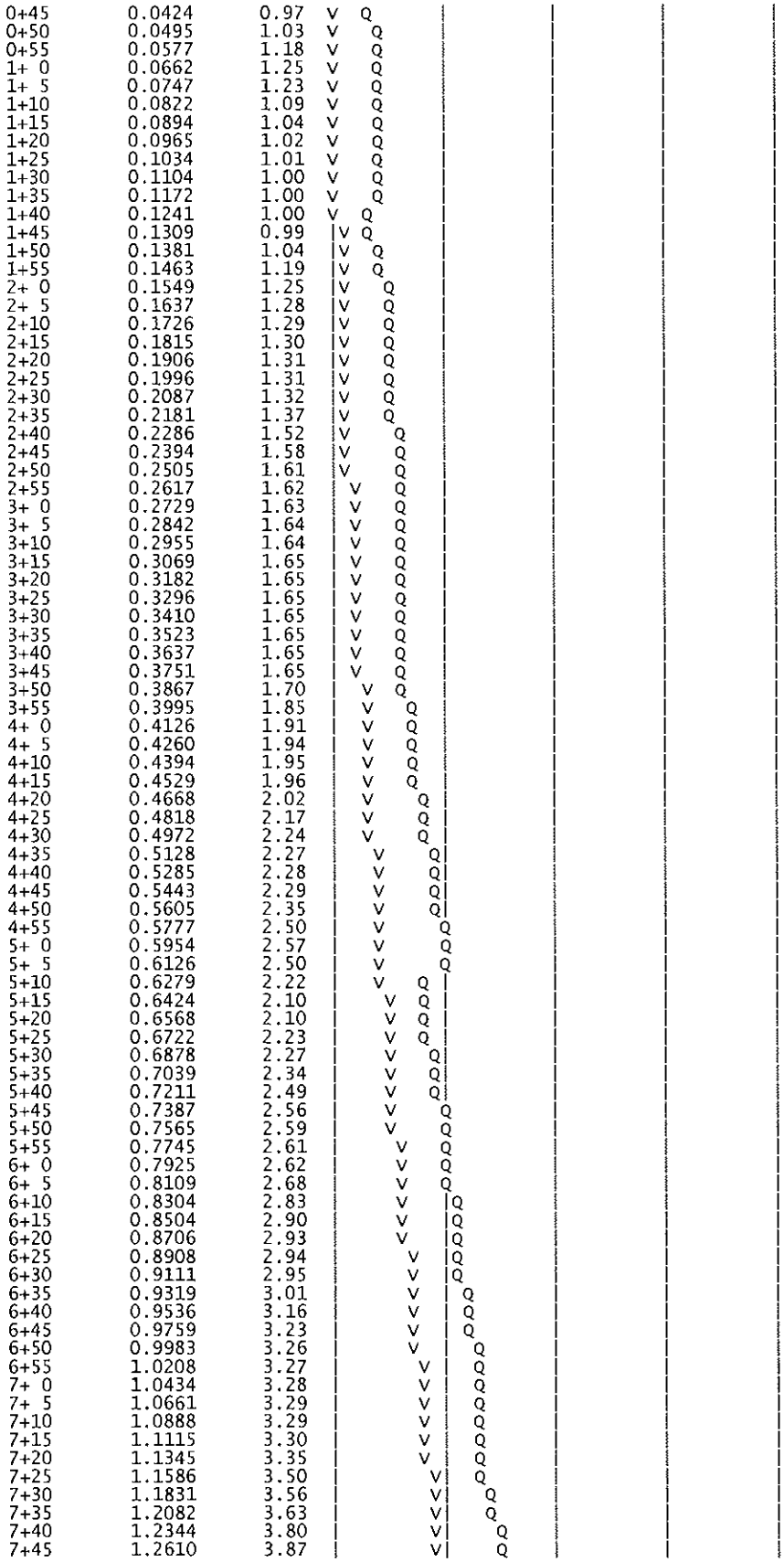
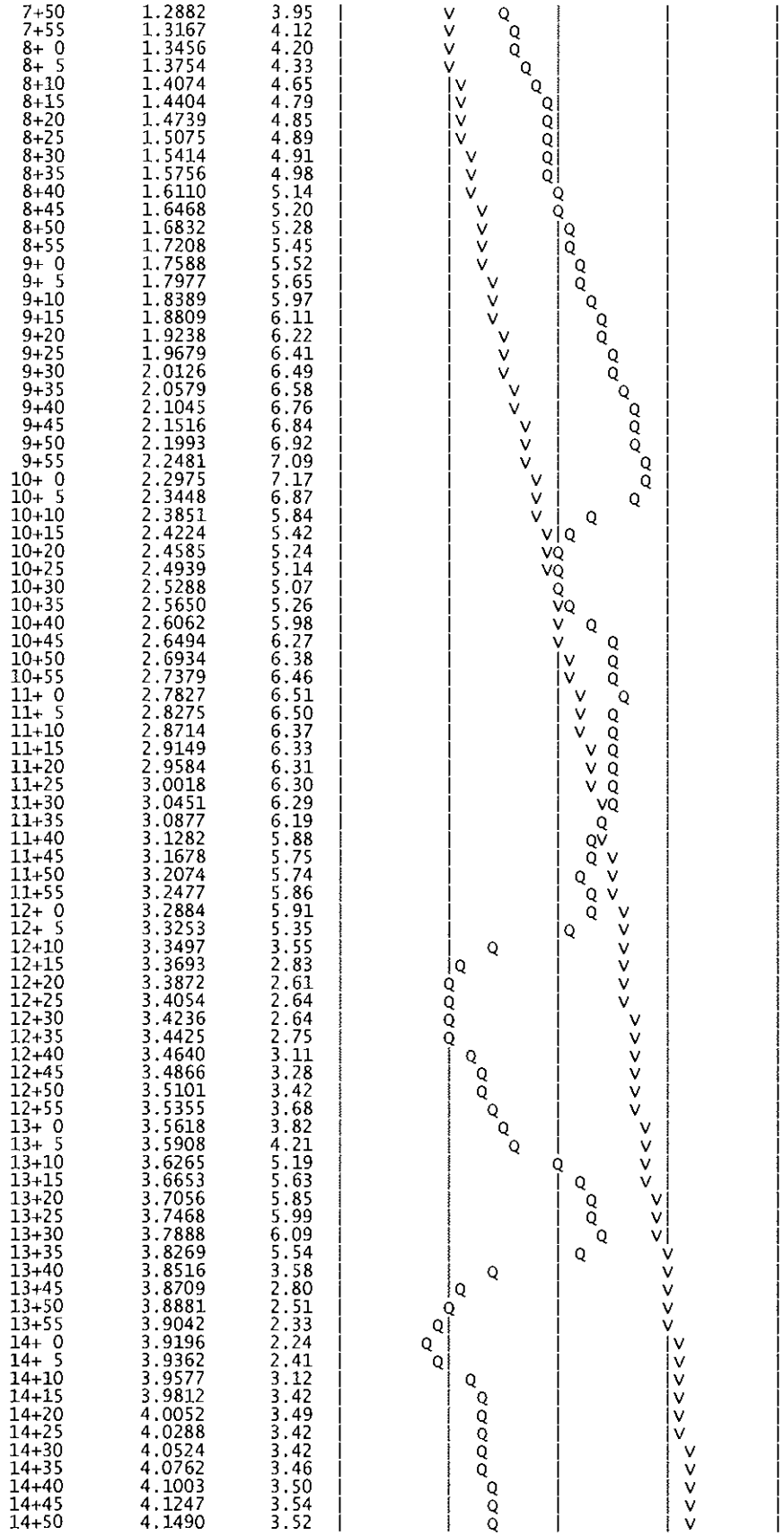
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

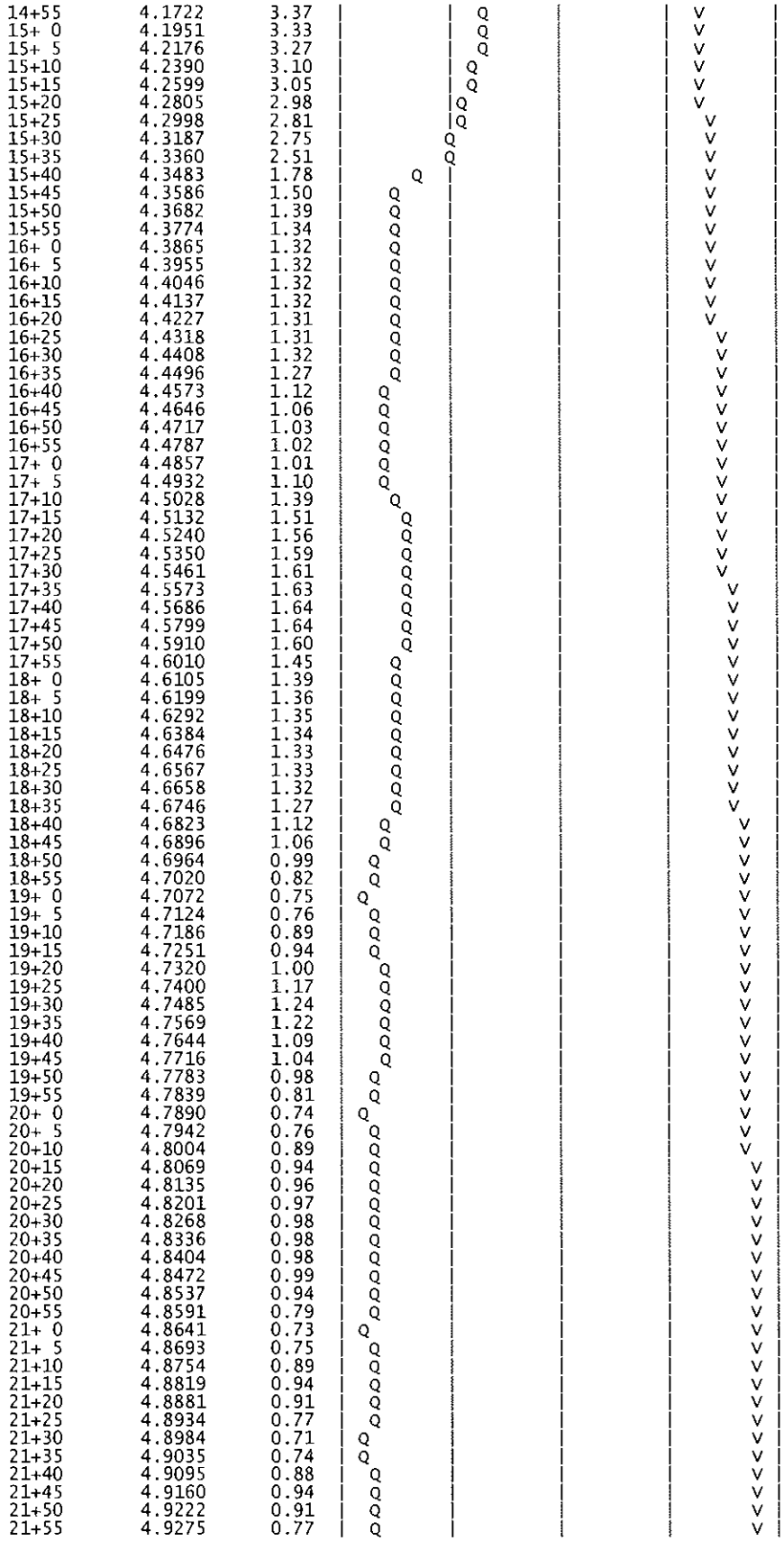
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0007	0.09	Q				
0+10	0.0034	0.40	VQ				
0+15	0.0070	0.52	V Q				
0+20	0.0112	0.62	V Q				
0+25	0.0168	0.80	V Q				
0+30	0.0229	0.88	V Q				
0+35	0.0292	0.93	V Q				
0+40	0.0358	0.95	V Q				


0+45 0.0424 0.97
0+50 0.0495 1.03
0+55 0.0577 1.18
1+ 0 0.0662 1.25
1+ 5 0.0747 1.23
1+10 0.0822 1.09
1+15 0.0894 1.04
1+20 0.0965 1.02
1+25 0.1034 1.01
1+30 0.1104 1.00
1+35 0.1172 1.00
1+40 0.1241 1.00
1+45 0.1309 0.99
1+50 0.1381 1.04
1+55 0.1463 1.19
2+ 0 0.1549 1.25
2+ 5 0.1637 1.28
2+10 0.1726 1.29
2+15 0.1815 1.30
2+20 0.1906 1.31
2+25 0.1996 1.31
2+30 0.2087 1.32
2+35 0.2181 1.37
2+40 0.2286 1.52
2+45 0.2394 1.58
2+50 0.2505 1.61
2+55 0.2617 1.62
3+ 0 0.2729 1.63
3+ 5 0.2842 1.64
3+10 0.2955 1.64
3+15 0.3069 1.65
3+20 0.3182 1.65
3+25 0.3296 1.65
3+30 0.3410 1.65
3+35 0.3523 1.65
3+40 0.3637 1.65
3+45 0.3751 1.65
3+50 0.3867 1.70
3+55 0.3995 1.85
4+ 0 0.4126 1.91
4+ 5 0.4260 1.94
4+10 0.4394 1.95
4+15 0.4529 1.96
4+20 0.4668 2.02
4+25 0.4818 2.17
4+30 0.4972 2.24
4+35 0.5128 2.27
4+40 0.5285 2.28
4+45 0.5443 2.29
4+50 0.5605 2.35
4+55 0.5777 2.50
5+ 0 0.5954 2.57
5+ 5 0.6126 2.50
5+10 0.6279 2.22
5+15 0.6424 2.10
5+20 0.6568 2.10
5+25 0.6722 2.23
5+30 0.6878 2.27
5+35 0.7039 2.34
5+40 0.7211 2.49
5+45 0.7387 2.56
5+50 0.7565 2.59
5+55 0.7745 2.61
6+ 0 0.7925 2.62
6+ 5 0.8109 2.68
6+10 0.8304 2.83
6+15 0.8504 2.90
6+20 0.8706 2.93
6+25 0.8908 2.94
6+30 0.9111 2.95
6+35 0.9319 3.01
6+40 0.9536 3.16
6+45 0.9759 3.23
6+50 0.9983 3.26
6+55 1.0208 3.27
7+ 0 1.0434 3.28
7+ 5 1.0661 3.29
7+10 1.0888 3.29
7+15 1.1115 3.30
7+20 1.1345 3.35
7+25 1.1586 3.50
7+30 1.1831 3.56
7+35 1.2082 3.63
7+40 1.2344 3.80
7+45 1.2610 3.87



7+50	1.2882	3.95	
7+55	1.3167	4.12	
8+ 0	1.3456	4.20	
8+ 5	1.3754	4.33	
8+10	1.4074	4.65	
8+15	1.4404	4.79	
8+20	1.4739	4.85	
8+25	1.5075	4.89	
8+30	1.5414	4.91	
8+35	1.5756	4.98	
8+40	1.6110	5.14	
8+45	1.6468	5.20	
8+50	1.6832	5.28	
8+55	1.7208	5.45	
9+ 0	1.7588	5.52	
9+ 5	1.7977	5.65	
9+10	1.8389	5.97	
9+15	1.8809	6.11	
9+20	1.9238	6.22	
9+25	1.9679	6.41	
9+30	2.0126	6.49	
9+35	2.0579	6.58	
9+40	2.1045	6.76	
9+45	2.1516	6.84	
9+50	2.1993	6.92	
9+55	2.2481	7.09	
10+ 0	2.2975	7.17	
10+ 5	2.3448	6.87	
10+10	2.3851	5.84	
10+15	2.4224	5.42	
10+20	2.4585	5.24	
10+25	2.4939	5.14	
10+30	2.5288	5.07	
10+35	2.5650	5.26	
10+40	2.6062	5.98	
10+45	2.6494	6.27	
10+50	2.6934	6.38	
10+55	2.7379	6.46	
11+ 0	2.7827	6.51	
11+ 5	2.8275	6.50	
11+10	2.8714	6.37	
11+15	2.9149	6.33	
11+20	2.9584	6.31	
11+25	3.0018	6.30	
11+30	3.0451	6.29	
11+35	3.0877	6.19	
11+40	3.1282	5.88	
11+45	3.1678	5.75	
11+50	3.2074	5.74	
11+55	3.2477	5.86	
12+ 0	3.2884	5.91	
12+ 5	3.3253	5.35	
12+10	3.3497	3.55	
12+15	3.3693	2.83	
12+20	3.3872	2.61	
12+25	3.4054	2.64	
12+30	3.4236	2.64	
12+35	3.4425	2.75	
12+40	3.4640	3.11	
12+45	3.4866	3.28	
12+50	3.5101	3.42	
12+55	3.5355	3.68	
13+ 0	3.5618	3.82	
13+ 5	3.5908	4.21	
13+10	3.6265	5.19	
13+15	3.6653	5.63	
13+20	3.7056	5.85	
13+25	3.7468	5.99	
13+30	3.7888	6.09	
13+35	3.8269	5.54	
13+40	3.8516	3.58	
13+45	3.8709	2.80	
13+50	3.8881	2.51	
13+55	3.9042	2.33	
14+ 0	3.9196	2.24	
14+ 5	3.9362	2.41	
14+10	3.9577	3.12	
14+15	3.9812	3.42	
14+20	4.0052	3.49	
14+25	4.0288	3.42	
14+30	4.0524	3.42	
14+35	4.0762	3.46	
14+40	4.1003	3.50	
14+45	4.1247	3.54	
14+50	4.1490	3.52	



14+55	4.1722	3.37	
15+ 0	4.1951	3.33	
15+ 5	4.2176	3.27	
15+10	4.2390	3.10	
15+15	4.2599	3.05	
15+20	4.2805	2.98	
15+25	4.2998	2.81	
15+30	4.3187	2.75	
15+35	4.3360	2.51	
15+40	4.3483	1.78	
15+45	4.3586	1.50	
15+50	4.3682	1.39	
15+55	4.3774	1.34	
16+ 0	4.3865	1.32	
16+ 5	4.3955	1.32	
16+10	4.4046	1.32	
16+15	4.4137	1.32	
16+20	4.4227	1.31	
16+25	4.4318	1.31	
16+30	4.4408	1.32	
16+35	4.4496	1.27	
16+40	4.4573	1.12	
16+45	4.4646	1.06	
16+50	4.4717	1.03	
16+55	4.4787	1.02	
17+ 0	4.4857	1.01	
17+ 5	4.4932	1.10	
17+10	4.5028	1.39	
17+15	4.5132	1.51	
17+20	4.5240	1.56	
17+25	4.5350	1.59	
17+30	4.5461	1.61	
17+35	4.5573	1.63	
17+40	4.5686	1.64	
17+45	4.5799	1.64	
17+50	4.5910	1.60	
17+55	4.6010	1.45	
18+ 0	4.6105	1.39	
18+ 5	4.6199	1.36	
18+10	4.6292	1.35	
18+15	4.6384	1.34	
18+20	4.6476	1.33	
18+25	4.6567	1.33	
18+30	4.6658	1.32	
18+35	4.6746	1.27	
18+40	4.6823	1.12	
18+45	4.6896	1.06	
18+50	4.6964	0.99	
18+55	4.7020	0.82	
19+ 0	4.7072	0.75	
19+ 5	4.7124	0.76	
19+10	4.7186	0.89	
19+15	4.7251	0.94	
19+20	4.7320	1.00	
19+25	4.7400	1.17	
19+30	4.7485	1.24	
19+35	4.7569	1.22	
19+40	4.7644	1.09	
19+45	4.7716	1.04	
19+50	4.7783	0.98	
19+55	4.7839	0.81	
20+ 0	4.7890	0.74	
20+ 5	4.7942	0.76	
20+10	4.8004	0.89	
20+15	4.8069	0.94	
20+20	4.8135	0.96	
20+25	4.8201	0.97	
20+30	4.8268	0.98	
20+35	4.8336	0.98	
20+40	4.8404	0.98	
20+45	4.8472	0.99	
20+50	4.8537	0.94	
20+55	4.8591	0.79	
21+ 0	4.8641	0.73	
21+ 5	4.8693	0.75	
21+10	4.8754	0.89	
21+15	4.8819	0.94	
21+20	4.8881	0.91	
21+25	4.8934	0.77	
21+30	4.8984	0.71	
21+35	4.9035	0.74	
21+40	4.9095	0.88	
21+45	4.9160	0.94	
21+50	4.9222	0.91	
21+55	4.9275	0.77	

22+ 0	4.9325	0.71	Q	|	|	|	V|
22+ 5	4.9376	0.74	Q	|	|	|	V|
22+10	4.9436	0.88	Q	|	|	|	V|
22+15	4.9501	0.94	Q	|	|	|	V|
22+20	4.9563	0.91	Q	|	|	|	V|
22+25	4.9616	0.77	Q	|	|	|	V|
22+30	4.9665	0.71	Q	|	|	|	V|
22+35	4.9713	0.69	Q	|	|	|	V|
22+40	4.9760	0.68	Q	|	|	|	V|
22+45	4.9807	0.67	Q	|	|	|	V|
22+50	4.9853	0.67	Q	|	|	|	V|
22+55	4.9899	0.67	Q	|	|	|	V|
23+ 0	4.9944	0.66	Q	|	|	|	V|
23+ 5	4.9990	0.66	Q	|	|	|	V|
23+10	5.0035	0.66	Q	|	|	|	V|
23+15	5.0081	0.66	Q	|	|	|	V|
23+20	5.0126	0.66	Q	|	|	|	V|
23+25	5.0172	0.66	Q	|	|	|	V|
23+30	5.0217	0.66	Q	|	|	|	V|
23+35	5.0262	0.66	Q	|	|	|	V|
23+40	5.0308	0.66	Q	|	|	|	V|
23+45	5.0353	0.66	Q	|	|	|	V|
23+50	5.0399	0.66	Q	|	|	|	V|
23+55	5.0444	0.66	Q	|	|	|	V|
24+ 0	5.0490	0.66	Q	|	|	|	V|
24+ 5	5.0529	0.57	Q	|	|	|	V|
24+10	5.0547	0.26	Q	|	|	|	V|
24+15	5.0556	0.14	Q	|	|	|	V|
24+20	5.0562	0.09	Q	|	|	|	V|
24+25	5.0566	0.06	Q	|	|	|	V|
24+30	5.0569	0.04	Q	|	|	|	V|
24+35	5.0570	0.02	Q	|	|	|	V|
24+40	5.0571	0.01	Q	|	|	|	V|
24+45	5.0571	0.01	Q	|	|	|	V|

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2004, Version 7.0
                Study date  05/12/08 File: 0727S002242.out

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------------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format


------------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 2-YEAR

------------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            1.70                106.08

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            4.25                265.20

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.700(In)
Area Averaged 100-Year Rainfall =    4.250(In)

Point rain (area averaged) =    1.700(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    1.700(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    56.400           56.00          0.900
     6.000           86.00          0.000
 Total Area Entered =     62.40(Ac.)


RI     RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%      F
AMC2 AMC-1     (In/Hr)     (Dec.%)      (In/Hr)       (Dec.)     (In/Hr)
56.0  36.0      0.706      0.900         0.134        0.904      0.121
86.0  71.6      0.343      0.000         0.343        0.096      0.033
                                                   Sum (F) =    0.154
Area averaged mean soil loss (F) (In/Hr) =  0.154
Minimum soil loss rate ((In/Hr)) =  0.077
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
------------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000	Sum= 62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.014	0.273	0.002	0.01
2	0.17	0.07	0.014	0.272	0.002	0.01
3	0.25	0.07	0.014	0.271	0.002	0.01
4	0.33	0.10	0.020	0.270	0.004	0.02
5	0.42	0.10	0.020	0.269	0.004	0.02
6	0.50	0.10	0.020	0.268	0.004	0.02
7	0.58	0.10	0.020	0.267	0.004	0.02
8	0.67	0.10	0.020	0.266	0.004	0.02
9	0.75	0.10	0.020	0.265	0.004	0.02
10	0.83	0.13	0.027	0.264	0.005	0.02
11	0.92	0.13	0.027	0.263	0.005	0.02
12	1.00	0.13	0.027	0.262	0.005	0.02
13	1.08	0.10	0.020	0.261	0.004	0.02
14	1.17	0.10	0.020	0.260	0.004	0.02
15	1.25	0.10	0.020	0.259	0.004	0.02
16	1.33	0.10	0.020	0.258	0.004	0.02
17	1.42	0.10	0.020	0.257	0.004	0.02
18	1.50	0.10	0.020	0.256	0.004	0.02
19	1.58	0.10	0.020	0.255	0.004	0.02
20	1.67	0.10	0.020	0.254	0.004	0.02
21	1.75	0.10	0.020	0.253	0.004	0.02
22	1.83	0.13	0.027	0.252	0.005	0.02
23	1.92	0.13	0.027	0.251	0.005	0.02
24	2.00	0.13	0.027	0.250	0.005	0.02
25	2.08	0.13	0.027	0.249	0.005	0.02
26	2.17	0.13	0.027	0.248	0.005	0.02
27	2.25	0.13	0.027	0.247	0.005	0.02
28	2.33	0.13	0.027	0.246	0.005	0.02
29	2.42	0.13	0.027	0.245	0.005	0.02
30	2.50	0.13	0.027	0.244	0.005	0.02
31	2.58	0.17	0.034	0.243	0.006	0.03
32	2.67	0.17	0.034	0.242	0.006	0.03
33	2.75	0.17	0.034	0.241	0.006	0.03
34	2.83	0.17	0.034	0.240	0.006	0.03
35	2.92	0.17	0.034	0.239	0.006	0.03
36	3.00	0.17	0.034	0.238	0.006	0.03
37	3.08	0.17	0.034	0.237	0.006	0.03
38	3.17	0.17	0.034	0.236	0.006	0.03
39	3.25	0.17	0.034	0.235	0.006	0.03
40	3.33	0.17	0.034	0.234	0.006	0.03
41	3.42	0.17	0.034	0.233	0.006	0.03
42	3.50	0.17	0.034	0.232	0.006	0.03
43	3.58	0.17	0.034	0.231	0.006	0.03
44	3.67	0.17	0.034	0.230	0.006	0.03
45	3.75	0.17	0.034	0.229	0.006	0.03
46	3.83	0.20	0.041	0.228	0.007	0.03
47	3.92	0.20	0.041	0.227	0.007	0.03
48	4.00	0.20	0.041	0.226	0.007	0.03
49	4.08	0.20	0.041	0.225	0.007	0.03
50	4.17	0.20	0.041	0.224	0.007	0.03
51	4.25	0.20	0.041	0.223	0.007	0.03
52	4.33	0.23	0.048	0.222	0.009	0.04
53	4.42	0.23	0.048	0.221	0.009	0.04
54	4.50	0.23	0.048	0.220	0.009	0.04
55	4.58	0.23	0.048	0.219	0.009	0.04
56	4.67	0.23	0.048	0.218	0.009	0.04
57	4.75	0.23	0.048	0.217	0.009	0.04
58	4.83	0.27	0.054	0.216	0.010	0.04
59	4.92	0.27	0.054	0.216	0.010	0.04
60	5.00	0.27	0.054	0.215	0.010	0.04
61	5.08	0.20	0.041	0.214	0.007	0.03
62	5.17	0.20	0.041	0.213	0.007	0.03
63	5.25	0.20	0.041	0.212	0.007	0.03

64	5.33	0.23	0.048	0.211	0.009	0.04
65	5.42	0.23	0.048	0.210	0.009	0.04
66	5.50	0.23	0.048	0.209	0.009	0.04
67	5.58	0.27	0.054	0.208	0.010	0.04
68	5.67	0.27	0.054	0.207	0.010	0.04
69	5.75	0.27	0.054	0.206	0.010	0.04
70	5.83	0.27	0.054	0.205	0.010	0.04
71	5.92	0.27	0.054	0.204	0.010	0.04
72	6.00	0.27	0.054	0.204	0.010	0.04
73	6.08	0.30	0.061	0.203	0.011	0.05
74	6.17	0.30	0.061	0.202	0.011	0.05
75	6.25	0.30	0.061	0.201	0.011	0.05
76	6.33	0.30	0.061	0.200	0.011	0.05
77	6.42	0.30	0.061	0.199	0.011	0.05
78	6.50	0.30	0.061	0.198	0.011	0.05
79	6.58	0.33	0.068	0.197	0.012	0.06
80	6.67	0.33	0.068	0.196	0.012	0.06
81	6.75	0.33	0.068	0.196	0.012	0.06
82	6.83	0.33	0.068	0.195	0.012	0.06
83	6.92	0.33	0.068	0.194	0.012	0.06
84	7.00	0.33	0.068	0.193	0.012	0.06
85	7.08	0.33	0.068	0.192	0.012	0.06
86	7.17	0.33	0.068	0.191	0.012	0.06
87	7.25	0.33	0.068	0.190	0.012	0.06
88	7.33	0.37	0.075	0.189	0.013	0.06
89	7.42	0.37	0.075	0.189	0.013	0.06
90	7.50	0.37	0.075	0.188	0.013	0.06
91	7.58	0.40	0.082	0.187	0.015	0.07
92	7.67	0.40	0.082	0.186	0.015	0.07
93	7.75	0.40	0.082	0.185	0.015	0.07
94	7.83	0.43	0.088	0.184	0.016	0.07
95	7.92	0.43	0.088	0.183	0.016	0.07
96	8.00	0.43	0.088	0.183	0.016	0.07
97	8.08	0.50	0.102	0.182	0.018	0.08
98	8.17	0.50	0.102	0.181	0.018	0.08
99	8.25	0.50	0.102	0.180	0.018	0.08
100	8.33	0.50	0.102	0.179	0.018	0.08
101	8.42	0.50	0.102	0.178	0.018	0.08
102	8.50	0.50	0.102	0.177	0.018	0.08
103	8.58	0.53	0.109	0.177	0.020	0.09
104	8.67	0.53	0.109	0.176	0.020	0.09
105	8.75	0.53	0.109	0.175	0.020	0.09
106	8.83	0.57	0.116	0.174	0.021	0.09
107	8.92	0.57	0.116	0.173	0.021	0.09
108	9.00	0.57	0.116	0.173	0.021	0.09
109	9.08	0.63	0.129	0.172	0.023	0.11
110	9.17	0.63	0.129	0.171	0.023	0.11
111	9.25	0.63	0.129	0.170	0.023	0.11
112	9.33	0.67	0.136	0.169	0.024	0.11
113	9.42	0.67	0.136	0.168	0.024	0.11
114	9.50	0.67	0.136	0.168	0.024	0.11
115	9.58	0.70	0.143	0.167	0.026	0.12
116	9.67	0.70	0.143	0.166	0.026	0.12
117	9.75	0.70	0.143	0.165	0.026	0.12
118	9.83	0.73	0.150	0.164	0.027	0.12
119	9.92	0.73	0.150	0.164	0.027	0.12
120	10.00	0.73	0.150	0.163	0.027	0.12
121	10.08	0.50	0.102	0.162	0.018	0.08
122	10.17	0.50	0.102	0.161	0.018	0.08
123	10.25	0.50	0.102	0.161	0.018	0.08
124	10.33	0.50	0.102	0.160	0.018	0.08
125	10.42	0.50	0.102	0.159	0.018	0.08
126	10.50	0.50	0.102	0.158	0.018	0.08
127	10.58	0.67	0.136	0.157	0.024	0.11
128	10.67	0.67	0.136	0.157	0.024	0.11
129	10.75	0.67	0.136	0.156	0.024	0.11
130	10.83	0.67	0.136	0.155	0.024	0.11
131	10.92	0.67	0.136	0.154	0.024	0.11
132	11.00	0.67	0.136	0.154	0.024	0.11
133	11.08	0.63	0.129	0.153	0.023	0.11
134	11.17	0.63	0.129	0.152	0.023	0.11
135	11.25	0.63	0.129	0.151	0.023	0.11
136	11.33	0.63	0.129	0.151	0.023	0.11
137	11.42	0.63	0.129	0.150	0.023	0.11
138	11.50	0.63	0.129	0.149	0.023	0.11
139	11.58	0.57	0.116	0.148	0.021	0.09
140	11.67	0.57	0.116	0.148	0.021	0.09
141	11.75	0.57	0.116	0.147	0.021	0.09
142	11.83	0.60	0.122	0.146	0.022	0.10
143	11.92	0.60	0.122	0.145	0.022	0.10
144	12.00	0.60	0.122	0.145	0.022	0.10
145	12.08	0.83	0.170	0.144	---	0.03
146	12.17	0.83	0.170	0.143	---	0.03
147	12.25	0.83	0.170	0.143	---	0.03
148	12.33	0.87	0.177	0.142	---	0.03

149	12.42	0.87	0.177	0.141	---	0.04
150	12.50	0.87	0.177	0.140	---	0.04
151	12.58	0.93	0.190	0.140	---	0.05
152	12.67	0.93	0.190	0.139	---	0.05
153	12.75	0.93	0.190	0.138	---	0.05
154	12.83	0.97	0.197	0.138	---	0.06
155	12.92	0.97	0.197	0.137	---	0.06
156	13.00	0.97	0.197	0.136	---	0.06
157	13.08	1.13	0.231	0.136	---	0.10
158	13.17	1.13	0.231	0.135	---	0.10
159	13.25	1.13	0.231	0.134	---	0.10
160	13.33	1.13	0.231	0.133	---	0.10
161	13.42	1.13	0.231	0.133	---	0.10
162	13.50	1.13	0.231	0.132	---	0.10
163	13.58	0.77	0.156	0.131	---	0.02
164	13.67	0.77	0.156	0.131	---	0.03
165	13.75	0.77	0.156	0.130	---	0.03
166	13.83	0.77	0.156	0.129	---	0.03
167	13.92	0.77	0.156	0.129	---	0.03
168	14.00	0.77	0.156	0.128	---	0.03
169	14.08	0.90	0.184	0.127	---	0.06
170	14.17	0.90	0.184	0.127	---	0.06
171	14.25	0.90	0.184	0.126	---	0.06
172	14.33	0.87	0.177	0.126	---	0.05
173	14.42	0.87	0.177	0.125	---	0.05
174	14.50	0.87	0.177	0.124	---	0.05
175	14.58	0.87	0.177	0.124	---	0.05
176	14.67	0.87	0.177	0.123	---	0.05
177	14.75	0.87	0.177	0.122	---	0.05
178	14.83	0.83	0.170	0.122	---	0.05
179	14.92	0.83	0.170	0.121	---	0.05
180	15.00	0.83	0.170	0.120	---	0.05
181	15.08	0.80	0.163	0.120	---	0.04
182	15.17	0.80	0.163	0.119	---	0.04
183	15.25	0.80	0.163	0.119	---	0.04
184	15.33	0.77	0.156	0.118	---	0.04
185	15.42	0.77	0.156	0.117	---	0.04
186	15.50	0.77	0.156	0.117	---	0.04
187	15.58	0.63	0.129	0.116	---	0.01
188	15.67	0.63	0.129	0.116	---	0.01
189	15.75	0.63	0.129	0.115	---	0.01
190	15.83	0.63	0.129	0.114	---	0.01
191	15.92	0.63	0.129	0.114	---	0.02
192	16.00	0.63	0.129	0.113	---	0.02
193	16.08	0.13	0.027	0.113	0.005	0.02
194	16.17	0.13	0.027	0.112	0.005	0.02
195	16.25	0.13	0.027	0.112	0.005	0.02
196	16.33	0.13	0.027	0.111	0.005	0.02
197	16.42	0.13	0.027	0.110	0.005	0.02
198	16.50	0.13	0.027	0.110	0.005	0.02
199	16.58	0.10	0.020	0.109	0.004	0.02
200	16.67	0.10	0.020	0.109	0.004	0.02
201	16.75	0.10	0.020	0.108	0.004	0.02
202	16.83	0.10	0.020	0.108	0.004	0.02
203	16.92	0.10	0.020	0.107	0.004	0.02
204	17.00	0.10	0.020	0.107	0.004	0.02
205	17.08	0.17	0.034	0.106	0.006	0.03
206	17.17	0.17	0.034	0.105	0.006	0.03
207	17.25	0.17	0.034	0.105	0.006	0.03
208	17.33	0.17	0.034	0.104	0.006	0.03
209	17.42	0.17	0.034	0.104	0.006	0.03
210	17.50	0.17	0.034	0.103	0.006	0.03
211	17.58	0.17	0.034	0.103	0.006	0.03
212	17.67	0.17	0.034	0.102	0.006	0.03
213	17.75	0.17	0.034	0.102	0.006	0.03
214	17.83	0.13	0.027	0.101	0.005	0.02
215	17.92	0.13	0.027	0.101	0.005	0.02
216	18.00	0.13	0.027	0.100	0.005	0.02
217	18.08	0.13	0.027	0.100	0.005	0.02
218	18.17	0.13	0.027	0.099	0.005	0.02
219	18.25	0.13	0.027	0.099	0.005	0.02
220	18.33	0.13	0.027	0.098	0.005	0.02
221	18.42	0.13	0.027	0.098	0.005	0.02
222	18.50	0.13	0.027	0.097	0.005	0.02
223	18.58	0.10	0.020	0.097	0.004	0.02
224	18.67	0.10	0.020	0.096	0.004	0.02
225	18.75	0.10	0.020	0.096	0.004	0.02
226	18.83	0.07	0.014	0.096	0.002	0.01
227	18.92	0.07	0.014	0.095	0.002	0.01
228	19.00	0.07	0.014	0.095	0.002	0.01
229	19.08	0.10	0.020	0.094	0.004	0.02
230	19.17	0.10	0.020	0.094	0.004	0.02
231	19.25	0.10	0.020	0.093	0.004	0.02
232	19.33	0.13	0.027	0.093	0.005	0.02
233	19.42	0.13	0.027	0.092	0.005	0.02

234	19.50	0.13	0.027	0.092	0.005	0.02
235	19.58	0.10	0.020	0.092	0.004	0.02
236	19.67	0.10	0.020	0.091	0.004	0.02
237	19.75	0.10	0.020	0.091	0.004	0.02
238	19.83	0.07	0.014	0.090	0.002	0.01
239	19.92	0.07	0.014	0.090	0.002	0.01
240	20.00	0.07	0.014	0.090	0.002	0.01
241	20.08	0.10	0.020	0.089	0.004	0.02
242	20.17	0.10	0.020	0.089	0.004	0.02
243	20.25	0.10	0.020	0.088	0.004	0.02
244	20.33	0.10	0.020	0.088	0.004	0.02
245	20.42	0.10	0.020	0.088	0.004	0.02
246	20.50	0.10	0.020	0.087	0.004	0.02
247	20.58	0.10	0.020	0.087	0.004	0.02
248	20.67	0.10	0.020	0.087	0.004	0.02
249	20.75	0.10	0.020	0.086	0.004	0.02
250	20.83	0.07	0.014	0.086	0.002	0.01
251	20.92	0.07	0.014	0.085	0.002	0.01
252	21.00	0.07	0.014	0.085	0.002	0.01
253	21.08	0.10	0.020	0.085	0.004	0.02
254	21.17	0.10	0.020	0.084	0.004	0.02
255	21.25	0.10	0.020	0.084	0.004	0.02
256	21.33	0.07	0.014	0.084	0.002	0.01
257	21.42	0.07	0.014	0.083	0.002	0.01
258	21.50	0.07	0.014	0.083	0.002	0.01
259	21.58	0.10	0.020	0.083	0.004	0.02
260	21.67	0.10	0.020	0.083	0.004	0.02
261	21.75	0.10	0.020	0.082	0.004	0.02
262	21.83	0.07	0.014	0.082	0.002	0.01
263	21.92	0.07	0.014	0.082	0.002	0.01
264	22.00	0.07	0.014	0.081	0.002	0.01
265	22.08	0.10	0.020	0.081	0.004	0.02
266	22.17	0.10	0.020	0.081	0.004	0.02
267	22.25	0.10	0.020	0.081	0.004	0.02
268	22.33	0.07	0.014	0.080	0.002	0.01
269	22.42	0.07	0.014	0.080	0.002	0.01
270	22.50	0.07	0.014	0.080	0.002	0.01
271	22.58	0.07	0.014	0.080	0.002	0.01
272	22.67	0.07	0.014	0.079	0.002	0.01
273	22.75	0.07	0.014	0.079	0.002	0.01
274	22.83	0.07	0.014	0.079	0.002	0.01
275	22.92	0.07	0.014	0.079	0.002	0.01
276	23.00	0.07	0.014	0.079	0.002	0.01
277	23.08	0.07	0.014	0.078	0.002	0.01
278	23.17	0.07	0.014	0.078	0.002	0.01
279	23.25	0.07	0.014	0.078	0.002	0.01
280	23.33	0.07	0.014	0.078	0.002	0.01
281	23.42	0.07	0.014	0.078	0.002	0.01
282	23.50	0.07	0.014	0.078	0.002	0.01
283	23.58	0.07	0.014	0.078	0.002	0.01
284	23.67	0.07	0.014	0.077	0.002	0.01
285	23.75	0.07	0.014	0.077	0.002	0.01
286	23.83	0.07	0.014	0.077	0.002	0.01
287	23.92	0.07	0.014	0.077	0.002	0.01
288	24.00	0.07	0.014	0.077	0.002	0.01
	Sum =	100.0			Sum =	12.1

Flood volume = Effective rainfall 1.01(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 5.2(Ac.Ft)
Total soil loss = 0.69(In)
Total soil loss = 3.601(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 228160.2 Cubic Feet
Total soil loss = 156863.2 Cubic Feet

Peak flow rate of this hydrograph = 7.652(CFS)

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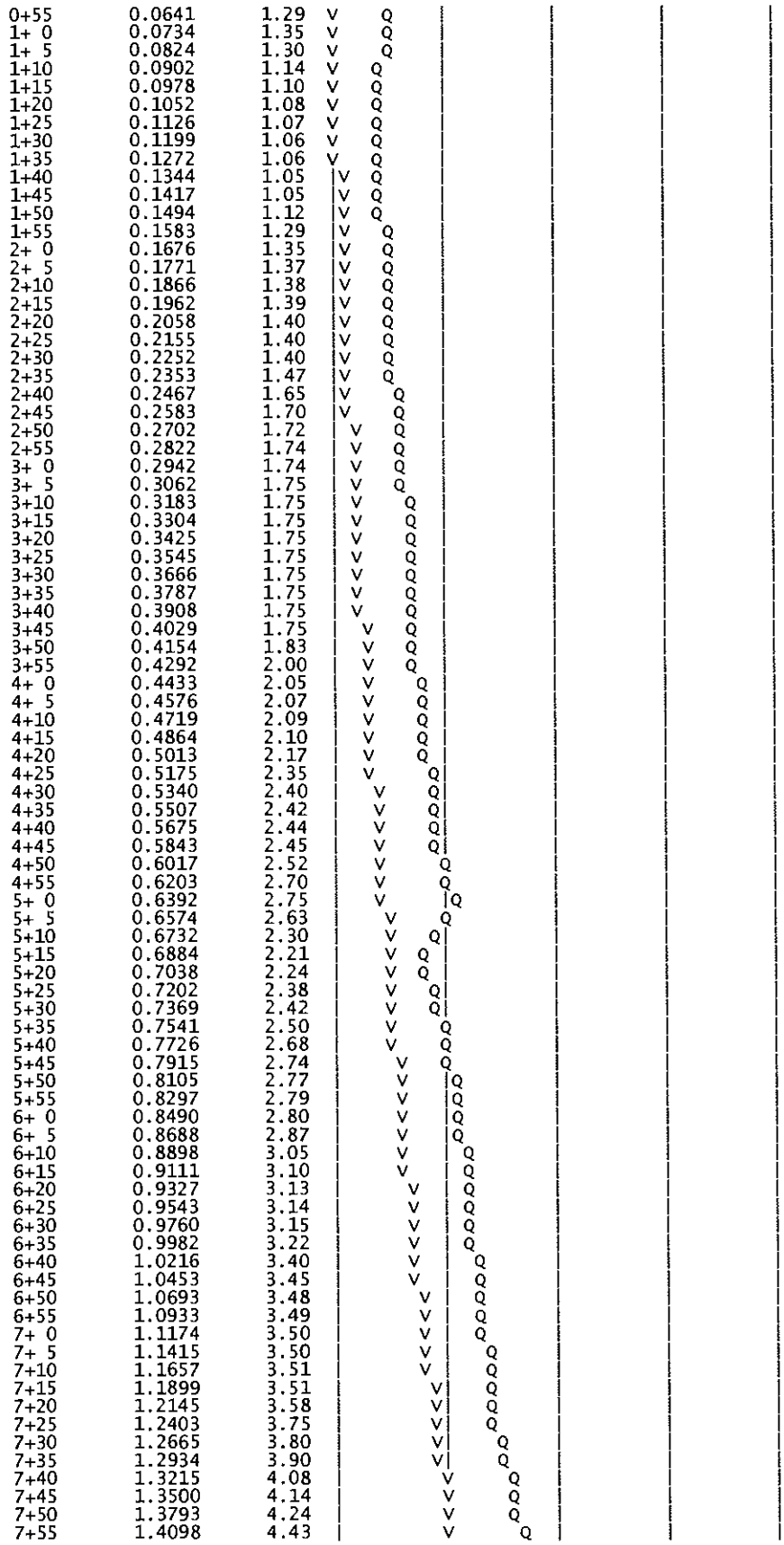
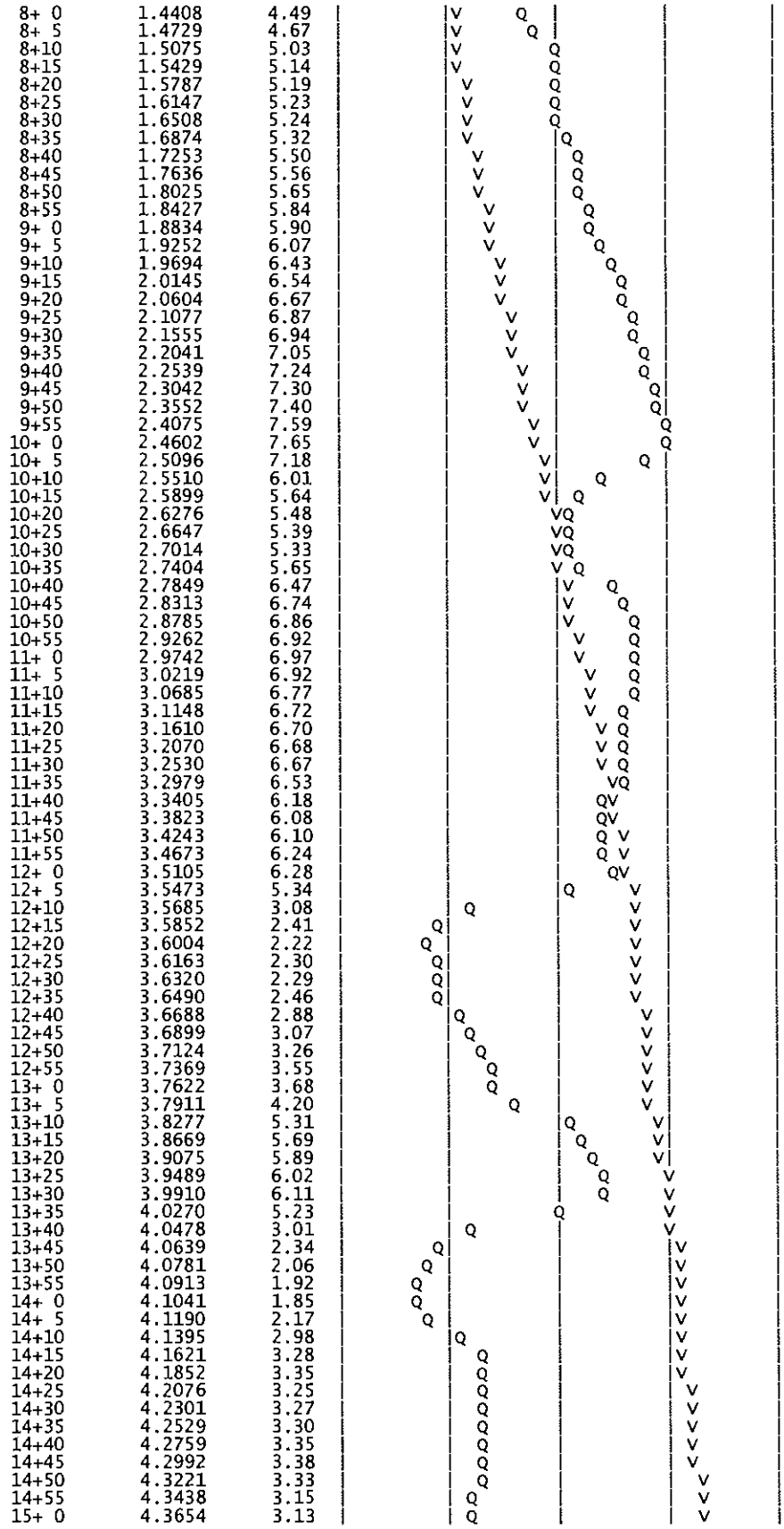
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

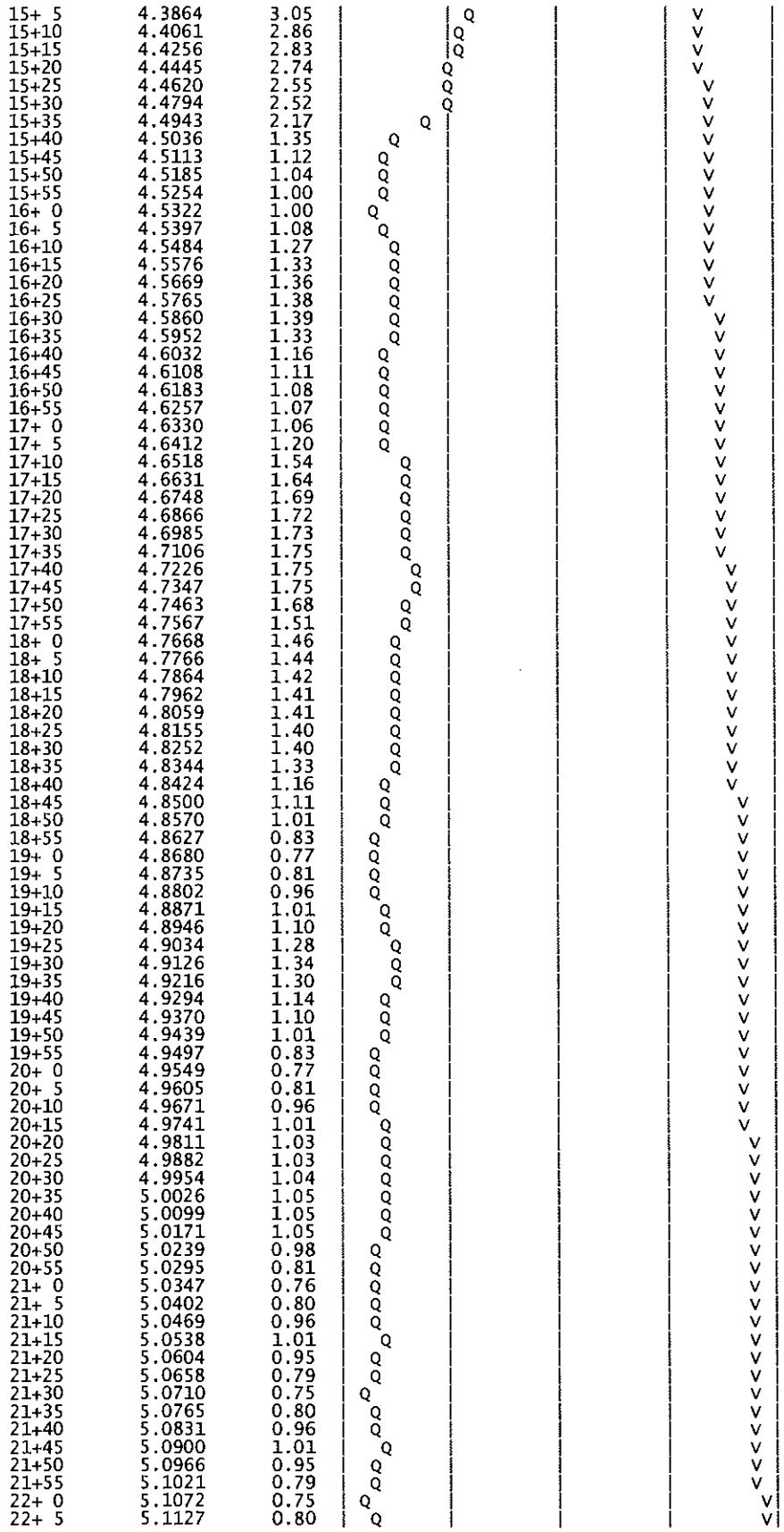
Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0010	0.14	Q	|	|	|	|
0+10	0.0043	0.48	VQ	|	|	|	|
0+15	0.0084	0.59	V Q	|	|	|	|
0+20	0.0133	0.71	V Q	|	|	|	|
0+25	0.0195	0.91	V Q	|	|	|	|
0+30	0.0262	0.98	V Q	|	|	|	|
0+35	0.0332	1.01	V Q	|	|	|	|
0+40	0.0403	1.03	V Q	|	|	|	|
0+45	0.0475	1.04	V Q	|	|	|	|
0+50	0.0552	1.12	V Q	|	|	|	|



0+55	0.0641	1.29	V Q
1+ 0	0.0734	1.35	V Q
1+ 5	0.0824	1.30	V Q
1+10	0.0902	1.14	V Q
1+15	0.0978	1.10	V Q
1+20	0.1052	1.08	V Q
1+25	0.1126	1.07	V Q
1+30	0.1199	1.06	V Q
1+35	0.1272	1.06	V Q
1+40	0.1344	1.05	|V Q
1+45	0.1417	1.05	|V Q
1+50	0.1494	1.12	|V Q
1+55	0.1583	1.29	|V Q
2+ 0	0.1676	1.35	|V Q
2+ 5	0.1771	1.37	|V Q
2+10	0.1866	1.38	|V Q
2+15	0.1962	1.39	|V Q
2+20	0.2058	1.40	|V Q
2+25	0.2155	1.40	|V Q
2+30	0.2252	1.40	|V Q
2+35	0.2353	1.47	|V Q
2+40	0.2467	1.65	|V Q
2+45	0.2583	1.70	|V Q
2+50	0.2702	1.72	| V Q
2+55	0.2822	1.74	| V Q
3+ 0	0.2942	1.74	| V Q
3+ 5	0.3062	1.75	| V Q
3+10	0.3183	1.75	| V Q
3+15	0.3304	1.75	| V Q
3+20	0.3425	1.75	| V Q
3+25	0.3545	1.75	| V Q
3+30	0.3666	1.75	| V Q
3+35	0.3787	1.75	| V Q
3+40	0.3908	1.75	| V Q
3+45	0.4029	1.75	| V Q
3+50	0.4154	1.83	| V Q
3+55	0.4292	2.00	| V Q
4+ 0	0.4433	2.05	| V Q
4+ 5	0.4576	2.07	| V Q
4+10	0.4719	2.09	| V Q
4+15	0.4864	2.10	| V Q
4+20	0.5013	2.17	| V Q
4+25	0.5175	2.35	| V Q
4+30	0.5340	2.40	| V Q
4+35	0.5507	2.42	| V Q
4+40	0.5675	2.44	| V Q
4+45	0.5843	2.45	| V Q
4+50	0.6017	2.52	| V Q
4+55	0.6203	2.70	| V Q
5+ 0	0.6392	2.75	| V |Q
5+ 5	0.6574	2.63	| V Q
5+10	0.6732	2.30	| V Q |
5+15	0.6884	2.21	| V Q |
5+20	0.7038	2.24	| V Q |
5+25	0.7202	2.38	| V Q |
5+30	0.7369	2.42	| V Q |
5+35	0.7541	2.50	| V Q
5+40	0.7726	2.68	| V Q
5+45	0.7915	2.74	| V Q
5+50	0.8105	2.77	| V |Q
5+55	0.8297	2.79	| V |Q
6+ 0	0.8490	2.80	| V |Q
6+ 5	0.8688	2.87	| V |Q
6+10	0.8898	3.05	| V | Q
6+15	0.9111	3.10	| V | Q
6+20	0.9327	3.13	| V | Q
6+25	0.9543	3.14	| V | Q
6+30	0.9760	3.15	| V | Q
6+35	0.9982	3.22	| V | Q
6+40	1.0216	3.40	| V | Q
6+45	1.0453	3.45	| V | Q
6+50	1.0693	3.48	| V | Q
6+55	1.0933	3.49	| V | Q
7+ 0	1.1174	3.50	| V | Q
7+ 5	1.1415	3.50	| V | Q
7+10	1.1657	3.51	| V | Q
7+15	1.1899	3.51	| V | Q
7+20	1.2145	3.58	| V | Q
7+25	1.2403	3.75	| V | Q
7+30	1.2665	3.80	| V | Q
7+35	1.2934	3.90	| V | Q
7+40	1.3215	4.08	| V Q
7+45	1.3500	4.14	| V Q
7+50	1.3793	4.24	| V Q
7+55	1.4098	4.43	| V Q |



8+ 0	1.4408	4.49	
8+ 5	1.4729	4.67	
8+10	1.5075	5.03	
8+15	1.5429	5.14	
8+20	1.5787	5.19	
8+25	1.6147	5.23	
8+30	1.6508	5.24	
8+35	1.6874	5.32	
8+40	1.7253	5.50	
8+45	1.7636	5.56	
8+50	1.8025	5.65	
8+55	1.8427	5.84	
9+ 0	1.8834	5.90	
9+ 5	1.9252	6.07	
9+10	1.9694	6.43	
9+15	2.0145	6.54	
9+20	2.0604	6.67	
9+25	2.1077	6.87	
9+30	2.1555	6.94	
9+35	2.2041	7.05	
9+40	2.2539	7.24	
9+45	2.3042	7.30	
9+50	2.3552	7.40	
9+55	2.4075	7.59	
10+ 0	2.4602	7.65	
10+ 5	2.5096	7.18	
10+10	2.5510	6.01	
10+15	2.5899	5.64	
10+20	2.6276	5.48	
10+25	2.6647	5.39	
10+30	2.7014	5.33	
10+35	2.7404	5.65	
10+40	2.7849	6.47	
10+45	2.8313	6.74	
10+50	2.8785	6.86	
10+55	2.9262	6.92	
11+ 0	2.9742	6.97	
11+ 5	3.0219	6.92	
11+10	3.0685	6.77	
11+15	3.1148	6.72	
11+20	3.1610	6.70	
11+25	3.2070	6.68	
11+30	3.2530	6.67	
11+35	3.2979	6.53	
11+40	3.3405	6.18	
11+45	3.3823	6.08	
11+50	3.4243	6.10	
11+55	3.4673	6.24	
12+ 0	3.5105	6.28	
12+ 5	3.5473	5.34	
12+10	3.5685	3.08	
12+15	3.5852	2.41	
12+20	3.6004	2.22	
12+25	3.6163	2.30	
12+30	3.6320	2.29	
12+35	3.6490	2.46	
12+40	3.6688	2.88	
12+45	3.6899	3.07	
12+50	3.7124	3.26	
12+55	3.7369	3.55	
13+ 0	3.7622	3.68	
13+ 5	3.7911	4.20	
13+10	3.8277	5.31	
13+15	3.8669	5.69	
13+20	3.9075	5.89	
13+25	3.9489	6.02	
13+30	3.9910	6.11	
13+35	4.0270	5.23	
13+40	4.0478	3.01	
13+45	4.0639	2.34	
13+50	4.0781	2.06	
13+55	4.0913	1.92	
14+ 0	4.1041	1.85	
14+ 5	4.1190	2.17	
14+10	4.1395	2.98	
14+15	4.1621	3.28	
14+20	4.1852	3.35	
14+25	4.2076	3.25	
14+30	4.2301	3.27	
14+35	4.2529	3.30	
14+40	4.2759	3.35	
14+45	4.2992	3.38	
14+50	4.3221	3.33	
14+55	4.3438	3.15	
15+ 0	4.3654	3.13	



15+ 5	4.3864	3.05	
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15+15	4.4256	2.83	
15+20	4.4445	2.74	
15+25	4.4620	2.55	
15+30	4.4794	2.52	
15+35	4.4943	2.17	
15+40	4.5036	1.35	
15+45	4.5113	1.12	
15+50	4.5185	1.04	
15+55	4.5254	1.00	
16+ 0	4.5322	1.00	
16+ 5	4.5397	1.08	
16+10	4.5484	1.27	
16+15	4.5576	1.33	
16+20	4.5669	1.36	
16+25	4.5765	1.38	
16+30	4.5860	1.39	
16+35	4.5952	1.33	
16+40	4.6032	1.16	
16+45	4.6108	1.11	
16+50	4.6183	1.08	
16+55	4.6257	1.07	
17+ 0	4.6330	1.06	
17+ 5	4.6412	1.20	
17+10	4.6518	1.54	
17+15	4.6631	1.64	
17+20	4.6748	1.69	
17+25	4.6866	1.72	
17+30	4.6985	1.73	
17+35	4.7106	1.75	
17+40	4.7226	1.75	
17+45	4.7347	1.75	
17+50	4.7463	1.68	
17+55	4.7567	1.51	
18+ 0	4.7668	1.46	
18+ 5	4.7766	1.44	
18+10	4.7864	1.42	
18+15	4.7962	1.41	
18+20	4.8059	1.41	
18+25	4.8155	1.40	
18+30	4.8252	1.40	
18+35	4.8344	1.33	
18+40	4.8424	1.16	
18+45	4.8500	1.11	
18+50	4.8570	1.01	
18+55	4.8627	0.83	
19+ 0	4.8680	0.77	
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19+10	4.8802	0.96	
19+15	4.8871	1.01	
19+20	4.8946	1.10	
19+25	4.9034	1.28	
19+30	4.9126	1.34	
19+35	4.9216	1.30	
19+40	4.9294	1.14	
19+45	4.9370	1.10	
19+50	4.9439	1.01	
19+55	4.9497	0.83	
20+ 0	4.9549	0.77	
20+ 5	4.9605	0.81	
20+10	4.9671	0.96	
20+15	4.9741	1.01	
20+20	4.9811	1.03	
20+25	4.9882	1.03	
20+30	4.9954	1.04	
20+35	5.0026	1.05	
20+40	5.0099	1.05	
20+45	5.0171	1.05	
20+50	5.0239	0.98	
20+55	5.0295	0.81	
21+ 0	5.0347	0.76	
21+ 5	5.0402	0.80	
21+10	5.0469	0.96	
21+15	5.0538	1.01	
21+20	5.0604	0.95	
21+25	5.0658	0.79	
21+30	5.0710	0.75	
21+35	5.0765	0.80	
21+40	5.0831	0.96	
21+45	5.0900	1.01	
21+50	5.0966	0.95	
21+55	5.1021	0.79	
22+ 0	5.1072	0.75	
22+ 5	5.1127	0.80	

22+10	5.1193	0.96	Q				V
22+15	5.1263	1.01		Q			V
22+20	5.1328	0.95		Q			V
22+25	5.1383	0.79		Q			V
22+30	5.1434	0.75	Q				V
22+35	5.1485	0.73	Q				V
22+40	5.1534	0.72	Q				V
22+45	5.1583	0.71	Q				V
22+50	5.1632	0.71	Q				V
22+55	5.1680	0.70	Q				V
23+ 0	5.1728	0.70	Q				V
23+ 5	5.1777	0.70	Q				V
23+10	5.1825	0.70	Q				V
23+15	5.1873	0.70	Q				V
23+20	5.1922	0.70	Q				V
23+25	5.1970	0.70	Q				V
23+30	5.2018	0.70	Q				V
23+35	5.2067	0.70	Q				V
23+40	5.2115	0.70	Q				V
23+45	5.2163	0.70	Q				V
23+50	5.2212	0.70	Q				V
23+55	5.2260	0.70	Q				V
24+ 0	5.2308	0.70	Q				V
24+ 5	5.2347	0.56	Q				V
24+10	5.2362	0.22	Q				V
24+15	5.2370	0.11	Q				V
24+20	5.2374	0.06	Q				V
24+25	5.2376	0.04	Q				V
24+30	5.2378	0.02	Q				V
24+35	5.2378	0.01	Q				V

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727N00262.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCO Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 2-YEAR

-----------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            1.10                  64.57

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            2.50                 146.75

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.100(In)
Area Averaged 100-Year Rainfall =    2.500(In)

Point rain (area averaged) =    1.100(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    1.100(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    55.300           56.00          0.900
     3.400           86.00          0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134        0.942      0.126
86.0  71.6      0.343     0.000        0.343        0.058      0.020
                                                   Sum (F) =   0.146
Area averaged mean soil loss (F) (In/Hr) =  0.146
Minimum soil loss rate ((In/Hr)) =  0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-----------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000 Sum=	59.159

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.066	0.146	0.012	0.05
2	0.17	0.60	0.079	0.146	0.014	0.06
3	0.25	0.60	0.079	0.146	0.014	0.06
4	0.33	0.60	0.079	0.146	0.014	0.06
5	0.42	0.60	0.079	0.146	0.014	0.06
6	0.50	0.70	0.092	0.146	0.017	0.08
7	0.58	0.70	0.092	0.146	0.017	0.08
8	0.67	0.70	0.092	0.146	0.017	0.08
9	0.75	0.70	0.092	0.146	0.017	0.08
10	0.83	0.70	0.092	0.146	0.017	0.08
11	0.92	0.70	0.092	0.146	0.017	0.08
12	1.00	0.80	0.106	0.146	0.019	0.09
13	1.08	0.80	0.106	0.146	0.019	0.09
14	1.17	0.80	0.106	0.146	0.019	0.09
15	1.25	0.80	0.106	0.146	0.019	0.09
16	1.33	0.80	0.106	0.146	0.019	0.09
17	1.42	0.80	0.106	0.146	0.019	0.09
18	1.50	0.80	0.106	0.146	0.019	0.09
19	1.58	0.80	0.106	0.146	0.019	0.09
20	1.67	0.80	0.106	0.146	0.019	0.09
21	1.75	0.80	0.106	0.146	0.019	0.09
22	1.83	0.80	0.106	0.146	0.019	0.09
23	1.92	0.80	0.106	0.146	0.019	0.09
24	2.00	0.90	0.119	0.146	0.021	0.10
25	2.08	0.80	0.106	0.146	0.019	0.09
26	2.17	0.90	0.119	0.146	0.021	0.10
27	2.25	0.90	0.119	0.146	0.021	0.10
28	2.33	0.90	0.119	0.146	0.021	0.10
29	2.42	0.90	0.119	0.146	0.021	0.10
30	2.50	0.90	0.119	0.146	0.021	0.10
31	2.58	0.90	0.119	0.146	0.021	0.10
32	2.67	0.90	0.119	0.146	0.021	0.10
33	2.75	1.00	0.132	0.146	0.024	0.11
34	2.83	1.00	0.132	0.146	0.024	0.11
35	2.92	1.00	0.132	0.146	0.024	0.11
36	3.00	1.00	0.132	0.146	0.024	0.11
37	3.08	1.00	0.132	0.146	0.024	0.11
38	3.17	1.10	0.145	0.146	0.026	0.12
39	3.25	1.10	0.145	0.146	0.026	0.12
40	3.33	1.10	0.145	0.146	0.026	0.12
41	3.42	1.20	0.158	0.146	---	0.01
42	3.50	1.30	0.172	0.146	---	0.03
43	3.58	1.40	0.185	0.146	---	0.04
44	3.67	1.40	0.185	0.146	---	0.04
45	3.75	1.50	0.198	0.146	---	0.05
46	3.83	1.50	0.198	0.146	---	0.05
47	3.92	1.60	0.211	0.146	---	0.06
48	4.00	1.60	0.211	0.146	---	0.06
49	4.08	1.70	0.224	0.146	---	0.08
50	4.17	1.80	0.238	0.146	---	0.09
51	4.25	1.90	0.251	0.146	---	0.10
52	4.33	2.00	0.264	0.146	---	0.12
53	4.42	2.10	0.277	0.146	---	0.13
54	4.50	2.10	0.277	0.146	---	0.13
55	4.58	2.20	0.290	0.146	---	0.14
56	4.67	2.30	0.304	0.146	---	0.16
57	4.75	2.40	0.317	0.146	---	0.17
58	4.83	2.40	0.317	0.146	---	0.17
59	4.92	2.50	0.330	0.146	---	0.18
60	5.00	2.60	0.343	0.146	---	0.20
61	5.08	3.10	0.409	0.146	---	0.26

62	5.17	3.60	0.475	0.146	---	0.33
63	5.25	3.90	0.515	0.146	---	0.37
64	5.33	4.20	0.554	0.146	---	0.41
65	5.42	4.70	0.620	0.146	---	0.47
66	5.50	5.60	0.739	0.146	---	0.59
67	5.58	1.90	0.251	0.146	---	0.10
68	5.67	0.90	0.119	0.146	0.021	0.10
69	5.75	0.60	0.079	0.146	0.014	0.06
70	5.83	0.50	0.066	0.146	0.012	0.05
71	5.92	0.30	0.040	0.146	0.007	0.03
72	6.00	0.20	0.026	0.146	0.005	0.02
Sum =		100.0			Sum =	8.4

Flood volume = Effective rainfall 0.70(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 3.4(Ac.Ft)
Total soil loss = 0.40(In)
Total soil loss = 1.953(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 149253.1 Cubic Feet
Total soil loss = 85088.8 Cubic Feet

Peak flow rate of this hydrograph = 26.434(CFS)

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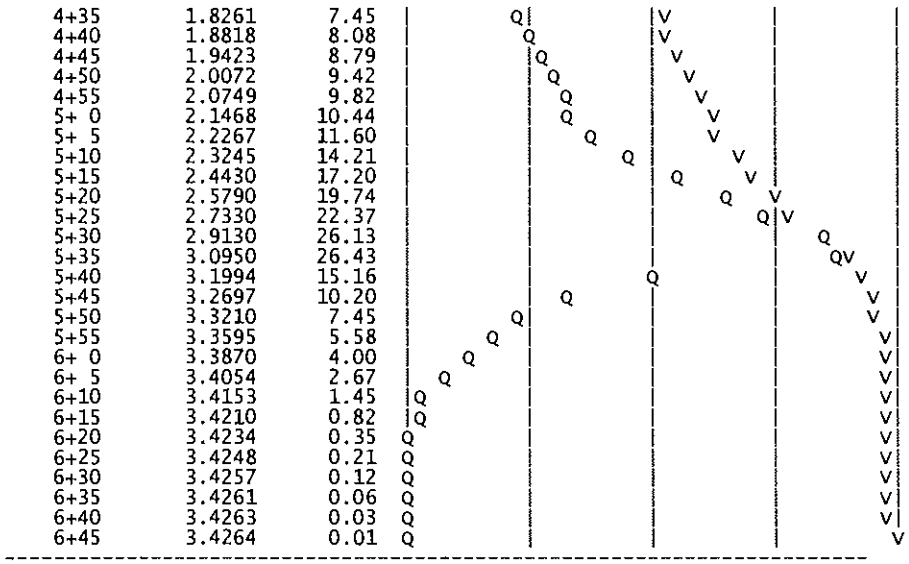
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0032	0.46	Q	|	|	|	|
0+10	0.0170	2.01	V Q	|	|	|	|
0+15	0.0371	2.91	V Q	|	|	|	|
0+20	0.0597	3.29	V Q	|	|	|	|
0+25	0.0838	3.49	V Q	|	|	|	|
0+30	0.1093	3.71	V Q	|	|	|	|
0+35	0.1375	4.09	V Q	|	|	|	|
0+40	0.1669	4.27	V Q	|	|	|	|
0+45	0.1969	4.36	V Q	|	|	|	|
0+50	0.2274	4.42	V Q	|	|	|	|
0+55	0.2580	4.45	V Q	|	|	|	|
1+ 0	0.2894	4.56	V Q	|	|	|	|
1+ 5	0.3229	4.86	V Q	|	|	|	|
1+10	0.3572	4.98	V Q	|	|	|	|
1+15	0.3919	5.04	V Q	|	|	|	|
1+20	0.4268	5.07	V Q	|	|	|	|
1+25	0.4619	5.09	VQ	|	|	|	|
1+30	0.4970	5.10	VQ	|	|	|	|
1+35	0.5322	5.11	Q	|	|	|	|
1+40	0.5675	5.12	Q	|	|	|	|
1+45	0.6028	5.12	QV	|	|	|	|
1+50	0.6381	5.12	QV	|	|	|	|
1+55	0.6734	5.12	QV	|	|	|	|
2+ 0	0.7093	5.22	Q V	|	|	|	|
2+ 5	0.7466	5.42	QV	|	|	|	|
2+10	0.7833	5.34	Q V	|	|	|	|
2+15	0.8216	5.56	Q V	|	|	|	|
2+20	0.8606	5.66	Q V	|	|	|	|
2+25	0.8999	5.70	Q V	|	|	|	|
2+30	0.9393	5.73	Q V	|	|	|	|
2+35	0.9788	5.74	Q | V	|	|	|	|
2+40	1.0184	5.75	Q | V	|	|	|	|
2+45	1.0587	5.85	Q | V	|	|	|	|
2+50	1.1010	6.14	Q | V	|	|	|	|
2+55	1.1442	6.27	Q | V	|	|	|	|
3+ 0	1.1878	6.32	Q | V	|	|	|	|
3+ 5	1.2315	6.35	Q | V	|	|	|	|
3+10	1.2760	6.46	Q | V	|	|	|	|
3+15	1.3226	6.77	Q | V	|	|	|	|
3+20	1.3701	6.90	Q | V	|	|	|	|
3+25	1.4118	6.05	Q | V	|	|	|	|
3+30	1.4346	3.31	Q V	|	|	|	|
3+35	1.4525	2.60	Q V	|	|	|	|
3+40	1.4705	2.61	Q V	|	|	|	|
3+45	1.4886	2.64	Q V	|	|	|	|
3+50	1.5087	2.92	Q V	|	|	|	|
3+55	1.5301	3.11	Q V	|	|	|	|
4+ 0	1.5541	3.47	Q V	|	|	|	|
4+ 5	1.5798	3.74	Q V	|	|	|	|
4+10	1.6091	4.26	Q V	|	|	|	|
4+15	1.6432	4.94	Q V	|	|	|	|
4+20	1.6822	5.66	Q V	|	|	|	|
4+25	1.7263	6.40	Q V	|	|	|	|
4+30	1.7748	7.05	Q V	|	|	|	|



4+35	1.8261	7.45	
4+40	1.8818	8.08	
4+45	1.9423	8.79	
4+50	2.0072	9.42	
4+55	2.0749	9.82	
5+ 0	2.1468	10.44	
5+ 5	2.2267	11.60	
5+10	2.3245	14.21	
5+15	2.4430	17.20	
5+20	2.5790	19.74	
5+25	2.7330	22.37	
5+30	2.9130	26.13	
5+35	3.0950	26.43	
5+40	3.1994	15.16	
5+45	3.2697	10.20	
5+50	3.3210	7.45	
5+55	3.3595	5.58	
6+ 0	3.3870	4.00	
6+ 5	3.4054	2.67	
6+10	3.4153	1.45	
6+15	3.4210	0.82	
6+20	3.4234	0.35	
6+25	3.4248	0.21	
6+30	3.4257	0.12	
6+35	3.4261	0.06	
6+40	3.4263	0.03	
6+45	3.4264	0.01	

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/12/08 File: 0727S00262.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6061

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITIDN - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 2-YEAR

Drainage Area = 62.40(Ac.) = 0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 62.40(Ac.) = 0.098 Sq. Mi.
Length along longest watercourse = 3060.00(Ft.)
Length along longest watercourse measured to centroid = 1530.00(Ft.)
Length along longest watercourse = 0.580 Mi.
Length along longest watercourse measured to centroid = 0.290 Mi.
Difference in elevation = 43.66(Ft.)
Slope along watercourse = 75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.080 Hr.
Lag time = 4.82 Min.
25% of lag time = 1.21 Min.
40% of lag time = 1.93 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	1.10	68.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
62.40	2.50	156.00

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.100(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
56.400	56.00	0.900
6.000	86.00	0.000

Total Area Entered = 62.40(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	36.0	0.706	0.900	0.134	0.904	0.121
86.0	71.6	0.343	0.000	0.343	0.096	0.033
					Sum (F) =	0.154

Area averaged mean soil loss (F) (In/Hr) = 0.154
Minimum soil loss rate ((In/Hr)) = 0.077
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000	Sum= 62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.066	0.154	0.012	0.05
2	0.17	0.60	0.079	0.154	0.014	0.06
3	0.25	0.60	0.079	0.154	0.014	0.06
4	0.33	0.60	0.079	0.154	0.014	0.06
5	0.42	0.60	0.079	0.154	0.014	0.06
6	0.50	0.70	0.092	0.154	0.017	0.08
7	0.58	0.70	0.092	0.154	0.017	0.08
8	0.67	0.70	0.092	0.154	0.017	0.08
9	0.75	0.70	0.092	0.154	0.017	0.08
10	0.83	0.70	0.092	0.154	0.017	0.08
11	0.92	0.70	0.092	0.154	0.017	0.08
12	1.00	0.80	0.106	0.154	0.019	0.09
13	1.08	0.80	0.106	0.154	0.019	0.09
14	1.17	0.80	0.106	0.154	0.019	0.09
15	1.25	0.80	0.106	0.154	0.019	0.09
16	1.33	0.80	0.106	0.154	0.019	0.09
17	1.42	0.80	0.106	0.154	0.019	0.09
18	1.50	0.80	0.106	0.154	0.019	0.09
19	1.58	0.80	0.106	0.154	0.019	0.09
20	1.67	0.80	0.106	0.154	0.019	0.09
21	1.75	0.80	0.106	0.154	0.019	0.09
22	1.83	0.80	0.106	0.154	0.019	0.09
23	1.92	0.80	0.106	0.154	0.019	0.09
24	2.00	0.90	0.119	0.154	0.021	0.10
25	2.08	0.80	0.106	0.154	0.019	0.09
26	2.17	0.90	0.119	0.154	0.021	0.10
27	2.25	0.90	0.119	0.154	0.021	0.10
28	2.33	0.90	0.119	0.154	0.021	0.10
29	2.42	0.90	0.119	0.154	0.021	0.10
30	2.50	0.90	0.119	0.154	0.021	0.10
31	2.58	0.90	0.119	0.154	0.021	0.10
32	2.67	0.90	0.119	0.154	0.021	0.10
33	2.75	1.00	0.132	0.154	0.024	0.11
34	2.83	1.00	0.132	0.154	0.024	0.11
35	2.92	1.00	0.132	0.154	0.024	0.11
36	3.00	1.00	0.132	0.154	0.024	0.11
37	3.08	1.00	0.132	0.154	0.024	0.11
38	3.17	1.10	0.145	0.154	0.026	0.12
39	3.25	1.10	0.145	0.154	0.026	0.12
40	3.33	1.10	0.145	0.154	0.026	0.12
41	3.42	1.20	0.158	0.154	---	0.00
42	3.50	1.30	0.172	0.154	---	0.02
43	3.58	1.40	0.185	0.154	---	0.03
44	3.67	1.40	0.185	0.154	---	0.03
45	3.75	1.50	0.198	0.154	---	0.04
46	3.83	1.50	0.198	0.154	---	0.04
47	3.92	1.60	0.211	0.154	---	0.06
48	4.00	1.60	0.211	0.154	---	0.06
49	4.08	1.70	0.224	0.154	---	0.07
50	4.17	1.80	0.238	0.154	---	0.08
51	4.25	1.90	0.251	0.154	---	0.10
52	4.33	2.00	0.264	0.154	---	0.11
53	4.42	2.10	0.277	0.154	---	0.12
54	4.50	2.10	0.277	0.154	---	0.12
55	4.58	2.20	0.290	0.154	---	0.14
56	4.67	2.30	0.304	0.154	---	0.15
57	4.75	2.40	0.317	0.154	---	0.16
58	4.83	2.40	0.317	0.154	---	0.16
59	4.92	2.50	0.330	0.154	---	0.18
60	5.00	2.60	0.343	0.154	---	0.19
61	5.08	3.10	0.409	0.154	---	0.25
62	5.17	3.60	0.475	0.154	---	0.32
63	5.25	3.90	0.515	0.154	---	0.36

64	5.33	4.20	0.554	0.154	---	0.40
65	5.42	4.70	0.620	0.154	---	0.47
66	5.50	5.60	0.739	0.154	---	0.58
67	5.58	1.90	0.251	0.154	---	0.10
68	5.67	0.90	0.119	0.154	0.021	0.10
69	5.75	0.60	0.079	0.154	0.014	0.06
70	5.83	0.50	0.066	0.154	0.012	0.05
71	5.92	0.30	0.040	0.154	0.007	0.03
72	6.00	0.20	0.026	0.154	0.005	0.02
Sum =		100.0			Sum =	8.2

Flood volume = Effective rainfall 0.68(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 3.5(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 2.170(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 154585.9 Cubic Feet
Total soil loss = 94523.9 Cubic Feet

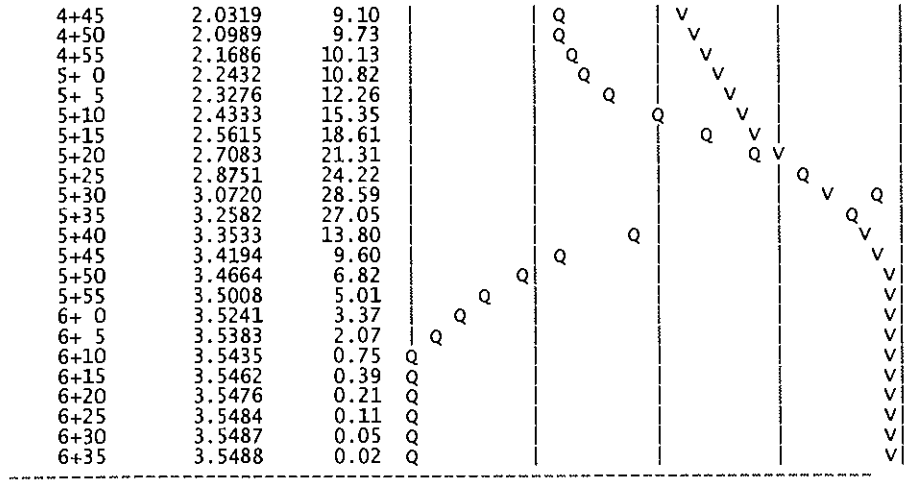
Peak flow rate of this hydrograph = 28.587(CFS)

++

6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0048	0.69	Q				
0+10	0.0219	2.49	V Q				
0+15	0.0448	3.33	V Q				
0+20	0.0701	3.67	V Q				
0+25	0.0966	3.85	V Q				
0+30	0.1248	4.09	V Q				
0+35	0.1557	4.49	V Q				
0+40	0.1877	4.65	V Q				
0+45	0.2201	4.70	V Q				
0+50	0.2527	4.73	V Q				
0+55	0.2854	4.75	V Q				
1+ 0	0.3191	4.90	V Q				
1+ 5	0.3552	5.24	V Q				
1+10	0.3920	5.34	V Q				
1+15	0.4290	5.39	V Q				
1+20	0.4663	5.41	V Q				
1+25	0.5037	5.43	V Q				
1+30	0.5412	5.44	VQ				
1+35	0.5787	5.45	VQ				
1+40	0.6162	5.45	VQ				
1+45	0.6537	5.45	Q				
1+50	0.6912	5.45	Q				
1+55	0.7287	5.45	QV				
2+ 0	0.7672	5.59	QV				
2+ 5	0.8070	5.78	Q V				
2+10	0.8462	5.69	Q V				
2+15	0.8872	5.96	Q V				
2+20	0.9289	6.05	Q V				
2+25	0.9708	6.08	Q V				
2+30	1.0128	6.10	Q V				
2+35	1.0549	6.12	Q V				
2+40	1.0971	6.12	Q V				
2+45	1.1402	6.27	Q V				
2+50	1.1857	6.60	Q V				
2+55	1.2318	6.70	Q V				
3+ 0	1.2783	6.75	Q V				
3+ 5	1.3249	6.77	Q V				
3+10	1.3727	6.93	Q V				
3+15	1.4227	7.27	Q V				
3+20	1.4736	7.38	Q V				
3+25	1.5146	5.96	Q V				
3+30	1.5328	2.64	Q V				
3+35	1.5475	2.13	Q V				
3+40	1.5625	2.18	Q V				
3+45	1.5780	2.26	Q V				
3+50	1.5958	2.57	Q V				
3+55	1.6151	2.81	Q V				
4+ 0	1.6373	3.21	Q V				
4+ 5	1.6618	3.56	Q V				
4+10	1.6909	4.22	Q V				
4+15	1.7251	4.97	Q V				
4+20	1.7647	5.75	Q V				
4+25	1.8099	6.55	Q V				
4+30	1.8595	7.20	Q V				
4+35	1.9119	7.62	Q V				
4+40	1.9692	8.32	Q V				



4+45	2.0319	9.10	
4+50	2.0989	9.73	
4+55	2.1686	10.13	
5+ 0	2.2432	10.82	
5+ 5	2.3276	12.26	
5+10	2.4333	15.35	
5+15	2.5615	18.61	
5+20	2.7083	21.31	
5+25	2.8751	24.22	
5+30	3.0720	28.59	
5+35	3.2582	27.05	
5+40	3.3533	13.80	
5+45	3.4194	9.60	
5+50	3.4664	6.82	
5+55	3.5008	5.01	
6+ 0	3.5241	3.37	
6+ 5	3.5383	2.07	
6+10	3.5435	0.75	
6+15	3.5462	0.39	
6+20	3.5476	0.21	
6+25	3.5484	0.11	
6+30	3.5487	0.05	
6+35	3.5488	0.02	

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        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727N00232.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



------------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 2-YEAR

------------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            0.80                  46.96

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       58.70            1.85                 108.60

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    0.800(In)
Area Averaged 100-Year Rainfall =    1.850(In)

Point rain (area averaged) =    0.800(In)
Areal adjustment factor =   99.97 %
Adjusted average point rain =    0.800(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    55.300           56.00          0.900
     3.400           86.00          0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134       0.942      0.126
86.0  71.6      0.343     0.000        0.343       0.058      0.020
                                                  Sum (F) =    0.146
Area averaged mean soil loss (F) (In/Hr) =  0.146
Minimum soil loss rate ((In/Hr)) =  0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
------------------------------------------------------------------------
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U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000	Sum= 59.159

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.125	0.146	0.022	0.10
2	0.17	1.30	0.125	0.146	0.022	0.10
3	0.25	1.10	0.106	0.146	0.019	0.09
4	0.33	1.50	0.144	0.146	0.026	0.12
5	0.42	1.50	0.144	0.146	0.026	0.12
6	0.50	1.80	0.173	0.146	---	0.03
7	0.58	1.50	0.144	0.146	0.026	0.12
8	0.67	1.80	0.173	0.146	---	0.03
9	0.75	1.80	0.173	0.146	---	0.03
10	0.83	1.50	0.144	0.146	0.026	0.12
11	0.92	1.60	0.154	0.146	---	0.01
12	1.00	1.80	0.173	0.146	---	0.03
13	1.08	2.20	0.211	0.146	---	0.06
14	1.17	2.20	0.211	0.146	---	0.06
15	1.25	2.20	0.211	0.146	---	0.06
16	1.33	2.00	0.192	0.146	---	0.05
17	1.42	2.60	0.250	0.146	---	0.10
18	1.50	2.70	0.259	0.146	---	0.11
19	1.58	2.40	0.230	0.146	---	0.08
20	1.67	2.70	0.259	0.146	---	0.11
21	1.75	3.30	0.317	0.146	---	0.17
22	1.83	3.10	0.298	0.146	---	0.15
23	1.92	2.90	0.278	0.146	---	0.13
24	2.00	3.00	0.288	0.146	---	0.14
25	2.08	3.10	0.298	0.146	---	0.15
26	2.17	4.20	0.403	0.146	---	0.26
27	2.25	5.00	0.480	0.146	---	0.33
28	2.33	3.50	0.336	0.146	---	0.19
29	2.42	6.80	0.653	0.146	---	0.51
30	2.50	7.30	0.701	0.146	---	0.55
31	2.58	8.20	0.787	0.146	---	0.64
32	2.67	5.90	0.566	0.146	---	0.42
33	2.75	2.00	0.192	0.146	---	0.05
34	2.83	1.80	0.173	0.146	---	0.03
35	2.92	1.80	0.173	0.146	---	0.03
36	3.00	0.60	0.058	0.146	0.010	0.05
Sum =		100.0			Sum =	5.3

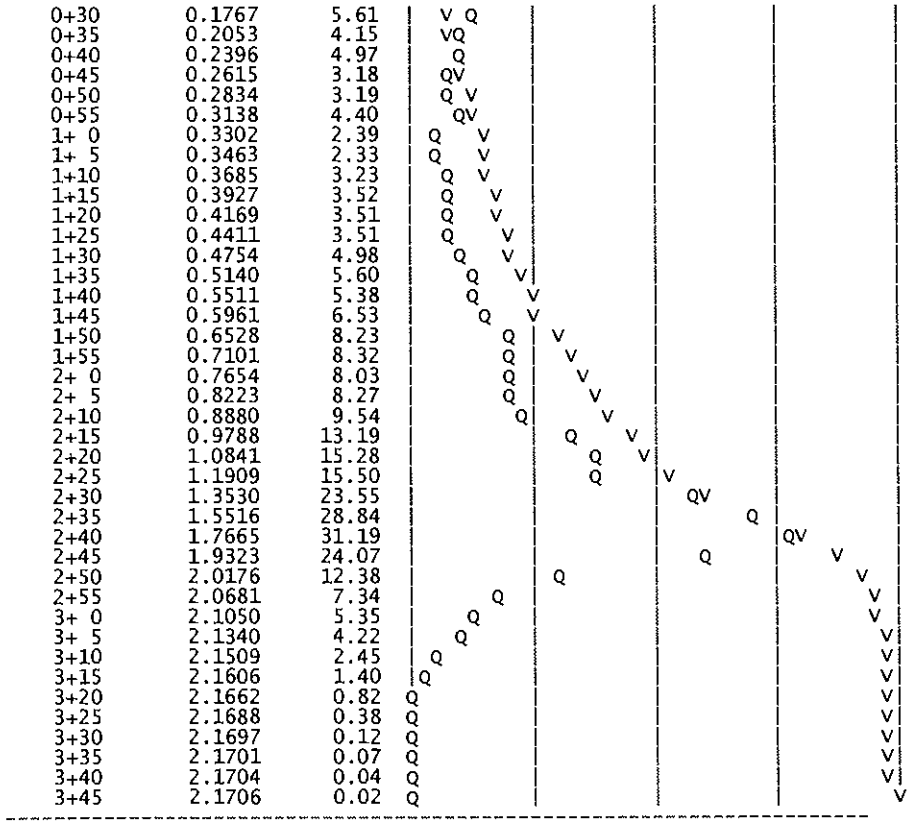
Flood volume = Effective rainfall 0.44(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 2.2(Ac.Ft)
Total soil loss = 0.36(In)
Total soil loss = 1.742(Ac.Ft)
Total rainfall = 0.80(In)
Flood volume = 94550.3 Cubic Feet
Total soil loss = 75870.7 Cubic Feet

Peak flow rate of this hydrograph = 31.192(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0060	0.87	Q				
0+10	0.0310	3.63	V Q				
0+15	0.0630	4.64	V Q				
0+20	0.0972	4.97	V Q				
0+25	0.1381	5.93	V Q				


0+30 0.1767 5.61
0+35 0.2053 4.15
0+40 0.2396 4.97
0+45 0.2615 3.18
0+50 0.2834 3.19
0+55 0.3138 4.40
1+ 0 0.3302 2.39
1+ 5 0.3463 2.33
1+10 0.3685 3.23
1+15 0.3927 3.52
1+20 0.4169 3.51
1+25 0.4411 3.51
1+30 0.4754 4.98
1+35 0.5140 5.60
1+40 0.5511 5.38
1+45 0.5961 6.53
1+50 0.6528 8.23
1+55 0.7101 8.32
2+ 0 0.7654 8.03
2+ 5 0.8223 8.27
2+10 0.8880 9.54
2+15 0.9788 13.19
2+20 1.0841 15.28
2+25 1.1909 15.50
2+30 1.3530 23.55
2+35 1.5516 28.84
2+40 1.7665 31.19
2+45 1.9323 24.07
2+50 2.0176 12.38
2+55 2.0681 7.34
3+ 0 2.1050 5.35
3+ 5 2.1340 4.22
3+10 2.1509 2.45
3+15 2.1606 1.40
3+20 2.1662 0.82
3+25 2.1688 0.38
3+30 2.1697 0.12
3+35 2.1701 0.07
3+40 2.1704 0.04
3+45 2.1706 0.02

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727S00232.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 2-YEAR

-------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            0.80                  49.92

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       62.40            1.85                 115.44

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    0.800(In)
Area Averaged 100-Year Rainfall =    1.850(In)

Point rain (area averaged) =    0.800(In)
Areal adjustment factor =   99.97 %
Adjusted average point rain =    0.800(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    56.400           56.00          0.900
     6.000           86.00          0.000
 Total Area Entered =     62.40(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134       0.904      0.121
86.0  71.6      0.343     0.000        0.343       0.096      0.033
                                                  Sum (F) =    0.154
Area averaged mean soil loss (F) (In/Hr) =  0.154
Minimum soil loss rate ((In/Hr)) =  0.077
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-------------------------------------------------------------------
```

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000	Sum= 62.888

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.125	0.154	0.022	0.10
2	0.17	1.30	0.125	0.154	0.022	0.10
3	0.25	1.10	0.106	0.154	0.019	0.09
4	0.33	1.50	0.144	0.154	0.026	0.12
5	0.42	1.50	0.144	0.154	0.026	0.12
6	0.50	1.80	0.173	0.154	---	0.02
7	0.58	1.50	0.144	0.154	0.026	0.12
8	0.67	1.80	0.173	0.154	---	0.02
9	0.75	1.80	0.173	0.154	---	0.02
10	0.83	1.50	0.144	0.154	0.026	0.12
11	0.92	1.60	0.154	0.154	0.028	0.13
12	1.00	1.80	0.173	0.154	---	0.02
13	1.08	2.20	0.211	0.154	---	0.06
14	1.17	2.20	0.211	0.154	---	0.06
15	1.25	2.20	0.211	0.154	---	0.06
16	1.33	2.00	0.192	0.154	---	0.04
17	1.42	2.60	0.250	0.154	---	0.10
18	1.50	2.70	0.259	0.154	---	0.10
19	1.58	2.40	0.230	0.154	---	0.08
20	1.67	2.70	0.259	0.154	---	0.10
21	1.75	3.30	0.317	0.154	---	0.16
22	1.83	3.10	0.298	0.154	---	0.14
23	1.92	2.90	0.278	0.154	---	0.12
24	2.00	3.00	0.288	0.154	---	0.13
25	2.08	3.10	0.298	0.154	---	0.14
26	2.17	4.20	0.403	0.154	---	0.25
27	2.25	5.00	0.480	0.154	---	0.33
28	2.33	3.50	0.336	0.154	---	0.18
29	2.42	6.80	0.653	0.154	---	0.50
30	2.50	7.30	0.701	0.154	---	0.55
31	2.58	8.20	0.787	0.154	---	0.63
32	2.67	5.90	0.566	0.154	---	0.41
33	2.75	2.00	0.192	0.154	---	0.04
34	2.83	1.80	0.173	0.154	---	0.02
35	2.92	1.80	0.173	0.154	---	0.02
36	3.00	0.60	0.058	0.154	0.010	0.05
Sum =		100.0			Sum =	5.2

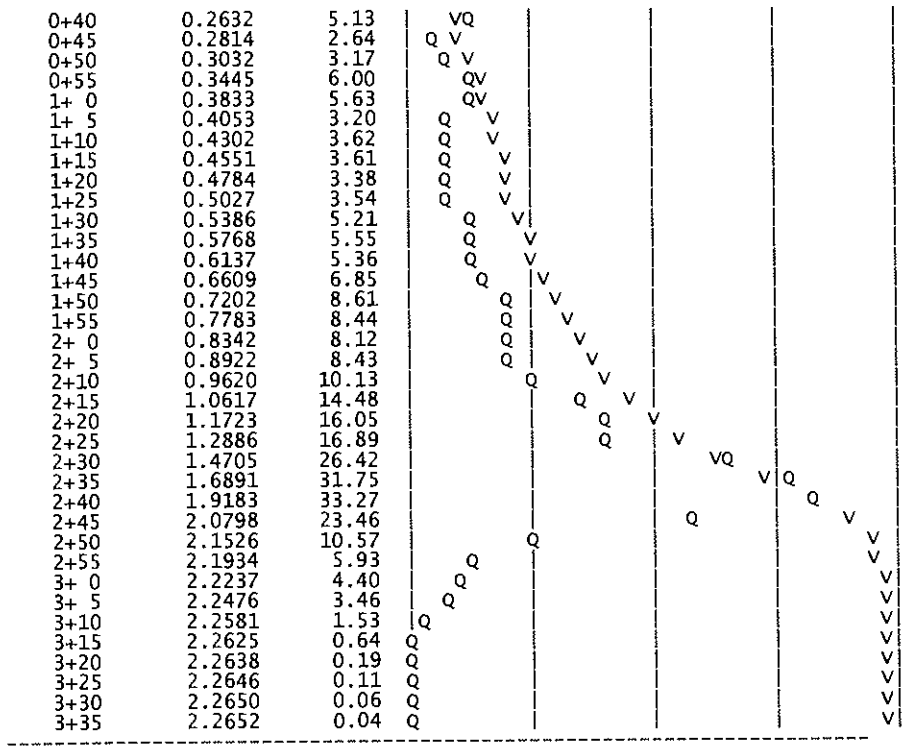
Flood volume = Effective rainfall 0.44(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 2.3(Ac.Ft)
Total soil loss = 0.36(In)
Total soil loss = 1.894(Ac.Ft)
Total rainfall = 0.80(In)
Flood volume = 98673.9 Cubic Feet
Total soil loss = 82486.2 Cubic Feet

Peak flow rate of this hydrograph = 33.270(CFS)

3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0090	1.31	VQ				
0+10	0.0396	4.44	V Q				
0+15	0.0755	5.21	V Q				
0+20	0.1138	5.57	V Q				
0+25	0.1595	6.63	V Q				
0+30	0.1991	5.75	V Q				
0+35	0.2279	4.17	Q				


0+40 0.2632 5.13
0+45 0.2814 2.64
0+50 0.3032 3.17
0+55 0.3445 6.00
1+ 0 0.3833 5.63
1+ 5 0.4053 3.20
1+10 0.4302 3.62
1+15 0.4551 3.61
1+20 0.4784 3.38
1+25 0.5027 3.54
1+30 0.5386 5.21
1+35 0.5768 5.55
1+40 0.6137 5.36
1+45 0.6609 6.85
1+50 0.7202 8.61
1+55 0.7783 8.44
2+ 0 0.8342 8.12
2+ 5 0.8922 8.43
2+10 0.9620 10.13
2+15 1.0617 14.48
2+20 1.1723 16.05
2+25 1.2886 16.89
2+30 1.4705 26.42
2+35 1.6891 31.75
2+40 1.9183 33.27
2+45 2.0798 23.46
2+50 2.1526 10.57
2+55 2.1934 5.93
3+ 0 2.2237 4.40
3+ 5 2.2476 3.46
3+10 2.2581 1.53
3+15 2.2625 0.64
3+20 2.2638 0.19
3+25 2.2646 0.11
3+30 2.2650 0.06
3+35 2.2652 0.04

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727N00212.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - NORTH OUTLET
HYDROLOGIC ANALYSIS - 2-YEAR

------------------------------------------------------------------
Drainage Area =      58.70(Ac.)  =      0.092 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      58.70(Ac.)  =      0.092 Sq. Mi.
Length along longest watercourse =    3750.00(Ft.)
Length along longest watercourse measured to centroid =    1875.00(Ft.)
Length along longest watercourse =      0.710 Mi.
Length along longest watercourse measured to centroid =      0.355 Mi.
Difference in elevation =      39.50(Ft.)
Slope along watercourse =     55.6160 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.099 Hr.
Lag time =     5.96 Min.
25% of lag time =     1.49 Min.
40% of lag time =     2.39 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]       Weighting[1*2]
      58.70              0.48                  28.18

100 YEAR Area rainfall data:


Area(Ac.)[1]        Rainfall(In)[2]       Weighting[1*2]
      58.70              1.20                  70.44

STORM EVENT (YEAR) =     2.00
Area Averaged 2-Year Rainfall =     0.480(In)
Area Averaged 100-Year Rainfall =     1.200(In)

Point rain (area averaged) =     0.480(In)
Areal adjustment factor =   99.95 %
Adjusted average point rain =    0.480(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    55.300           56.00          0.900
     3.400           86.00          0.000
 Total Area Entered =     58.70(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%      F
AMC2 AMC-1     (In/Hr)     (Dec.%)       (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706      0.900         0.134        0.942      0.126
86.0  71.6      0.343      0.000         0.343        0.058      0.020
                                                   Sum (F) =     0.146
Area averaged mean soil loss (F) (In/Hr) =  0.146
Minimum soil loss rate ((In/Hr)) =  0.073
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
--------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5000
```

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	83.837	14.384	8.509
2	0.167	167.673	45.623	26.990
3	0.250	251.510	18.878	11.168
4	0.333	335.346	7.999	4.732
5	0.417	419.183	4.768	2.821
6	0.500	503.020	2.968	1.756
7	0.583	586.856	2.135	1.263
8	0.667	670.693	1.432	0.847
9	0.750	754.529	0.938	0.555
10	0.833	838.366	0.874	0.517
			Sum = 100.000	Sum= 59.159

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.242	0.146	---	0.10
2	0.17	4.30	0.248	0.146	---	0.10
3	0.25	5.00	0.288	0.146	---	0.14
4	0.33	5.00	0.288	0.146	---	0.14
5	0.42	5.80	0.334	0.146	---	0.19
6	0.50	6.50	0.374	0.146	---	0.23
7	0.58	7.40	0.426	0.146	---	0.28
8	0.67	8.60	0.495	0.146	---	0.35
9	0.75	12.30	0.708	0.146	---	0.56
10	0.83	29.10	1.675	0.146	---	1.53
11	0.92	6.80	0.391	0.146	---	0.25
12	1.00	5.00	0.288	0.146	---	0.14
Sum =		100.0			Sum =	4.0

Flood volume = Effective rainfall 0.33(In)
times area 58.7(Ac.)/[(In)/(Ft.)] = 1.6(Ac.Ft)
Total soil loss = 0.15(In)
Total soil loss = 0.715(Ac.Ft)
Total rainfall = 0.48(In)
Flood volume = 71062.6 Cubic Feet
Total soil loss = 31161.9 Cubic Feet

Peak flow rate of this hydrograph = 52.986(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0056	0.81	Q				
0+10	0.0293	3.44	V Q				
0+15	0.0638	5.01	V Q				
0+20	0.1094	6.61	V Q				
0+25	0.1628	7.75	V Q				
0+30	0.2297	9.71	VQ				
0+35	0.3123	12.00	VQ				
0+40	0.4144	14.82	QV				
0+45	0.5487	19.51	Q				
0+50	0.7883	34.79	V Q				
0+55	1.1532	52.99	V Q				
1+ 0	1.3574	29.65	Q V				
1+ 5	1.4726	16.73	Q V				
1+10	1.5342	8.95	Q V				
1+15	1.5709	5.33	Q V				
1+20	1.5956	3.58	Q V				
1+25	1.6117	2.35	Q V				
1+30	1.6222	1.53	Q V				
1+35	1.6295	1.05	Q V				
1+40	1.6309	0.21	Q V				
1+45	1.6314	0.07	Q V				

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  05/12/08 File: 0727S00212.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6061

-----------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



-----------------------------------------------------------------------
PROLOGIS PARK - MORENO VALLEY
PROPOSED CONDITION - SOUTH OUTLET
HYDROLOGIC ANALYSIS - 2-YEAR

-----------------------------------------------------------------------
Drainage Area =      62.40(Ac.)  =      0.098 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      62.40(Ac.)  =      0.098 Sq. Mi.
Length along longest watercourse =    3060.00(Ft.)
Length along longest watercourse measured to centroid =    1530.00(Ft.)
Length along longest watercourse =      0.580 Mi.
Length along longest watercourse measured to centroid =      0.290 Mi.
Difference in elevation =      43.66(Ft.)
Slope along watercourse =     75.3349 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.080 Hr.
Lag time =     4.82 Min.
25% of lag time =     1.21 Min.
40% of lag time =     1.93 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      62.40            0.48                  29.95

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      62.40            1.20                  74.88

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    0.480(In)
Area Averaged 100-Year Rainfall =    1.200(In)

Point rain (area averaged) =    0.480(In)
Areal adjustment factor =   99.94 %
Adjusted average point rain =    0.480(In)

Sub-Area Data:
Area(Ac.)          Runoff Index   Impervious %
    56.400            56.00          0.900
     6.000            86.00          0.000
 Total Area Entered =     62.40(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706     0.900        0.134       0.904      0.121
86.0  71.6      0.343     0.000        0.343       0.096      0.033
                                                  Sum (F) =   0.154
Area averaged mean soil loss (F) (In/Hr) =  0.154
Minimum soil loss rate ((In/Hr)) =  0.077
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.180
-----------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.5000
```

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	103.655	20.320	12.779
2	0.167	207.310	48.633	30.584
3	0.250	310.965	15.108	9.501
4	0.333	414.620	6.871	4.321
5	0.417	518.275	3.836	2.412
6	0.500	621.930	2.465	1.550
7	0.583	725.585	1.489	0.937
8	0.667	829.240	1.278	0.803
			Sum = 100.000	Sum= 62.888

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.242	0.154	---	0.09
2	0.17	4.30	0.248	0.154	---	0.09
3	0.25	5.00	0.288	0.154	---	0.13
4	0.33	5.00	0.288	0.154	---	0.13
5	0.42	5.80	0.334	0.154	---	0.18
6	0.50	6.50	0.374	0.154	---	0.22
7	0.58	7.40	0.426	0.154	---	0.27
8	0.67	8.60	0.495	0.154	---	0.34
9	0.75	12.30	0.708	0.154	---	0.55
10	0.83	29.10	1.675	0.154	---	1.52
11	0.92	6.80	0.391	0.154	---	0.24
12	1.00	5.00	0.288	0.154	---	0.13
Sum =		100.0			Sum =	3.9

Flood volume = Effective rainfall 0.33(In)
times area 62.4(Ac.)/[(In)/(Ft.)] = 1.7(Ac.Ft)
Total soil loss = 0.15(In)
Total soil loss = 0.802(Ac.Ft)
Total rainfall = 0.48(In)
Flood volume = 73728.4 Cubic Feet
Total soil loss = 34935.9 Cubic Feet

Peak flow rate of this hydrograph = 57.586(CFS)

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0077	1.12	Q				
0+10	0.0344	3.87	V Q				
0+15	0.0715	5.40	V Q				
0+20	0.1202	7.06	V Q				
0+25	0.1771	8.27	VQ				
0+30	0.2496	10.52	V Q				
0+35	0.3394	13.04	Q				
0+40	0.4511	16.23	Q				
0+45	0.6019	21.89	Q				
0+50	0.8901	41.85	V Q				
0+55	1.2867	57.59	V Q				
1+ 0	1.4755	27.41	Q V				
1+ 5	1.5803	15.22	Q V				
1+10	1.6310	7.36	Q V				
1+15	1.6606	4.30	Q V				
1+20	1.6783	2.56	Q V				
1+25	1.6897	1.65	Q V				
1+30	1.6918	0.32	Q V				
1+35	1.6926	0.11	Q V				

Technical Appendix E

Hydrology Maps

Technical Appendix A

Hydrologic Analysis
Existing Condition – Rational Method

Technical Appendix B

Hydrologic Analysis
Existing Condition – Flood Hydrograph

Technical Appendix C

Street Capacity Calculations
(Eucalyptus Avenue)

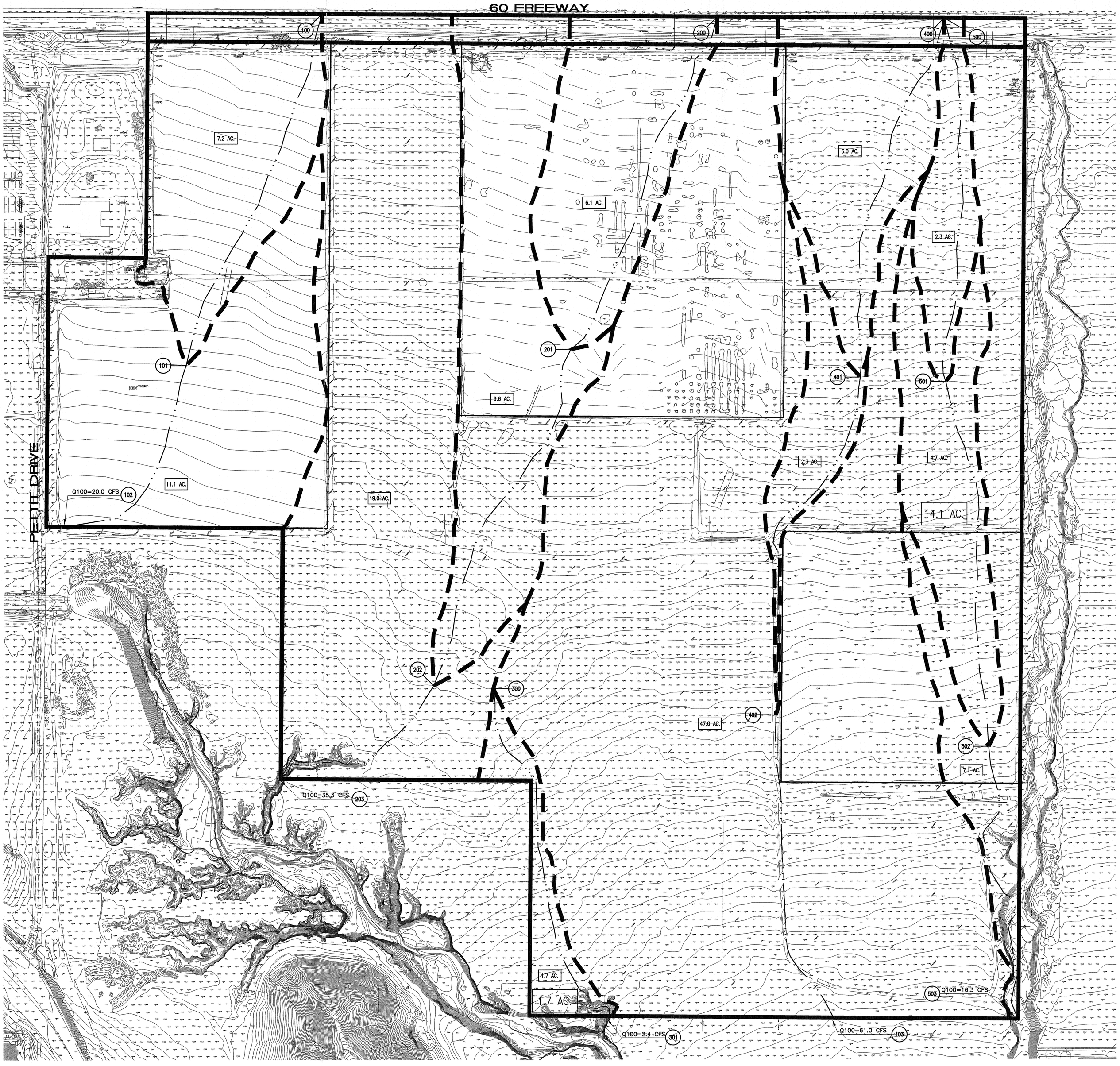
Hydrologic Analysis
Proposed Condition – Rational Method

Technical Appendix D

Hydrologic Analysis
Proposed Condition – Flood Hydrograph

Technical Appendix E

Hydrology Maps



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SCALE:1"=100'

Last Update: 5/13/08
O:\2800-2899\2818\2818hyd-ex.dwg

PREPARED BY:

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
16800 VALLEY VIEW AVENUE
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

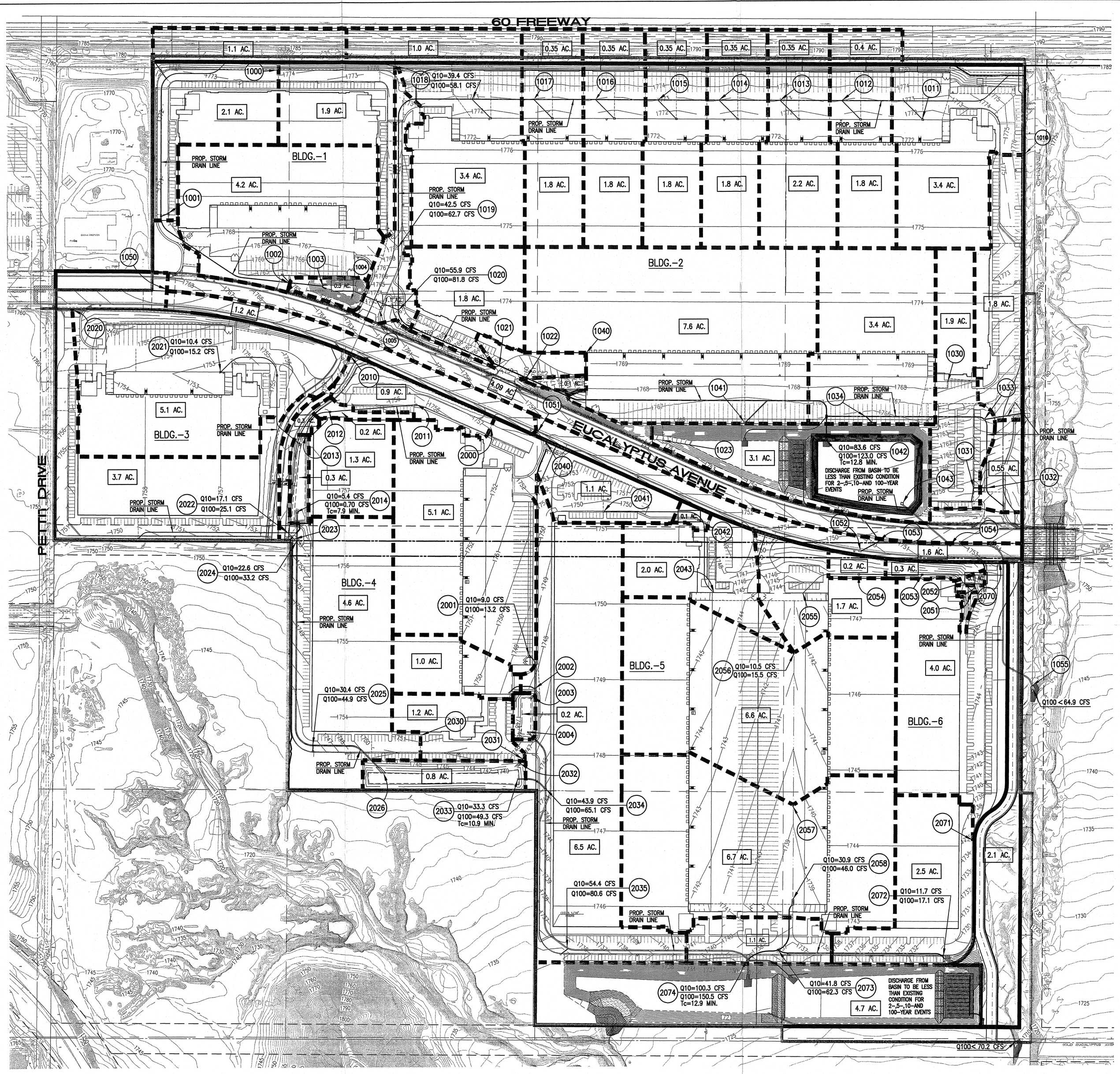
EXISTING CONDITION HYDROLOGY MAP

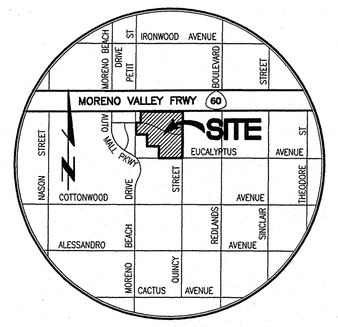
PROLOGIS PARK
MORENO VALLEY EUCALYPTUS

MORENO VALLEY CALIFORNIA

SCALE: 1" = 100'	DATE: JUNE, 2007	J.N. 2818	SHEET 1 OF 1

AutoCAD File: O:\2800-2899\2818\2818hyd-ex.dwg Plotted at: Wed Jul 23 07:13:26 2008





VICINITY MAP
N.T.S.

LEGEND	
	PROJECT BOUNDARY
	SUBAREA BOUNDARY
1.00 AC.	SUBAREA AREA (IN ACRES)
1001	NODE NUMBER
Tc=12.0 MIN.	TIME OF CONCENTRATION (IN MINUTES)

PREPARED BY:

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

PROPOSED CONDITION HYDROLOGY MAP

PROLOGIS PARK
MORENO VALLEY EUCALYPTUS
PA 07-0084 TPM 35679

MORENO VALLEY CALIFORNIA

SCALE: 1" = 100'	DATE: JUNE, 2007	J.N. 2818	SHEET 1 OF 1

Last Update:10/30/08
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PRELIMIARY
WATER QUALITY
MANAGEMENT PLAN

FOR

MORENO VALLEY-EUCALYPTUS
S/O 60 FREEWAY BETWEEN PETTIT STREET AND QUINCY STREET
MORENO VALLEY, CALIFORNIA 92555
PA07-0084
A.P.N. # 477-120-06, 7, 8, 14, 15, 22

PREPARED FOR

PROLOGIS DEV.SERV., INC.
4041 MCARTHUR BOULEVARD, SUITE #400
NEWPORT BEACH, CALIFORNIA 92660
P. (949) 251-6100
FAX. (949) 251-0766
CONTACT: JIM JACHETTA

JUNE 26, 2007
REVISED DECEMBER 10, 2007
REVISED APRIL 9, 2008
REVISED MARCH 18, 2009
REVISED JULY 15, 2009

PREPARED BY

THIENES ENGINEERING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
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FAX. (714) 521-4173
CONTACT: SHELLY MCMASTERS

PRELIMINARY WATER QUALITY MANAGEMENT PLAN

FOR

MORENO VALLEY-EUCALYPTUS

PREPARED BY SHELLY MCMASTERS
UNDER THE SUPERVISION OF

HAIDOOK AGHAIAN DATE:
R.C.E. 43293
EXP. 03/31/10

Project Specific
Preliminary
Water Quality Management Plan

For:
Moreno Valley-Eucalyptus

DEVELOPMENT NO. APN #477-120-06, 7, 8, 14, 15, 22
DESIGN REVIEW NO. PA07-0084

Prepared for:
Prologis Dev. Serv., Inc.
4041 McArthur Boulevard, suite #400
Newport Beach, California 92660
Contact: Jim Jachetta
P. (949) 251-6100
FAX. (949) 251-0766

Prepared by:
Thienes Engineering, Inc.
14349 Firestone Blvd.
La Mirada CA 90638
(714) 521-4811
Prepared by Shelly McMasters

WQMP Preparation/Revision Date: June 26, 2007
Revised December 10, 2007
Revised April 9, 2008
Revised March 18, 2009
Revised July 15, 2009

July 15, 2009

OWNER'S CERTIFICATION

This project-specific Preliminary Water Quality Management Plan (P-WQMP) has been prepared for Prologis Dev. Serv., Inc. by Thienes Engineering, Inc. for the project known as Moreno Valley-Eucalyptus located S/O 60 Freeway between Pettit Street and Quincy Street in the City of Moreno Valley, California 92555.

This P-WQMP is intended to comply with the requirements of City of Moreno Valley for the project site that includes the requirement for the preparation and implementation of a project-specific P-WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of the P-WQMP and will ensure that the F-WQMP is amended as appropriate to reflect up-to-date conditions on the site. The F-WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of the F-WQMP. At least one copy of the F-WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this P-WQMP. The undersigned is aware that implementation of this P-WQMP is enforceable under City of Moreno Valley Municipal Code Chapter 8.10.

If the undersigned transfers its interest in the subject property/project, its successor in interest the undersigned shall notify the successor in interest of its responsibility to implement the F-WQMP.

"I certify under penalty of law that the provision of this P-WQMP have been reviewed and accepted and that the F-WQMP will be transferred to future successors in interest."

James Jachetta
Owner's Signature

8/26/09
Date

James Jachetta
Owner's Printed Name

V. P.
Owner's Title/Position

Prologis ~~Dev. Serv., Inc~~.
4041 McArthur Boulevard, suite #400
Newport Beach, California 92660
P. (949) 251-6100

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of San Bernardino }

On August 20, 2009 (Date) before me, Joann A. Martinez, Notary Public, (Here Insert Name and Title of the Officer)

personally appeared James Jachetta (Name(s) of Signer(s))

,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Joann A. Martinez (Signature of Notary Public)

JOANN A. MARTINEZ
Commission # 1812309
Notary Public - California
San Bernardino County
My Comm. Expires Sep 6, 2012

JOANN A. MARTINEZ
Commission # 1812309
Notary Public - California
San Bernardino County
My Comm. Expires Sep 6, 2012

Place Notary Seal Above

OPTIONAL

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Signer's Name: _____
☐ Individual
☐ Corporate Officer — Title(s): _____
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____
Signer Is Representing: _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: _____
☐ Individual
☐ Corporate Officer — Title(s): _____
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: _____
Signer Is Representing: _____

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APPENDICES

A. CONDITIONS OF APPROVAL – TO BE INCLUDED IN THE F-WQMP

B. VICINITY MAP AND SITE PLAN

C. SUPPORTING DETAIL RELATED TO HYDRAULIC CONDITIONS OF CONCERN – TO BE INCLUDED IN THE F-WQMP

D. EDUCATIONAL MATERIALS – TO BE INCLUDED IN THE F-WQMP

E. SOILS REPORT AND PERCOLATION TEST

F. TREATMENT CONTROL BMP SIZING CALCULATIONS AND DESIGN DETAILS - (PRELIMINARY)

G. AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP – TO BE INCLUDED IN THE F-WQMP

H. PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS- TO BE INCLUDED IN THE F-WQMP

I. Project Description

The project site encompasses 115.7 acres and is located between Pettit Street and Quincy Street, south of the 60 Freeway in the City of Moreno Valley.

Under existing conditions the project site is currently a combination of dirt and orange trees and the site generally drains from north to south.

Proposed improvements to the site consist of the construction of six industrial type buildings that vary in size. The typical pollutants from an industrial site are trash, debris, oil and grease. The typical pollutants that are expected from uncovered parking lot runoff are metals, organic compounds, trash, debris, oil and grease. Bacteria/virus is detected in pavement runoff and is a potential pollutant. Additional pollutants specific to tenant's use may also be expected. Tenants are not known at the present time. Tenant usage will dictate the expected materials to be stored onsite. Regardless of use, all materials will be required to be stored within the building. There will be no outdoor storage of any materials.

There will be landscaping throughout the site, please see Appendix "B" BMP Site Map for locations.

There will be proposed extended detention/sedimentation basins and sand filters for the treatment of stormwater runoff. Vegetated swales and Flo-Gard Plus inserts (model FGP-2436F) in the catch basins for pre-treatment of runoff before discharging into the detention/sedimentation basins and sand filters.

Building one (1) will discharge into a vegetated swale and convey storm water to a detention/sedimentation basin and sand filter for treatment of storm water runoff. Building two (2) will discharge detention/sedimentation basin and sand filter for treatment of storm water runoff. Building three (3) will discharge into a vegetated swale and convey south to a detention/sedimentation basin and sand filter basin for treatment of stormwater runoff. Half of building four (4) will discharge into a swale and the other half into its own swale and convey south to a detention/sedimentation basin and sand filter for treatment of stormwater runoff. Building five (5) and six (6) will discharge into a detention/sedimentation basin and sand filter for treatment of stormwater runoff. Please see Water Quality Site Plan in Appendix "B" for locations of vegetated swales, detention/sedimentation basins and sand filters.

The site will discharge into Quincy Wash directly to the east of the project site and ultimately discharging into the Perris Valley Storm Drain.

Project Owner: **Prologis Dev. Serv., Inc.**
4041 McArthur Boulevard, suite #400
Newport Beach, California 92660
Telephone: **(949) 251-6100**
Fax. (949) 251-0766
Contact: Jim Jachetta

WQMP Preparer: Thienes Engineering, Inc.
14349 Firestone Blvd.
La Mirada CA 90638
(714) 521-4811 Contact: Shelly McMasters

Project Site Address:	S/O 60 Freeway between Pettit Street and Quincy Street Moreno Valley CA 92555
Planning Area/ Community Name:	Moreno Valley
APN Number(s):	APN No. 477-120-06, 7, 8, 14, 15, 22
Thomas Bros. Map:	Page 718 Grid D-3- The Thomas Guide 2007 Edition
Project Watershed:	Santa Ana River
Sub-watershed:	San Jacinto River
Project Site Size:	115.7 Acres

Standard Industrial Classification (SIC) Code: 1541

Formation of Home Owners' Association (HOA) or Property Owners Association (POA): No

Additional Permits/Approvals required for the Project

AGENCY	Permit required (yes or no)
State Department of Fish and Game, 1601 Streambed Alteration Agreement	No
State Water Resources Control Board, Clean Water Act (CWA) section 401 Water Quality Certification	*Yes-To be included in F-WQMP
US Army Corps of Engineers, CWA section 404 permit	*Yes-To be included in F-WQMP
US Fish and Wildlife, Endangered Species Act section 7 biological opinion	Yes
Other *(please list in the space below as required)*	
SWRCB General Construction Permit	Yes-To be included in F-WQMP
City of Moreno Valley Grading Permit	Yes-To be included in F-WQMP
City of Moreno Valley Building Permit	Yes-To be included in F-WQMP
General Industrial Activities Permit	Yes Dependant on Tenants (Tenants not known at this time).

*In the process of obtaining these items.

Appendix A of this project-specific WQMP includes a complete copy of the final Conditions of Approval. Appendix B of this project-specific WQMP shall include:

1. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail to allow the project site to be plotted on Co-Permittee base mapping; and
2. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:
   - Location and identification of all structural BMPs, including Treatment Control BMPs;
   - Landscaped areas;
   - Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.);
   - Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.);
   - Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation;
   - Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated;
   - Location(s) of Receiving Waters to which the project directly or indirectly discharges;
   - Location of points where onsite (or tributary offsite) flows exit the property/project site;
   - Proposed drainage areas boundaries, including tributary offsite areas, for each location where flows exits the property/project site. Each tributary area should be clearly denoted;
   - Pre- and post-project topography.

Appendix G of the project-specific F-WQMP shall include copies of CC&Rs, Covenant and Agreements, and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific F-WQMP requirements.

II. Site Characterization

Land Use Designation or Zoning: Industrial

Current Property Use: Undeveloped

Proposed Property Use: Industrial

Availability of Soils Report: Yes

Phase 1 Site Assessment: No-To be included in the F-WQMP

Receiving Waters for Urban Runoff from Site

Receiving Waters	303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Quincy Wash	None	None	
Perris Valley Storm Drain	None	None	Not Designated as RARE
San Jacinto River Reach 3	None	AGR, GWR, REC1, REC2, WARM, WILD,	Not Designated as RARE
San Jacinto River Reach 2 (Canyon Lake)	Nutrients, Pathogens	MUN AGR, GWR, REC1, REC2, WARM, WILD	Not Designated as RARE
San Jacinto River Reach 1	None	MUN, AGR, GWR, REC1 REC2, WARM, WILD	Not Designated as RARE
Lake Elsinore	Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs Unknown Toxicity	REC1 REC2, WARM, WILD	Not Designated as RARE
Temescal Creek Reach 6	None	GWR, REC1, REC2, WARM, WILD	Not Designated as RARE
Temescal Creek Reach 5	None	AGR, GWR, REC1, REC2, WARM, WILD, RARE	Approx. 27 miles

Temescal Creek Reach 4	None	AGR, GWR, REC1, REC2, WARM, WILD, RARE	Approx. 32 miles
Temescal Creek Reach 3-Lee Lake	None	AGR, IND, GWR, REC1, REC2, WARM, WILD	Not Designated as RARE
Temescal Creek Reach 2	None	AGR, IND, GWR, REC1, REC2, WARM, WILD	Not Designated as RARE
Temescal Creek Reach 1	None	REC1, REC2, WARM, WILD	Not Designated as RARE
Santa Ana River Reach 3	Pathogens	AGR, GWR, REC1, REC2, WARM, WILD, RARE	Approx. 51 miles
Prado Basin Management Zone	None	REC1, REC2, WARM, WILD, RARE	Approx. 57 m
Santa Ana River Reach 2	None	AGR, GWR, REC1, REC2, WARM, WILD, RARE	Approx. 61 m
Santa Ana River Reach 1	None	REC1, REC2, WARM, WILD	Not Designated as RARE
Tidal Prism of Santa Ana River(to within 1000' of Victoria Street) and Newport Slough	None	REC1, REC2, COMM, WILD, RARE, MAR	Approx. 67 m
Pacific Ocean Nearshore	None	IND, NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR, SHEL	Approx. 72 m
Pacific Ocean Offshore Zone	None	IND, NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR	Approx. 72 m

III. Pollutants of Concern

Potential pollutants associated with Urban Runoff from the proposed project must be identified. Exhibit B of the WQMP provides brief descriptions of typical pollutants associated with Urban Runoff and a table that associates typical potential pollutants with types of development (land use). It should be noted that at the Co-Permittees discretion, the Co-Permittees may also accept updated studies from the California Association of Stormwater Quality Agencies (CASQA), USEPA, SWRCB and/or other commonly accepted agencies/associations acceptable to the Co-Permittee for determination of Pollutants of Concern associated with given land use. Additionally, in identifying Pollutants of Concern, the presence of legacy pesticides, nutrients, or hazardous substances in the site's soils as a result of past uses and their potential for exposure to Urban Runoff must be addressed in project-specific WQMPs. The Co-Permittee may also require specific pollutants commonly associated with urban runoff to be addressed based on known problems in the watershed. The list of potential Urban Runoff pollutants identified for the project must be compared with the pollutants identified as causing an impairment of Receiving Waters, if any. To identify pollutants impairing proximate Receiving Waters, each project proponent preparing a project-specific WQMP shall, at a minimum, do the following:

1. For each of the proposed project discharge points, identify the proximate Receiving Water for each discharge point, using hydrologic unit basin numbers as identified in the most recent version of the Water Quality Control Plan for the Santa Ana River Basin or the San Diego Region.
2. Identify each proximate identified above that is listed on the most recent list of Clean Water Act Section 303(d) list of impaired water bodies, which can be found at website www.swrcb.ca.gov/tmdl/303d_lists.html. List all pollutants for which the proximate Receiving Waters are impaired.
3. Compare the list of pollutants for which the proximate Receiving Waters are impaired with the pollutants expected to be generated by the project.

Project Pollutants:

- Sediment/Turbidity, Nutrients, Organic Compounds, Trash and Debris, Oxygen Demanding Substances, Oil and Grease, Pesticides, Metals, and Bacteria and Viruses

Pollutants Impairing Proximate Receiving Waters:

- Canyon Lake-Impaired by Nutrients and Pathogens
- Lake Elsinore-Impaired by Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs, and Unknown Toxicity.

Project of Concern:

- Nutrients, Oxygen Demanding Substances, Bacteria and Viruses.
- Legacy Pollutants: According to the soils report by Geotechnical Professionals Inc. there is no evidence of legacy pollutants from past uses of the project site. The site is currently agricultural land.

IV. Hydrologic Conditions of Concern

Impacts to the hydrologic regime resulting from the Project may include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration, and peaks; faster time to reach peak flow; and water quality degradation. Under certain circumstances, changes could also result in the reduction in the amount of available sediment for transport; storm flows could fill this sediment-carrying capacity by eroding the downstream channel. These changes have the potential to permanently impact downstream channels and habitat integrity. A change to the hydrologic regime of a Project's site would be considered a hydrologic condition of concern if the change would have a significant impact on downstream erosion compared to the pre-development condition or have significant impacts on stream habitat, alone or as part of a cumulative impact from development in the watershed.

This project-specific WQMP must address the issue of Hydrologic Conditions of Concern unless one of the following conditions are met:

- **Condition A: 1.** Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4; **2.** the discharge is in full compliance with Co-Permittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements); **3.** the discharge would not significantly impact stream habitat in proximate Receiving Waters; **4.** and the discharge is authorized by the Co-Permittee.
- **Condition B:** The project disturbs less than 1 acre. The disturbed area calculation should include all disturbances associated with larger plans of development.
- **Condition C:** The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by minimizing impervious area on a site and incorporating other site-design concepts that mimic pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the Co-Permittee.

  This Project meets the following condition: CONDITION A

  "Will address in the final WQMP"

V. Best Management Practices

V.1 Site Design BMPs

Project proponents shall implement Site Design concepts that achieve each of the following:

1) Minimize Urban Runoff
2) Minimize Impervious Footprint
3) Conserve Natural Areas
4) Minimize Directly Connected Impervious Areas (DCIAs)

The project proponent should identify the specific BMPs implemented to achieve each Site Design concept and provide a brief explanation for those Site Design concepts considered not applicable.

The following site design BMP's have been incorporated into the project site:

- Efficient building layout leaves permeable area at locations where they are best used and incorporated for BMP's. Areas not used for building or parking have been landscaped to maximize the permeable area.
- Onsite extended detention/sedimentation basins and sand filters will treat all of the sites runoff via vegetated swales and will be maintained and inspected at least twice a year and prior to October 1.
- Sidewalk, drive and parking lot aisles are at the minimum widths necessary for safety and appropriate vehicle use.
- Required landscaped areas will not use decorating concrete or impervious surfaces.
- Landscape plans incorporate native and drought tolerant plants, trees, and shrubs. Landscaping will be maintained weekly and maintenance contractor will properly dispose of all landscape wastes.
- Outdoor Loading/Unloading truck docks will be kept in a clean and orderly condition with weekly inspections, continuous monitoring and immediate clean up of spills.
- Parking area maintenance will include the parking areas will be swept or vacuumed at least quarterly, if there is any trash or debris in between the routine sweeping it will be swept or vacuumed immediately.
- Drainage system maintenance will include the catch basins, storm drain system, extended detention/sedimentation basins, sand filters will be cleaned at least twice a year and prior to October 1.
- Irrigation system will be inspected monthly by the landscape contractor to check for over-watering, leaks, or excessive runoff to paved areas. Timers will be used to prevent over watering.
- Signage will be inspected and maintained twice a year for legibility.
- Trash enclosures will be inspected and maintained weekly or as needed by maintenance contractor.
- Drain inserts will be inspected and maintained at least twice a year and prior to October 1.

The owner will be required to inspect, maintain and fund all BMP's above.

Table 1. Site Design BMPs

			Included	
Design Concept	**Technique**	**Specific BMP**	**Yes**	**No**
Site Design Concept 1	*Minimize Urban Runoff*			
		Maximize the permeable area (See Section 4.5.1 of the WQMP).	X[C]	
		Incorporate landscaped buffer areas between sidewalks and streets.	X[A]	
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	X[B]	
		Use natural drainage systems.		X[1]
		Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration.	X[D]	
		Construct onsite ponding areas or retention facilities to increase opportunities for infiltration consistent with vector control objectives.	X[D]	
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required to describe BMP and how it addresses Site Design concept).		X

1 .There is no natural drainage on site. The property will be cleared of weeds and brush.

A. There will be landscaping adjacent to the streets.

B. Landscaping will include the planting of native and drought tolerant trees and shrubs.

C. Areas not used for building or parking areas have been landscaped to maximize the permeable area.

D. The proposed vegetated swales will be utilized to treat and infiltrate stormwater runoff.

Table 1. Site Design BMPs (Cont.)

			Included	
Design Concept	**Technique**	**Specific BMP**	**Yes**	**No**
Site Design Concept 1	Minimize Impervious Footprint			
		Maximize the permeable area.	X[A]	
		Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets and other low –traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials.		X[3]
		Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walk able environment for pedestrians are not compromised.	X[B]	
		Reduce widths of street where off-street parking is available.	X[C]	
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.	X[D]	
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).		X
Site Design Concept 1	Conserve Natural Areas			
		Conserve natural areas.		X[1]
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	X[E]	
		Use natural drainage systems.		X[2]
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).		X

1. The property will be cleared of weeds and brush.

2. There is no natural drainage on site. The property will be cleared of weeds and brush.

3. Pervious pavement was not considered, as an alternative extended detention/sedimentation basins, sand filters and vegetated swales will be utilized.

A. Areas not used for building or parking areas have been landscaped to maximize the permeable area.

B. Sidewalks, drive isles are per city standards.

C. The new street improvements will reduce widths of the street.

D. No decorative concrete was used in the landscape design.

E. Landscaping will include the planting of native and drought tolerant trees and shrubs.

Table 1. Site Design BMPs (Cont.)

			Included	
Design Concept	**Technique**	**Specific BMP**	**Yes**	**No**
Site Design Concept 2	Minimize Directly Connected Impervious Areas (DCIAs)	Residential and commercial sites must be designed to contain and infiltrate roof runoff, or direct roof runoff to vegetative swales or buffer areas, where feasible.	X[A]	
		Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	X[B]	
		Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales.	X[C]	
		Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings.		X[1]
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter.		X
		Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to MS4s.		X[2]
		Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping prior to discharging to the MS4.		X[3]
		Uncovered temporary or guest parking on private residential lots may be paved with a permeable surface, or designed to drain into landscaping prior to discharging to the MS4.		X[4]
		Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.		X[5]
		Overflow parking (parking stalls provided in excess of the Co-Permittee's minimum parking requirements) may be constructed with permeable paving.		X[6]
		Other comparable and equally effective design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).		X

1. Rural swale system will not be used. Instead a combination of catch basins and storm drain will deliver drainage to extended detention/sedimentation basins and sand filters.
2. A combination of catch basins and storm drain will deliver drainage to the basins.
3. The proposed project will be designed for industrial uses. Driveways will not be designed for shared or flared access. Runoff will drain to catch basins and a storm drain that will deliver runoff to the basins.
4. Uncovered temporary or guest parking on private residential lots with permeable surface is not proposed as there are no private residential lots.

5. Landscape areas will not be incorporated into the drainage design. Instead runoff will drain to catch basins and storm drain that will deliver drainage to the basins.
6. Parking is designed per City of Moreno Valley standards.
A. Roof runoff will directly connect to the storm drain system and then treated in the extended detention/sedimentation basins and sand filters. The roof runoff will not wash the pavement.
B. Sidewalks will be graded to drain to landscaping.
C. Vegetated swales will be located throughout the site for pre-treatment of Stormwater runoff.

V.2 Source Control BMPs

Table 2. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	X		
Activity Restrictions	X		
Irrigation System and Landscape Maintenance	X		
Common Area Litter Control	X		
Street Sweeping Private Streets and Parking Lots	X		
Drainage Facility Inspection and Maintenance	X		
Structural Source Control BMPs			
MS4 Stenciling and Signage	X		
Landscape and Irrigation System Design	X		
Protect Slopes and Channels		X	Not part of project design, no slopes or channels to protect
Provide Community Car Wash Racks		X	Not part of project design
Properly Design:			
Fueling Areas		X	Not part of project design
Air/Water Supply Area Drainage		X	Not part of project design
Trash Storage Areas	X		
Loading Docks	X		
Maintenance Bays		X	Not part of project design
Vehicle and Equipment Wash Areas		X	Not part of project design
Outdoor Material Storage Areas		X	Not part of project design
Outdoor Work Areas or Processing Areas		X	Not part of project design
Provide Wash Water Controls for Food Preparation Areas		X	Not part of project design

"Will address narrative for table above in the Final WQMP"

V.3 TREATMENT CONTROL BMPS

Directions for completing Table 3: Treatment Control BMP Selection Matrix

For each pollutant of concern enter "yes" if identified using Exhibit B (Riverside County WQMP - General Categories of Pollutants of Concern per the instructions specified in Section III of this Template), or "no" if not identified for the project. Check the boxes of selected BMPs that will be implemented for the project to address each pollutant of concern from the project as identified using Exhibit B. Treatment Control BMPs must be selected and installed with respect to identified pollutant characteristics and concentrations that will be discharged from the site. For any identified pollutants of concern not listed in the Treatment Control BMP Selection Matrix, provide an explanation of how they will be addressed by Treatment Control BMPs.

For identified pollutants of concern that are **causing an impairment in receiving waters**, the project WQMP shall incorporate one or more Treatment Control BMPs of medium or high effectiveness in reducing those pollutants. It is the responsibility of the project proponent to demonstrate, and document in the project WQMP, that all pollutants of concern will be fully addressed. The Agency may require information beyond the minimum requirements of this WQMP to demonstrate that adequate pollutant treatment is being accomplished.

Supporting engineering calculations for Q_{BMP} and/or V_{BMP}, and Treatment Control BMP design details are included in Appendix F.

Note: Projects that will utilize infiltration-based Treatment Control BMPs (e.g., Infiltration Basins, Infiltration Trenches, Porous Pavement) must include a copy of the property/project soils report as Appendix E to the project-specific WQMP. The selection of a Treatment Control BMP (or BMPs) for the project must specifically consider the effectiveness of the Treatment Control BMP for pollutants identified as causing an impairment of Receiving Waters to which the project will discharge Urban Runoff.

Treatment Control BMP's for the project site.

Extended Detention Basin/Sedimentation Basin - Treatment. Extended detention/sedimentation basins shall be inspected for clogging after storm events. Maintenance activities include repair undercut and eroded areas at the inflow and outflow structures. Remove trash, debris, and any landscaping debris from landscape maintenance operations that get into the detention/sedimentation basins and dispose of properly.

- Maintenance Schedule: The detention/sedimentation basins shall be inspected and maintained twice a year or more often as needed.
- BMP Implementation shall begin immediately after basins are complete.
- Responsible party for implementation, maintenance and inspections: Owner

Vegetated Swale Maintenance – Pre-Treatment. Landscaped areas shall include small swales to promote conservation of rainwater, irrigation water, fertilizer, and pesticides. Landscaped areas will also be used to infiltrate and treat runoff from portions of the site. The target pollutants are sediment, metals, oil/grease and organics. The removal rate is medium. Fertilizer and pesticide usage shall be consistent with the instructions contained on product labels and with regulations administered by California's Department of Pesticide Regulation.

- Maintenance Schedule: Landscaping shall be maintained weekly and maintenance contractor shall properly dispose of all landscape wastes. Typical maintenance activities are summarized as follows:

* Inspect swales at least four times a year for erosion, damage to vegetation, and sediment and debris accumulation. Inspect at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. Debris and litter to be removed with weekly maintenance and prior to mowing.
* Maintain grass to design height (approximately 4"-6"), remove unnecessary weeds and plant material.
* Inspect swales for pools of standing water.

- BMP Implementation shall begin immediately after landscaping is complete.
- Responsible party for implementation, maintenance and inspections: Owner

Media Filter (Sand Filter) – Treatment. The sand filters are located in the northeast corner and the southeast corner of the site. Runoff the site passes through a sand and gravel layer approximately 2.75' deep. Flows pass through the sand for treatment to a perforated pipe (wrapped in filter fabric).

Maintenance Schedule: Filter area shall be inspected weekly for removal of any trash and debris. Inspect filter bed and riser after major storms. Remove and replace any sand as necessary. Inspect for standing water.

- BMP Implementation shall begin immediately after storm drain system is complete.
- Responsibility party for implementation, maintenance and inspections: Owner

Drain Insert – Pre-Treatment: Flogard Plus inserts (model FGP-2436F) are proposed for the catch basins. Catch basins will be serviced by a qualified technician. All waste from the filters will be properly disposed of by the service contractor.

- Maintenance Schedule: Catch basin will be inspected at least twice a year, October 1 and April 1, and with a change of filter medium once per year or more often as necessary. Inspection and maintenance to begin shortly after installation.
- BMP Implementation shall begin immediately after storm drain system is completed.
- Responsible party for implementation, maintenance and inspections: Owner

Table 3: Treatment Control BMP Selection Matrix

Pollutant of Concern		Treatment Control BMP Categories[9]							
		Veg. Swale /Veg. Filter Strips	Detention Basins[2]	Infiltration Basins [4]	Wet Ponds or Wetlands	Sand Filter or Filtration	Water Quality Inlets	Hydrodynamic Separator Systems	Manufactured/ Proprietary Devices
Sediment/Turbidity		H/M	M	H/M	H/M	H/M	L	H/M (L for turbidity)	U
Yes/No?	No								
Nutrients		L	M	H/M	H/M	L/M	L	L	U
Yes/No?	Yes	X	X			X			X
Organic Compounds		U	U	U	U	H/M	L	L	U
Yes/No?	No								
Trash & Debris		L	M	U	U	H/M	M	H/M	U
Yes/No?	No								
Oxygen Demanding Substances		L	M	H/M	H/M	H/M	L	L	U
Yes/No?	Yes	X	X			X			X
Bacteria & Viruses		U	U	H/M	U	H/M	L	L	U
Yes/No?	Yes	X	X			X			X
Oils & Grease		H/M	M	U	U	H/M	M	L/M	U
Yes/No?	No								
Pesticides (non-soil bound)		U	U	U	U	U	L	L	U
Yes/No?	No								
Metals		H/M	M	H	H	H	L	L	U
Yes/No?	No								

Abbreviations:

L: Low removal efficiency H/M: High or medium removal efficiency U: Unknown removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.

(2) Includes grass swales, grass strips, wetland vegetation swales, and bioretention.

(3) Includes extended/dry detention basins with grass lining and extended/dry detention basins with impervious lining. Effectiveness based upon minimum 36-48-hour drawdown time.

(4) Includes infiltration basins, infiltration trenches, and porous pavements.

(5) Includes permanent pool wet ponds and constructed wetlands.

(6) Includes sand filters and media filters.

(7) Also known as hydrodynamic devices, baffle boxes, swirl concentrators, or cyclone separators.

(8) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP, or newly developed/emerging stormwater treatment technologies.

(9) Project proponents should base BMP designs on the Riverside County Stormwater Quality Best Management Practice Design Handbook. However, project proponents may also wish to reference the California Stormwater BMP Handbook – New Development and Redevelopment (www.cabmphandbooks.com). The Handbook contains additional information on BMP operation and maintenance.

(10) Note: Projects that will utilize infiltration-based Treatment Control BMPs (e.g., Infiltration Basins, Infiltration Trenches, Porous Pavement) must include a copy of the property/project soils report as Appendix E to the project-specific WQMP. The selection of a Treatment Control BMP (or BMPs) for the project must specifically consider the effectiveness of the Treatment Control BMP for pollutants identified as causing an impairment of Receiving Waters to which the project will discharge Urban Runoff.

V.4 EQUIVALENT TREATMENT CONTROL ALTERNATIVES

Not applicable.

V.5 REGIONALLY-BASED TREATMENT CONTROL BMPS

Not applicable.

VI. Operation and Maintenance Responsibility for Treatment Control BMPs

At this time, the proposed buildings do not have a prospective tenant. Ongoing maintenance and inspection of BMP's will be the owner's responsibility. The owner's information is below. Certain BMP's will require tenant responsibility. Owner will be responsible for all BMP's until the building is occupied by tenants. Owner/tenant responsibilities will need to be outlined in any future lease agreements.

The owner information is as follows:

Prologis Dev. Serv., Inc.
4041 McArthur Boulevard, suite #400
Newport Beach, California 92660
P. (949) 251-6100
FAX. (949) 251-0766
Contact person: Jim Jachetta

A schedule will be established for all maintenance and a log for all cleanups shall be recorded. All documents relating to site maintenance and BMP's will be kept on site and be made available to Federal, State, County, or City inspectors upon request. Future tenant use may require additional industrial permits and storm water monitoring. Records shall be kept onsite for at least three years.

"Will address in the Final WQMP"

VII. Funding

By certifying the project-specific WQMP, the Project applicant is certifying that the funding responsibilities have been addressed and will be transferred to future owners. One example of how to adhere to the requirement to transfer O&M responsibilities is to record the project-specific WQMP against the title to the property.

The owner information is as follows:
Prologis Dev. Serv., Inc.
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The owner will be responsible for the funding of all BMP's. The tenants are not known at the present time.

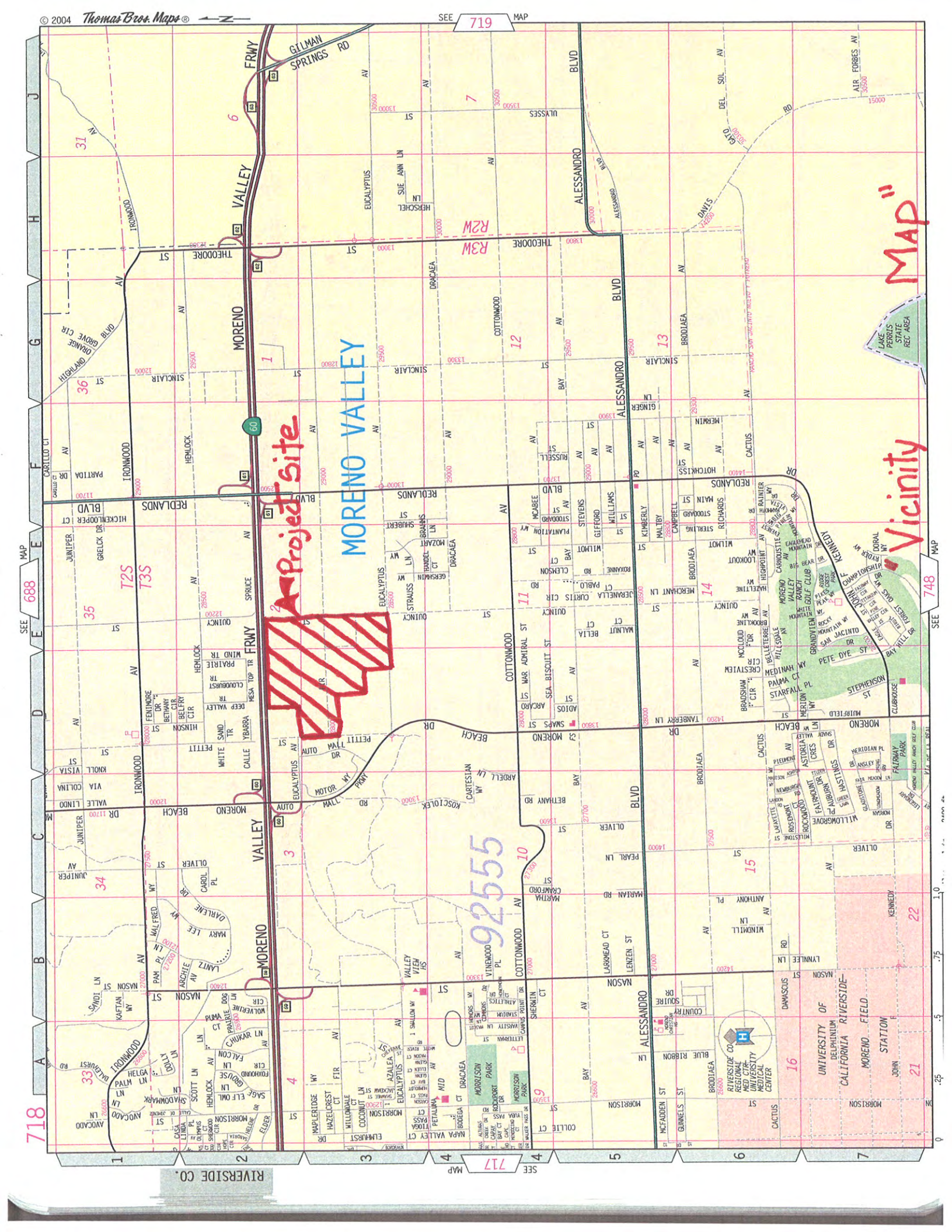
Appendix A

Conditions of Approval

"Will be addressed in the final WQMP"

Appendix B

Vicinity Map and Site Plan


© 2004 Thomas Bros. Maps®
SEE 719 MAP
SEE 688 MAP
SEE 748 MAP
SEE 717 MAP
718
RIVERSIDE CO.
Project Site
Vicinity Map
MORENO VALLEY
92555
GILMAN SPRINGS RD
MORENO VALLEY FRWY
ALESSANDRO BLVD
DAVIS RD
IRONWOOD
HEMLOCK
THEODORE ST
REDLANDS BLVD
COTTONWOOD
DRACAEA
BRODIAEA
SINCLAIR
EUCALYPTUS
QUINCY
SPRUCE
JUNIPER
ORANGE GROVE CIR
HIGHLAND BLVD
CARILLO CT
PARTIDA DR
GRELCK DR
HICKEL LOOPER CT
FENIMORE DR
BETHANY CIR
BELFRY CIR
HINSON
DEEP VALLEY
SAND TR
YBARRA
PRAIRIE WIND TR
CLOUDBURST TR
MESA TOP TR
WHITE
CALLE
VALLE LINDO
VIA COLINA
KNOLL VISTA
PETTIT
AUTO MALL DR
MOTOR WY
PKWY
CARTESIAN WY
ROSCIOLEK
ARBELL LN
BETHANY RD
MORENO BEACH DR
OLIVER
PEARL LN
MARTHA CRAWFORD
MARIAN RD
LARKMEAD CT
LENZEN ST
NASON ST
IONIS
KAFTAN WY
CAROL PL
DARLENE
MARY LEE
WALFRED
PAM PL
ARCHIE AV
LANTZ
WOLVERINE
PUMA CT
PRAIRIE DOG CIR
CHUKAR LN
FALCON
FOXHOUND
GOUDSE
ELF OWL
SAGE
SHADOWMARK
SCOTT LN
HELGA
PALM LN
DOLLI LN
BALDHURST RD
AVOCADO LN
CASA LINDA PL
OLYMPUS
SHERWOOD CIR
MORRISON CIR
ELDER
MAPLERIDGE
HAZELCREST CT
FIR
AZALEA
WILLOWDALE CT
COCONUT LN
LEMHURST
MORRISON PARK
MID
PETALUMA CT
NAPA VALLEY PASS
TIOGA PASS
ROCKPORT DR
VALLEY VIEW HS
VINEWOOD PL
SHALLOW WY
ATHLETICS
STADIUM
LETTERMAN
SHERWIN CT
COLLIE CT
MCFADDEN ST
GUINNELS ST
RIVERSIDE CO. REGIONAL MED CTR
UNIVERSITY MEDICAL CENTER
UNIVERSITY OF CALIFORNIA RIVERSIDE
DELPHINIUM
MORENO FIELD
STATION
DAMASCUS
JOHN
MORRISON
KENNEDY
COUNTRY SQUIRE
BLUE RIBBON
LAKE PERRIS STATE REC AREA
MORENO VALLEY RANCH GOLF CLUB
CHAMPIONSHIP
EAGLEHEAD MOUNTAIN
RIDGE CREST
FIVES PEAK
WHITE MOUNTAIN
ROCKY MOUNTAIN
SAN JACINTO
PETE DYE
BAY HILL
STEPHENSON
CLUBHOUSE
MEDINAH
PALMA CT
STARFALL PL
MERION
MUIRFIELD
TANBERRY LN
CRESTVIEW CIR
BRADSHAW CIR
MCCLOUD DR
BELLETERRE
HILLSDALE
GRANDVIEW
BROOKLINE
HAZELTINE
LOOKOUT
HIGHPOINT
CARNOUSTIE
MERCHANT LN
JERANELLA CURTIS CIR
PABLO
ROXANNE
CLEMSON
GERSHWIN
TRANDEL CT
MOZART
BRAHMS LN
SHUBERT
PLANTATION
MCABEE
STOCKARD
STEVENS
GIFFORD
WILLIAMS
KIMBERLY
MALTBY
CAMPBELL
STERLING
RICHARDS
MAIN
WILMOT
GINGER
MERWIN
RUSSELL
HOTCHKISS
CACTUS
RAINIER
DORAL
ROLLER
CHAMPIONSHIP
FORREST OAKS
ASTORIA CRES
PIEDMONT
MADISON
ASHBY
TILDEN
NEWBURGH
LAFAYETTE
ROSEMONT
ROCKWOOD
FAIRMOUNT
AUBURN
HASTINGS
MILLSTONE
GLADSTONE
LONGMOOR
MORGAN
MERIDIAN PL
BEL ASLEY
FAIR MEADOW LN
GREEN GLEN
FAIRWAY PARK
MILLOWGROVE
LENNLEE LN
WINDMILL LN
ANTHONY PL
ARGYLE
ORANGE
SAN BERNARDINO
LOS ANGELES
1 MILE
0
.25
.5
.75
1.0

FLOW

"RECEIVING WATERS MAP"

Thienes Engineering, Inc.
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Appendix C

Supporting Detail Related to Hydraulic Conditions of Concern
"Will be addressed in the final WQMP"

Appendix D

Educational Materials
"Will be addressed in the final WQMP"

Appendix E

Soils Report and Percolation Test

GEOTECHNICAL INVESTIGATION
PROPOSED PROLOGIS PARK – MORENO VALLEY
FUTURE EXTENSION OF EUCALYPTUS AVENUE
MORENO VALLEY, CALIFORNIA

Prepared for:
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Project No. 2175.1I

December 27, 2007

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1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of a geotechnical investigation performed by Geotechnical Professionals Inc. (GPI) for the proposed ProLogis Park – Moreno Valley along the future extension of Eucalyptus Avenue in Moreno Valley, California. The geographical site location is shown on the Site Location Map, Figure 1.

The scope of services was performed in accordance with our agreement dated September 18, 2007.

1.2 PROJECT DESCRIPTION

Based on the site plan provided, the proposed project will consist of six new dock-high industrial/warehouse buildings ranging in size from approximately 181,000 to 861,000 square feet on a 124 acre site. The total footprint of the buildings will cover approximately 2.2± million square feet. Associated parking, screen walls, landscaping, and street improvements are also planned. Detention basins are planned on the south side of four of the buildings. An extension of Eucalyptus Avenue will extend in an east-west direction through the center of the project site. The planned site layout is shown on the Site Plan, Figure 2.

We have assumed that the buildings will be constructed of tilt-up walls with slab-on-grade floors. We anticipate maximum column and wall loads on the order of 100 kips and 4 kips per lineal foot, respectively.

Currently, it is planned to slope the finished floor of the buildings at 0.5 percent down to the south. In general, the existing grades slope relatively uniform downward to the south at approximately 2 percent across the site.

The pad elevations for the Buildings 1 and 2 will be near the existing grade to about 3 feet below existing grade at the north end of the buildings. At the south end of Buildings 1 and 2, the pad elevation will be from about 5 to 8 feet above existing grade. The pad elevation for the Building 3 will be near the existing grade to about 1 foot below existing grade at the north end of the building to about 3 to 4 feet above existing grade at the south end of the building. The pad elevation for the Building 4 will be near the existing grade to about 4 feet below existing grade at the north end of the building to about 5 to 8 feet above existing grade at the south end of the building. The pad elevations for the Buildings 5 and 6 will be near the existing grade to about 9 feet below existing grade at the north end of the buildings. At the south end, the pad elevation for Buildings 5 and 6 will be from about 9 to 12 feet above existing grade. This information is based upon preliminary grading plans by Thienes Engineering.

To achieve the finished grades, fill soils will need to be imported to the site.

Our recommendations are based upon the above structural and grading information. We should be notified if the actual loads and/or grades change during the project design to either confirm or modify our recommendations.

1.3 PURPOSE OF INVESTIGATION

The primary purpose of this investigation and report is to provide an evaluation of the existing geotechnical conditions at the site as they relate to the design and construction of the proposed development. More specifically, this investigation was aimed at providing geotechnical recommendations for earthwork, and design of foundations and pavements.

2.0 SCOPE OF WORK

Our scope of work for this investigation consisted of review of existing information, field exploration, laboratory testing, engineering analysis, and the preparation of this report.

The field exploration consisted of 44 Cone Penetration Tests (CPT's) and 46 exploratory borings during the present investigation. The locations of the subsurface explorations are shown on the Site Plan, Figure 2.

During a past investigation by GPI (Reference 1), 4 borings were performed for percolation testing. The locations of these subsurface explorations are also shown on the Site Plan, Figure 2.

The CPT's were advanced to depths ranging from 20 to 50½ feet below existing site grades. Detailed logs of the CPT's and a summary of the equipment used are presented in Appendix A. The exploratory borings were drilled using 8-inch diameter truck-mounted hollow-stem auger drilling equipment to depths ranging from 6 to 50 feet below existing site grades. Details of the drilling and Logs of Borings are presented in Appendix B.

Laboratory soil tests were performed on selected representative samples as an aid in soil classification and to evaluate the engineering properties of the soils. The geotechnical laboratory testing program included determinations of moisture content and dry density, Atterberg limits, percent fines (percentage passing the No. 200 sieve), compressibility (consolidation), shear strength (direct shear), collapse potential, compaction, expansion potential, soil corrosivity, and R-value. Laboratory testing procedures and results are summarized in Appendix C.

R-value testing was performed by GeoLogic Associates. Soil corrosivity testing was performed by Schiff Associates. This work was performed under subcontract to GPI. Their test results are presented in Appendix C.

Our percolation testing report, including boring logs and laboratory data, is included as Appendix D.

We reviewed a preliminary geotechnical investigation (Reference 2) performed at the site for a previously planned residential development.

Engineering evaluations were performed to provide earthwork criteria, foundation and slab design parameters, preliminary pavement sections and assessments of seismic hazards. The results of our evaluations are presented in the remainder of the report.

3.0 SITE CONDITIONS

3.1 SURFACE CONDITIONS

The project site consists of 124± acres of undeveloped, agricultural land and is bounded on the north by State Route 60, on the east by a drainage channel, on the south by undeveloped agricultural land, and on the east by undeveloped commercial land situated on a relatively new extension of Auto Mall Drive.

According to the available topographic data, the current ground surface elevations slope relatively uniformly to the south between Elevations +1780 feet and +1730 feet. A drainage channel meanders unlined on the majority of the east end of the site with depths of up to approximately 10 feet below the surrounding grades. At the south end of the site, the channel becomes improved with concrete lined banks.

Three large citrus groves covered approximately 45 percent of the site when we performed our explorations. Outside the citrus groves, the soils within the upper 2 feet in much of the site appear to have been recently tilled. We observed a thin layer of surficial organics, which appeared to be manure recently spread over portion of the site. Where measured, the thickness of this layer ranged from approximately 1 to 3 inches. Figure 3 shows the approximate areas of these surface features at the site.

A previous geotechnical report (Reference 2) indicated groundwater wells are located within the site. We did not observe these wells during our investigation.

3.2 SUBSURFACE SOILS

Our field investigation disclosed a subsurface profile consisting of natural soils comprised of silty sands, sandy silts, sands, clays, and silty clays and their mixtures. Detailed descriptions of the subsurface conditions encountered in our explorations are provided in Appendix A and B. A brief summary of the subsurface conditions is provided below.

The natural soils encountered in our explorations consist of soft to firm sandy silts, loose to medium dense silty sands, firm to hard clays, and medium dense to dense sands. In general, the loose and soft deposits were encountered to depths of about 10 to 15 feet below the existing grade. Except in the citrus grove areas, the soils within the upper 2 feet have, in general, been tilled and are disturbed. In general, the moisture content of the upper soils is variable ranging from near optimum moisture to dry. The natural soils (upper 10 to 15 feet) exhibit moderate to high compressibility and low to moderate strength characteristics. The hydrocollapse potential of the in-place soils was found to be slight (from 0.8 percent to 1.6 percent).

3.3 GROUNDWATER AND CAVING

Groundwater was not encountered in our explorations to depths of 50 feet below the existing grade. Caving was not encountered during drilling, although the work was done using relatively small diameter (8-inch) hollow-stem augers.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL

Based on the results of our investigation, it is our opinion that from a geotechnical viewpoint it is feasible to develop the site as proposed. The proposed structures can be supported on shallow foundations with remedial grading to mitigate the geotechnical constraints discussed below. The most significant geotechnical issues that will affect the design and construction of the proposed structure are as follows:

- The near-surface natural soils have variable densities and are compressible. These materials are not suitable for uniform support of the proposed structure or pavements in their current state. We recommend removal/replacement to densify these materials. For bidding/planning purposes, we recommend removal and replacement of the upper 7 feet of the existing soil profile or a minimum of 4 feet below the bottom of the footings, whichever is deeper. Removals of 2 feet in pavement areas are also recommended.

- Moisture contents of the upper materials encountered were dry to moist (approximately 0 to 8 percent below the optimum moisture content). The use of a disc and significant moisture conditioning will be required to achieve uniform moisture conditions and compaction.

- The organic surface soils are not suitable for use as fill within the building pads. We recommend the soils be removed outside the building areas. Prior to utilizing in non-building areas, the organic soils should be thoroughly mixed with other soils.

- The on-site clays in the upper 5 feet have a low to medium expansion potential. Expansion index and classification tests indicate that the clays generally have a low expansion potential as defined by the California Building Code (E.I. less than 51). These materials are suitable as fill materials provided they are not used as retaining wall backfill. Tests of one sample from the site indicated that some of the on-site clays have a medium expansion potential (E.I. = 61). To reduce the potential for swelling with the increase in moisture content, the clay soils should be placed wet of the optimum moisture content. Clays exposed in subgrade should be maintained wet of the optimum moisture content until covered. There is still a potential for some shrinkage and swelling of the clays with changes in moisture content. To reduce the potential for adverse affects beneath floor slabs, the subgrade should consist of at least 1-foot of non-expansive (E.I. < 20) soil or the floor slab should be at least 5 inches thick and reinforced with No. 3 rebar at 18 inches on centers in both directions.

- There is a potential for a relatively significant amounts of collapsible soils to remain after grading. We estimate maximum settlements on the order of 1 inch may occur upon wetting of the soil under foundation loads. We recommend no landscaping be planned within 20 feet of buildings to help mitigate potential for infiltration of water under the buildings. Any gaps between the buildings and pavements should be

sealed with a flexible caulking compound. All roof drainage should be collected and conducted away from the buildings. We recommend no infiltration or retention systems within 100 feet of the buildings due to the significant storm water anticipated from the roofs and pavements.

- In the event of a design seismic event, there is a potential for settlement of the ground surface on the order of ½- to 1-inch.

Our recommendations related to the geotechnical aspects of the development of the site are presented in the subsequent sections of this report.

4.2 SEISMIC CONSIDERATIONS

4.2.1 General

The site is located in a seismically active area of Southern California, and is likely to be subjected to strong ground shaking due to earthquakes on nearby faults.

We assume the seismic design of the proposed development will be in accordance with the California Building Code, 2007 edition. The site is located within Seismic Zone No. 4. For the 2007 CBC, a Soil Class D may be used. The seismic code values can be obtained directly from the tables in the building code using the above values and appropriate web site.

The actual method of seismic design should be determined by the Project Structural Engineer.

4.2.2 Strong Ground Motion Potential

Based on published information (Reference 3), the most significant fault in the proximity of the site is the San Jacinto Fault, which is located approximately 2 kilometers from the site.

Based on information provided in Reference 4, the site could be subjected to a peak ground acceleration of 0.85g. This acceleration has a 10 percent chance of being exceeded in 50 years.

4.2.3 Potential for Ground Rupture

There are no known active faults crossing or projecting through the site. The site is not located in an Alquist-Priolo special studies zone. Therefore, ground rupture due to faulting is considered unlikely at this site.

4.2.4 Liquefaction

Soil liquefaction is a phenomenon in which saturated cohesionless soils undergo a temporary loss of strength during severe ground shaking and acquire a degree of mobility sufficient to permit ground deformation. In extreme cases, the soil particles can become suspended in groundwater, resulting in the soil deposit becoming mobile and fluid-like. Liquefaction is generally considered to occur primarily in loose to medium dense deposits of saturated soils. Thus, three conditions are required for liquefaction to occur: (1) a cohesionless soil of loose to medium density; (2) a saturated condition; and (3) rapid large strain, cyclic loading, normally provided by earthquake motions.

The site is not located in a Seismic Hazard Zone for liquefaction (Seismic Hazards Mapping Act, State of California), as the site vicinity has not yet been mapped.

Soil liquefaction is not likely to occur at the site due to the absence of groundwater to depths of at least 50 feet.

4.2.5 Seismic Ground Subsidence

Seismic ground subsidence, not related to liquefaction, occurs when loose, sandy soils (above the groundwater) are densified during strong earthquake shaking. Subsidence of loose sandy soils during a strong earthquake may occur in soils below the recommended earthwork. We estimate the magnitude of the subsidence would be on the order of on the order of ½ to 1 inch. The majority of the subsidence will occur in the loose materials from depths of 10 to 20 feet below the existing ground surface.

4.3 EARTHWORK

The earthwork anticipated at the project site will consist of clearing and grubbing, excavation of near-surface compressible soils, subgrade preparation, and placement and compaction of fill.

4.3.1 Clearing and Grubbing

Prior to grading, the areas to be developed should be stripped of any vegetation and cleared of all debris and pavements. All buried obstructions, such as footings, utilities and tree roots, located within the proposed building area should be removed. All deleterious materials generated during the clearing operations should be removed from the site. The organic material observed on the southern portion of the site should be removed from the building areas.

Although not encountered during our investigation, any cesspools or septic systems encountered during construction should be removed in their entirety. The resulting excavation should be backfilled as recommended in the "Subgrade Preparation" and "Placement and Compaction of Fill" sections of this report. As an alternative, cesspools can be cleaned of any contents and backfilled with a lean sand-cement slurry.

Any groundwater wells within the site should be removed in accordance with the appropriate regulatory agency guidelines.

4.3.2 Excavations

Excavations at the site will include removal of near-surface compressible soils, footing excavations, and trenching for utility lines. We have provided recommendations for both blanket removals and strip removals for the building area, as discussed below.

Prior to placement of fills or construction of buildings, the low-density and disturbed natural soils within the building pad (including the building, canopies, and loading dock retaining walls) should be removed and replaced as properly compacted, documented fill. These materials require densification/documentation to provide adequate support of foundations and slab-on-grade floors. For bidding/planning purposes, we recommend removal and replacement of the upper 7 feet of the existing soil profile to provide uniform support under the proposed building. As a minimum, compacted soils should extend 4 feet below the bottom of the footings. Deeper excavations may be required in the citrus grove areas to remove disturbed soils. The actual depths of removal will need to be determined during grading in the field by the Geotechnical Engineer.

In proposed pavement and hardscape areas, removals should extend to a depth of 2 feet below existing or proposed grades, whichever is deeper, and replaced as properly compacted fill.

The base of removals should extend laterally beyond the building lines a minimum distance equal to the depth of overexcavation/compaction below finish grade (i.e., a 1:1 projection below the outside edge of footings), but not less than a distance of 5 feet. Building lines include loading dock walls, canopies, or other foundation supported improvements.

Where not removed by the aforementioned excavations, existing utility trench backfill occurring within the building pad should be removed and replaced as properly compacted fill. This is especially important for deeper fills associated with existing sewers and storm drains. For planning purposes, removals over the utilities should extend to within 1 foot of the top of the pipe. For utilities that are 5 feet or shallower, the removal should extend laterally 1 foot beyond both sides of the pipe. For deeper utilities, the removals should include a zone defined by a 1:1 projection upward (and away from the pipe) from each side of the pipe. The actual limits of removal will be confirmed in the field. We recommend that all known utilities be shown on the grading plan.

Temporary construction excavations may be made vertically without shoring to a depth of 5 feet below adjacent grade. For deeper cuts up to 10 feet, the slopes should be properly shored or sloped back at least 1:1 (horizontal to vertical) or flatter. For cuts up to 15 feet, the slopes should be properly shored or sloped back at least 1½:1 or flatter. The temporary slope inclination refers from the toe to the top of the temporary cut. The exposed slope face should be kept moist (but not saturated) during construction to reduce local sloughing. No surcharge loads should be permitted within a horizontal distance equal to the height of cut from the top of the excavation or 5 feet from the top of the slopes, whichever is greater, unless the cut is properly shored. Excavations that extend below an imaginary plane,

inclined at 45 degrees below the edge of adjacent existing site facilities, should be properly shored to maintain support of adjacent elements. All excavations and shoring systems should meet the minimum requirements given in the most current State of California Occupational Safety and Health Standards.

4.3.3 Subgrade Preparation

After the recommended removals are performed and prior to placing fills or construction of the proposed improvements, the exposed subgrade soils in building and parking areas should be scarified to a depth of 8 to 12 inches, moisture-conditioned, and compacted to at least 90 percent (95 percent for sands) of the maximum dry density (ASTM D1557).

4.3.4 Material for Fill

The on-site soils are, in general, suitable for use as compacted fill, with the exception of retaining wall backfill, which should not consist of the on-site silts and clays.

The on-site clays have a low to medium expansion potential. Some shrinkage and swelling should be expected with changes in moisture content. If the potential for some heaving is not tolerable, we recommend the subgrade soils within the upper 1-foot of the slab subgrade consist of relatively non-expansive (E.I. < 20) granular soils, or the floor slab be constructed at least 5 inches thick with No. 3 rebar at 18 inches on centers.

The organic surface soils observed over a portion of the site are not suitable for use as fill within the building pads. We recommend the soils be removed outside the building areas. Prior to utilizing in non-building areas, the organic soils should be thoroughly mixed with other soils until the organic content is less than 1 percent by weight, as determined in accordance with ASTM D-2974.

Imported fill material should be predominately granular, non-expansive, and contain no more than 40 percent fines (portion passing No. 200 sieve). The import should also exhibit an R-value of at least 25, if used in pavement areas. GPI should be provided with a sample (at least 50 pounds) and notified of the location of any soils proposed for import at least 72 hours in advance. Each proposed import source should be sampled, tested and accepted for use prior to delivery of the soils to the site. Soils imported prior to acceptance by the Geotechnical Engineer may be rejected if not suitable.

Soils used in compacted fills should be free of debris and should not contain material larger than 6 inches in any dimension.

4.3.5 Placement and Compaction of Fills

All fill soils should be placed in horizontal lifts, moisture-conditioned, and mechanically compacted to at least 90 percent of maximum dry density in accordance with ASTM D-1557. The optimum lift thickness will depend on the compaction equipment used and can best be determined in the field. The following uncompacted lift thickness can be used as preliminary guidelines.

Plate compactors	4-6 inches
Small vibratory or static rollers (5-ton±)	6-8 inches
Scrapers and heavy loaders	8-12 inches

The maximum lift thickness should not be greater than 12 inches and each lift should be thoroughly compacted and accepted prior to placement of subsequent lifts.

In general, moisture contents of the upper materials encountered were dry to moist. In our borings, we encountered soils that are approximately 0 to 8 percent below the optimum moisture content. The use of a disc and significant moisture conditioning will be required to achieve uniform moisture conditions and compaction.

The moisture content of the fine-grained, fill materials should be within 2 to 4 percent above the optimum moisture content to readily achieve the required degree of compaction and reduce the potential for expansion of the clayey soils. The moisture content of the sandy soils should be within 1 to 2 percent above the optimum moisture content.

During backfill of excavations, the fill should be properly benched into the construction slopes as it is placed in lifts.

4.3.6 Shrinkage and Subsidence

Shrinkage is the loss of soil volume caused by compaction of fills to a higher density than before grading. Subsidence is the settlement of in-place subgrade soils caused by loads generated by large earthmoving equipment. For earthwork volume estimating purposes, an average shrinkage value of 15 to 20 percent and subsidence of 0.1 to 0.2 foot may be assumed for the surficial soils. It should be realized that the on-site soils exhibit variable densities, making shrinkage factors difficult to determine. These values are estimates only and exclude losses due to removal of vegetation or debris. Actual shrinkage and subsidence will depend on the types of earthmoving equipment used and should be determined during grading.

4.3.7 Trench/Wall Backfill

Utility trench backfill should be mechanically compacted in lifts. Wall backfill should consist of on-site or imported non-expansive sandy soils. Subcontractors should note the discussion presented previously in the "Compacted Fill" section of this report regarding moisture conditioning and lift thickness. Jetting or flooding of trench or wall backfill materials should not be permitted. The Geotechnical Engineer should observe and test all trench and wall backfills as they are placed.

In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, sand-cement slurry may be substituted for compacted backfill. The slurry should contain one sack of cement per cubic yard and have a maximum slump of 5 inches. When set, such a mix typically has the consistency of compacted soil.

4.3.8 Observation and Testing

A representative of GPI should observe all excavations, subgrade preparation, and fill placement activities. Sufficient in-place field density tests should be performed during fill placement to evaluate the overall compaction of the soils. Soils that do not meet minimum compaction requirements should be reworked and tested prior to placement of any additional fill.

4.4 COLLAPSE POTENTIAL

A collapsible soil will undergo a reduction in volume upon wetting. Collapsible soil will typically have a low dry density and low moisture content. Collapsible soils may support large pressures with low compressibility when dry but experience significant compression upon wetting without an increase in pressure. Fine grained, aeolian or alluvial soils deposited in a semi-arid to arid climate tend to be the most susceptible to collapse.

Laboratory testing indicated the hydrocollapse potential of the in-place soils to be slight, in accordance with ASTM D-5333, ranging from 0.8 percent to 1.6 percent. After performing the recommended removals, there is a potential for layers of collapsible soil to remain with a total thickness up to 8 feet. We estimate maximum settlements on the order of 1-inch may from occur upon wetting of the soil under foundation loads.

To lessen the potential impacts of collapsible soils at the site, consideration should be given to either minimizing the potential for wetting of underlying soils under structures and other improvements or pre-soaking the bottom of excavations prior to placing fill or constructing the improvements. Pre-soaking the bottom of the building excavations may cause subgrade instabilities requiring stabilization or delays to the contractor during drying of the subgrade. Both would be expensive on a project of this magnitude. We recommend no landscaping be planned within 20 feet of buildings to help mitigate potential for infiltration of water under the buildings.

Infiltration or retention systems should not be constructed within 100 feet of the buildings due to the significant storm water anticipated from the roofs and pavements.

Storm water runoff from the roofs and pavements should be directed to appropriate storm water collection systems. Careful efforts should be made to provide methods of transporting runoff water to collection devices and preventing runoff water from infiltrating soils within the vicinity of the buildings or other improvements. Proper measures should also be take reduce the potential for future pipe leakage and/or landscape irrigation infiltration into the soils near the buildings or other proposed improvements.

4.5 FOUNDATIONS

4.5.1 Foundation Type

The proposed structures may be supported on conventional isolated and/or continuous shallow spread footings, provided the anticipated settlements (including static and seismic) are tolerable and the subsurface soils are prepared in accordance with the recommendations given in this report. Footings should be supported by properly compacted fill.

4.5.2 Allowable Bearing Pressures

Based on the shear strength and elastic settlement characteristics of the recompacted on-site soils, a static allowable net bearing pressure of up to 3,000 pounds per square foot (psf) may be used for both continuous footings and isolated column footings. These bearing pressures are for dead-plus-live-loads, and may be increased one-third for short-term, transient, wind and seismic loading. The actual bearing pressure used may be less, and can be based on economics and structural loads to determine the minimum width and depth of footings as discussed below. The maximum edge pressures induced by eccentric loading or overturning moments should not be allowed to exceed these recommended values.

4.5.3 Minimum Footing Widths and Embedments

The following minimum footing widths and embedments are recommended for the corresponding allowable bearing pressure.

STATIC BEARING PRESSURE (psf)	MINIMUM FOOTING WIDTH (inches)	MINIMUM FOOTING* EMBEDMENT (inches)
3,000	24	24
2,500	18	24
2,000	18	18
1,500	15	15

*Refers to minimum depth below lowest adjacent grade.

A minimum footing width of 15 inches should be used even if the actual bearing pressure is less than 1,500 psf.

4.5.4 Estimated Settlements

Maximum total static settlement of the more heavily loaded column footings (assumed 150 kips) is expected to be less than 1-inch. Static settlement of wall footings (assumed 6 kips per lineal foot) is expected to be on the order of ½-inch. Maximum static differential settlements are expected to be less than ½-inch between similarly loaded adjacent footings or along a 40-foot span of a continuous footing.

These settlements should be included with the potential seismic-induced settlements of dry loose, sandy soils. The maximum total seismic settlement is expected to on the order of ½- to 1-inch during a design seismic event (magnitude 7.5, 475 year return period). Maximum differential settlements due to seismic subsidence are expected to be less than ½-inch between similarly loaded adjacent footings or along a 40-foot span of a continuous footing.

The above estimates are based on the assumption that the recommended earthwork will be performed and that the footings will be sized in accordance with our recommendations.

4.5.5 Lateral Load Resistance

Soil resistance to lateral loads will be provided by a combination of frictional resistance between the bottom of footings and underlying soils and by passive soil pressures acting against the embedded sides of the footings. For frictional resistance, a coefficient of friction of 0.35 may be used for design. In addition, an allowable lateral bearing pressure equal to an equivalent fluid weight of 300 pounds per cubic foot may be used, provided the footings are poured tight against compacted fill soils. These values may be used in combination without reduction.

4.5.6 Foundation Concrete

Based on laboratory chemical testing performed by Schiff Associates (Appendix C), soluble sulfate contents ranged from 72 and 93 mg/kg (0.0072 and 0.0093 percent by weight). For the 2007 CBC, foundation concrete should conform to the requirements outlined in ACI 318, Section 4.3.

4.5.7 Footing Excavation Observation

Prior to placement of concrete and steel, a representative of GPI should observe and approve all footing excavations.

4.6 BUILDING FLOOR SLABS

Slab-on-grade floors should be supported on soils moisture conditioned and compacted as discussed in the "Placement and Compaction of Fill" section. The moisture content of the near surface soils within the building pad and hardscape areas should be maintained until concrete placement. The on-site soils should not be allowed to dry out, or additional processing and moisture conditioning will be required.

The on-site clays have a low to medium expansion potential. Some shrinkage and swelling should be expected with changes in moisture content. If the potential for some heaving is not tolerable, we recommend the subgrade soils within the upper 1-foot of the slab subgrade consist of relatively non-expansive (E.I. < 20) granular soils, or the floor slab be constructed at least 5 inches thick with No. 3 rebar at 18 inches on centers.

A vapor/moisture retarder should be placed under any slabs that are to be covered with moisture-sensitive floor coverings (parquet, vinyl tile, etc.). Currently, common practice is to use 10-mil polyethylene as a vapor retarder, placed either directly on the subgrade or over a thin layer of sand. Recently, other types of vapor retarders with much lower permeability and higher puncture resistance have become available and should be considered as an alternative. Polyolefin in 10-mil or 15-mil thickness is such a material and could be considered for this project. This material should be covered by a layer of clean sand (less than 5 percent by weight passing the No. 200 sieve) having a minimum thickness of 2 inches. The function of the sand layer is to protect the vapor retarder during construction and to aid in the uniform curing of the concrete. This layer should be nominally compacted using light equipment. The sand placed over the vapor retarder should be only slightly moist. If the sand gets wet (for example, as a result of rainfall) it must be allowed to dry prior to placing concrete.

It should be noted that the material used as a vapor retarder is only one of several factors affecting the prevention of moisture accumulation under floor coverings. Other factors include effective sealing of joints and edges (particularly at pipe penetrations) as well as excess moisture in the concrete. The manufacturer of floor coverings should be consulted for establishing acceptable criteria for the condition of floor surface prior to placing moisture-sensitive floor coverings.

For elastic design of slabs supporting sustained concentrated loads, a modulus of subgrade reaction (k) of 80 pounds per cubic inch (pounds per square inch per inch of deflection) may be used. If a higher value is needed, the slab should be underlain by 6 inches of aggregate base, which will result in a k-value for the composite materials of 150 pci.

A coefficient of friction of 0.35 may be used between the slab and subgrade soils. Where a vapor/moisture retarder (visqueen) is provided, the friction value should be reduced to 0.1.

4.7 LATERAL EARTH PRESSURES

Based on information available to us at the time this report was prepared, no major retaining walls or basements were planned for the site. The following recommendations are provided for walls less than 7 feet in height. We recommend that walls be backfilled with on-site or imported non-expansive, granular (sandy) soils.

Active earth pressures can be used for designing walls that can yield at least 1-inch laterally in 10 feet of wall height under the imposed loads. For level backfill comprised of granular soils (no more than 40 percent passing No. 200 U.S. standard sieve), the magnitude of active pressures are equivalent to the pressures imposed by a fluid weighing 35 pounds per cubic foot (pcf). This pressure may also be used for the design of temporary excavation support.

At-rest pressures should be used for restrained walls that remain rigid enough to be essentially non-yielding. At-rest pressures for granular soils are equivalent to the pressures imposed by a fluid weighing 50 pounds per cubic foot.

Walls subject to surcharge loads should be designed for an additional uniform lateral pressure equal to one-third and one-half the anticipated surcharge pressure for unrestrained and restrained walls, respectively. The wall backfill should be well-drained to relieve possible hydrostatic pressure or designed to withstand these pressures. The Structural Engineer should indicate on the plans the type of backfill recommended above. Wall footings should be designed as discussed in the "Foundations" section.

4.8 CORROSIVITY

Resistivity testing (Appendix C) of a representative sample of the on-site soils indicates that they are corrosive to ferrous metals. Should the use of buried metal pipe be proposed, a corrosion engineer such as Schiff Associates should be consulted to provide recommendations to protect these elements from corrosion. GPI does not practice corrosion engineering.

4.9 DRAINAGE

Positive surface gradients should be provided adjacent to all structures so as to direct surface water run-off and roof drainage away from foundations and slabs toward suitable discharge facilities. Long-term ponding of surface water should not be allowed on pavements or adjacent to buildings. Any gaps between pavements and the buildings should be filled with a flexible caulking compound.

4.10 EXTERIOR CONCRETE AND MASONRY FLATWORK

Exterior concrete and masonry flatwork should be supported on properly moisture conditioned and compacted fill. Prior to placement of concrete, the subgrade should be prepared as recommended in "Subgrade Preparation". The moisture content of the soils within the upper 1 foot of hardscape and floor slabs should be confirmed immediately prior to placing concrete.

4.11 PAVED AREAS

R-value testing indicates that the subgrade soils have R-values ranging from 33 to 46 (Appendix C). Preliminary pavement design has been based on an R-Value of 30 and the following assumed traffic indices typically used for commercial/industrial developments. The California Division of Highways Design Method was used for design of the recommended preliminary pavement sections. These recommendations are based on the assumption that the pavement subgrades will consist of on-site materials. Final pavement design should be based on R-value testing performed near the conclusion of rough grading. The following pavement sections are recommended for planning purposes only.

ON-SITE PAVEMENT SECTIONS

PAVEMENT AREA	ASSUMED TRAFFIC INDEX	SECTION THICKNESS (inches)	
		ASPHALT CONCRETE	AGGREGATE BASE COURSE
Auto Parking	4.0	3	4
Circulation Drives/Light Trucks	5.0	3	6
Truck Courts	6.0	3	9
Truck Courts	6.5	3	10
Truck Drives	7.0	3	12
		Portland Cement Concrete	**Aggregate Base Course**
Truck Courts	6.0	7.0	----
Truck Courts	6.5	7.0	----
Truck Drives	7.0	7.0	----
Truck Drives	8.0	7.5	----

The pavement subgrade underlying the aggregate base should be properly prepared and compacted in accordance with the recommendations outlined under "Subgrade Preparation".

The pavement base course should be compacted to at least 95 percent of maximum dry density (ASTM D-1557). Aggregate base should conform to the requirements of Section 26 of the California Department of Transportation Standard Specifications for Class II aggregate base (three-quarter-inch maximum) or Section 200-2 of the Standard Specifications for Public Works Construction (Green Book) for untreated base materials (except Processed Miscellaneous Base).

The concrete used for paving should have a modulus of rupture of at least 550 psi (equivalent to an approximate compressive strength of 3,700 psi at the time the pavement is subjected to traffic.

The above recommendations are based on the assumption that the base course and compacted subgrade will be properly drained. The design of paved areas should incorporate measures to prevent moisture build-up within the base course, which can otherwise lead to premature pavement failure. For example, curbing adjacent to landscaped areas should be deep enough to act as a retarder to the infiltration of irrigation water into the adjacent base course.

5.0 LIMITATIONS

The report, exploration logs, and other materials resulting from GPI's efforts were prepared exclusively for use by ProLogis Development Services, Inc., and their consultants in designing the proposed development. The report is not intended to be suitable for reuse on extensions or modifications of the project or for use on any project other than the currently proposed development as it may not contain sufficient or appropriate information for such uses. If this report or portions of this report are provided to contractors or included in specifications, it should be understood that they are provided for information only. This report or portions thereof cannot be utilized by another entity without express written permission by GPI. This report is an instrument of our services and remains the property of GPI.

Soil deposits may vary in type, strength, and many other important properties between points of exploration due to non-uniformity of the geologic formations or to man-made cut and fill operations. While we cannot evaluate the consistency of the properties of materials in areas not explored, the conclusions drawn in this report are based on the assumption that the data obtained in the field and laboratory are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Furthermore, our recommendations were developed with the assumption that a proper level of field observation and construction review will be provided during grading, excavation, and foundation construction by GPI. If field conditions during construction appear to be different than is indicated in this report, we should be notified immediately so that we may assess the impact of such conditions on our recommendations. If construction-phase services are performed by others, the new consultant and the client must accept full responsibility for all geotechnical aspects of the project including this report.

Our investigation and evaluations were performed using generally accepted engineering approaches and principles available at this time and the degree of care and skill ordinarily exercised under similar circumstances by reputable Geotechnical Engineers practicing in this area. No other representation, either expressed or implied, is included or intended in our report.

Respectfully submitted,
Geotechnical Professionals Inc.

Donald A. Cords, G.E.
Associate

DAC:sph

James E. Harris, G.E.
Principal

DEC 27 2007

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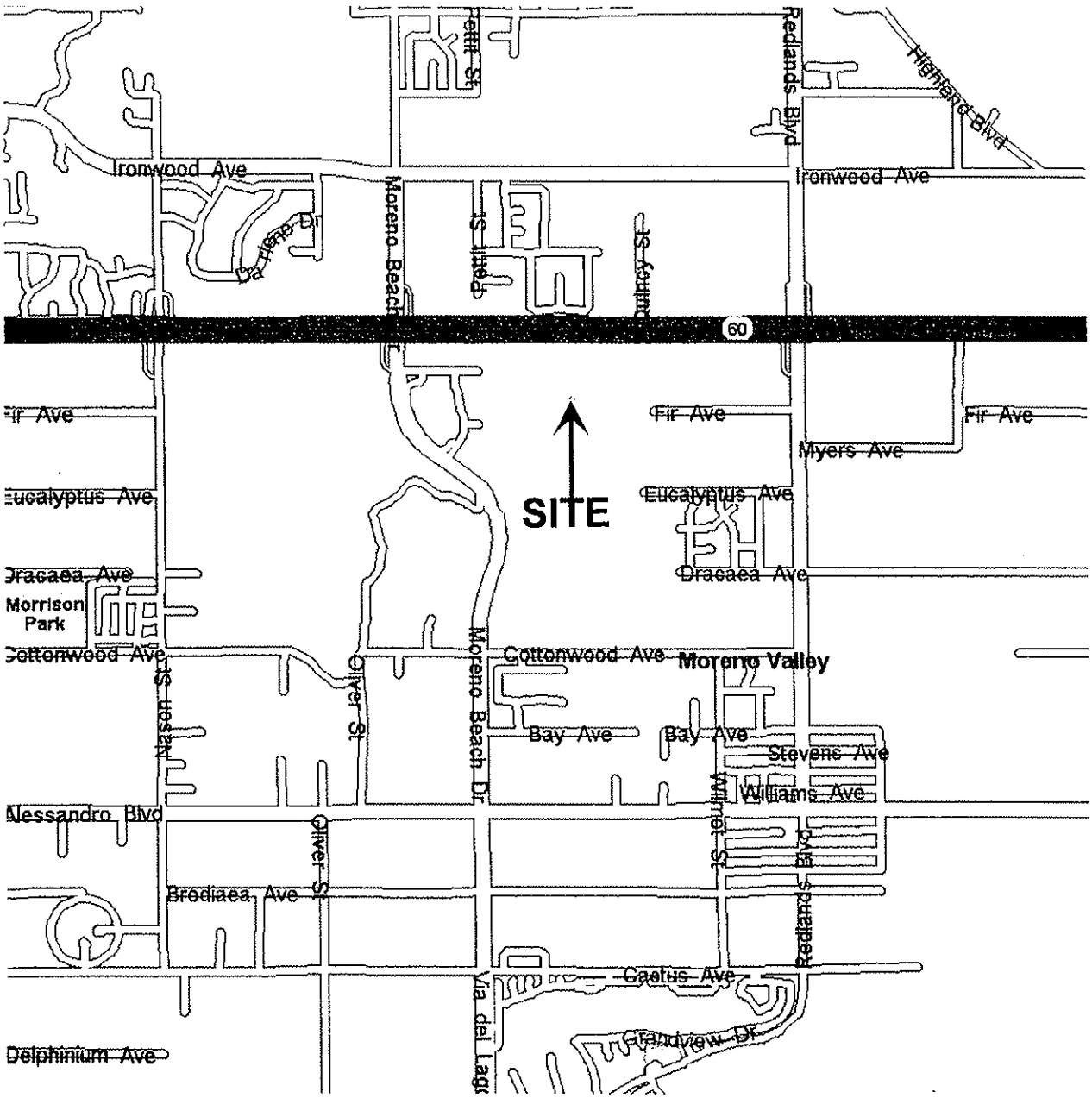
2. RM Environmental, Inc. (2004), *"Preliminary Geotechnical Investigation, Proposed 347 Lot, Single Family Residential Development, 120± Acres, Assessors Parcel Numbers (APN) 477-120-(001, 006, 007, 008, 014, 015), Near the Intersection of Pettit Street and Highway 60, City of Moreno Valley, California,"* Project No. 03-406, dated January 19, 2004.

3. Blake, T. F. (2000), *"EQFAULT, A Computer Program for the Deterministic Prediction of Peak Horizontal Acceleration from Digitized California Faults,"* Unpublished Private Program: Updated 2000.

4. Blake, T.F. (2000), *"FRISKP, A Computer Program for the Probabilistic Estimation of Uniform-Hazard Spectra Using Faults as Earthquake Sources, User's Manual,"* Version 3.01b, updated 2004.



SITE LOCATION MAP REPRODUCED FROM MS STREETS & TRIPS 2006

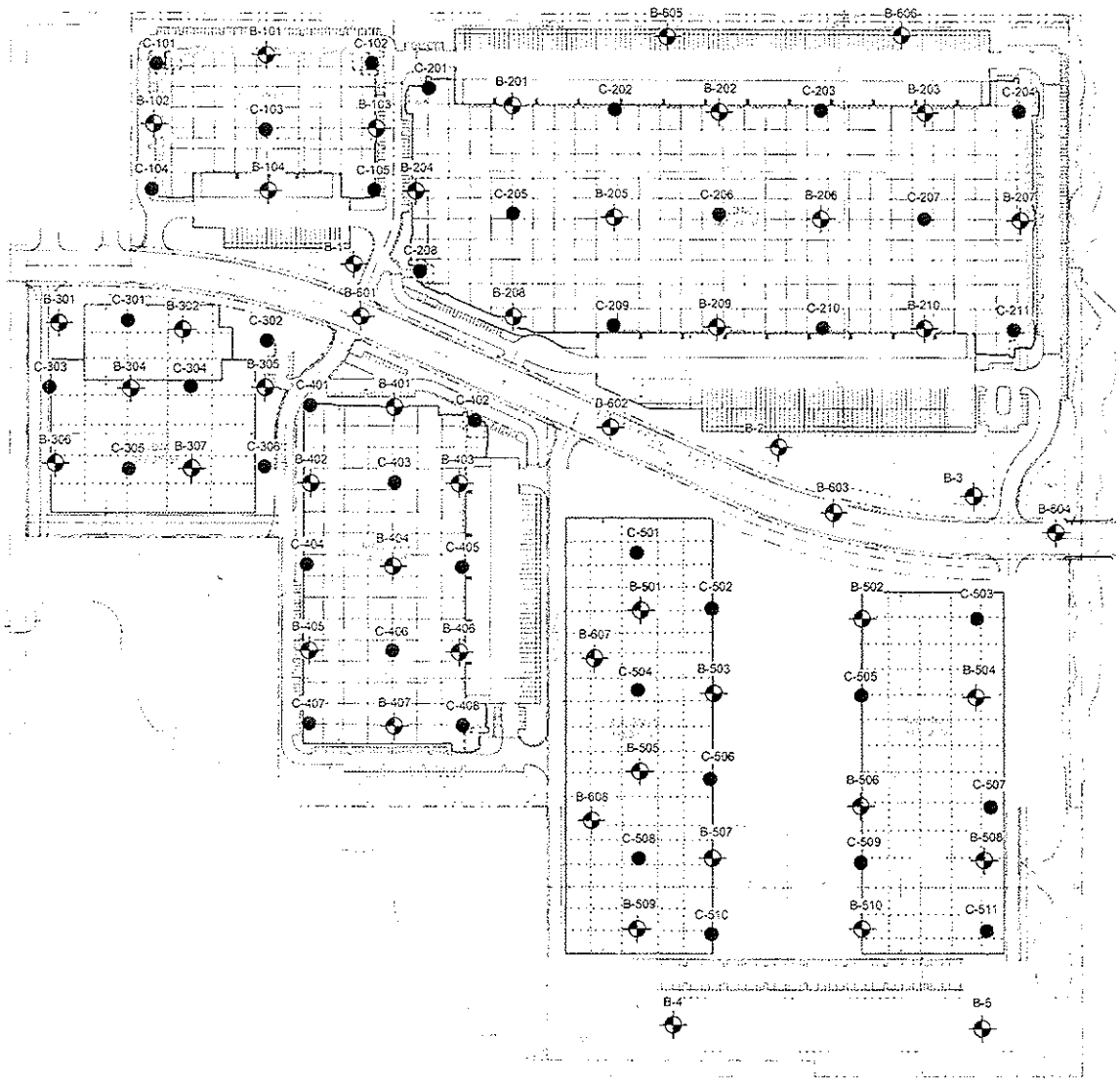
GPI GEOTECHNICAL PROFESSIONALS, INC.

PROLOGIS PARK - MORENO VALLEY

GPI PROJECT NO. 2175.1I | NO SCALE

SITE LOCATION MAP

FIGURE 1



BASE PLAN REPRODUCED FROM SITE PLAN PREPARED BY RGA (DATED JUNE 4, 2007)

EXPLANATION

B-1 — APPROXIMATE LOCATION AND NUMBER OF EXPLORATORY BORING

C-7 — APPROXIMATE LOCATION AND NUMBER OF CONE PENETRATION TEST

0 300 600 FEET

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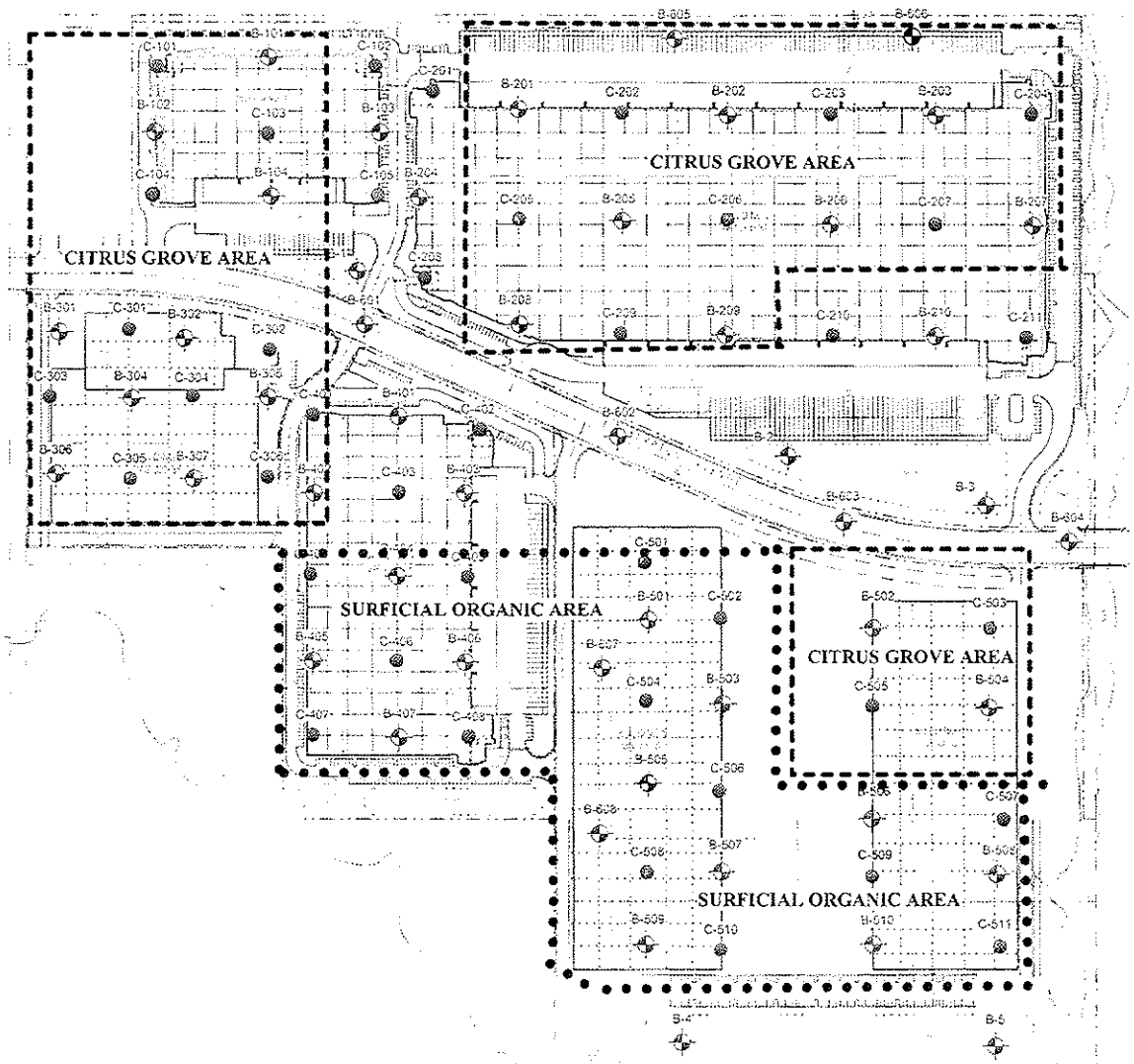
PROLOGIS PARK - MORENO VALLEY

GPI PROJECT NO. 2175.1I | SCALE: 1"=300'

SITE PLAN

FIGURE 2



EXPLANATION

APPROXIMATE AREA WITH CITRUS GROVES (EXISTING OR RECENTLY REMOVED)

APPROXIMATE AREA WITH SURFACE LAYER OF ORGANICS

0 300 600 FEET

BASE PLAN REPRODUCED FROM SITE PLAN PREPARED BY RGA (DATED JUNE 4, 2007)

GPI GEOTECHNICAL PROFESSIONALS, INC.

PROLOGIS PARK - MORENO VALLEY

GPI PROJECT NO. 2175 11 | SCALE: 1"=300'

SURFACE FEATURE AREAS

FIGURE 3

APPENDIX A

APPENDIX A

CONE PENETRATION TESTS

A total of 44 Cone Penetration Tests (CPT's) were performed at the site during the present investigation. These soundings were advanced to depths ranging from 20 to 50.5 feet below existing grades. The locations of the CPT's are shown on the Site Plan, Figure 2.

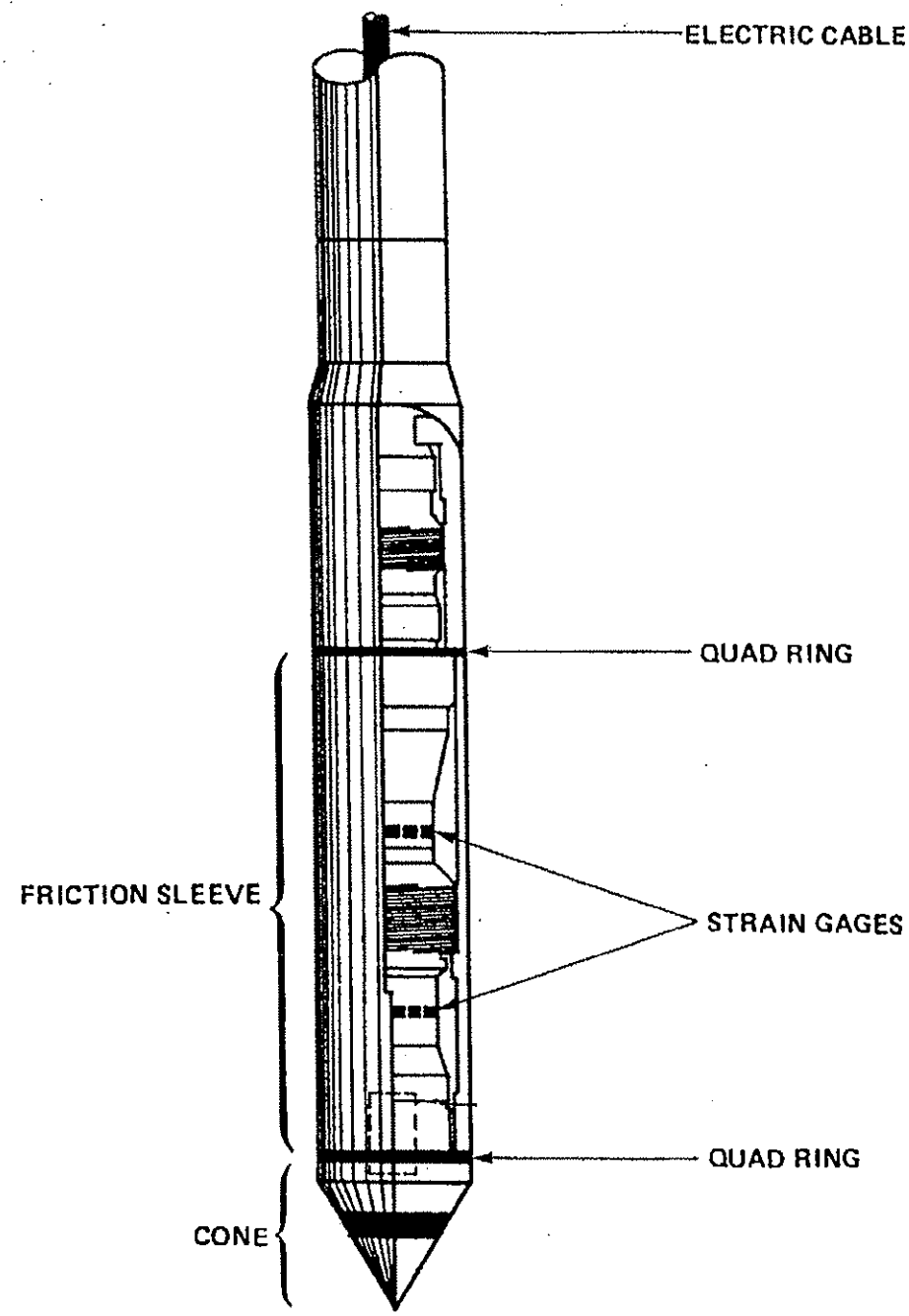
The Cone Penetration Test consists of pushing a cone-tipped probe into the soil deposit while simultaneously recording the cone tip resistance and side friction resistance of the soil to penetration (refer to Figure A-1). The CPT's described in this report were conducted in general accordance with ASTM specifications (ASTM D 5778) using an electric cone penetrometer.

The CPT equipment consists of a cone assembly mounted at the end of a series of hollow sounding rods. A set of hydraulic rams is used to push the cone and rods into the soil while a continuous record of cone and friction resistance versus depth is obtained in both analog and digital form at the ground surface. A specially designed truck is used to transport and house the test equipment and to provide a reaction to the thrust of the hydraulic rams.

Data obtained during a CPT consists of continuous stratigraphic information with close vertical resolution. Stratigraphic interpretation is based on relationships between cone tip resistance and friction resistance. The calculated friction ratio (CPT friction sleeve resistance divided by cone tip resistance) is used as an indicator of soil type. Granular soils typically have low friction ratios and high cone resistance, while cohesive or organic soils have high friction ratios and low cone resistance. These stratigraphic material categories form the basis for all subsequent calculations which utilize the CPT data.

Computer plots of the reduced CPT data acquired for this investigation are presented in Figures A-2 through A-45 of this appendix. The field testing and computer processing for the current investigation was performed by Fugro Geosciences, Inc. under subcontract to Geotechnical Professionals Inc. (GPI). The interpreted soil descriptions were prepared by GPI.

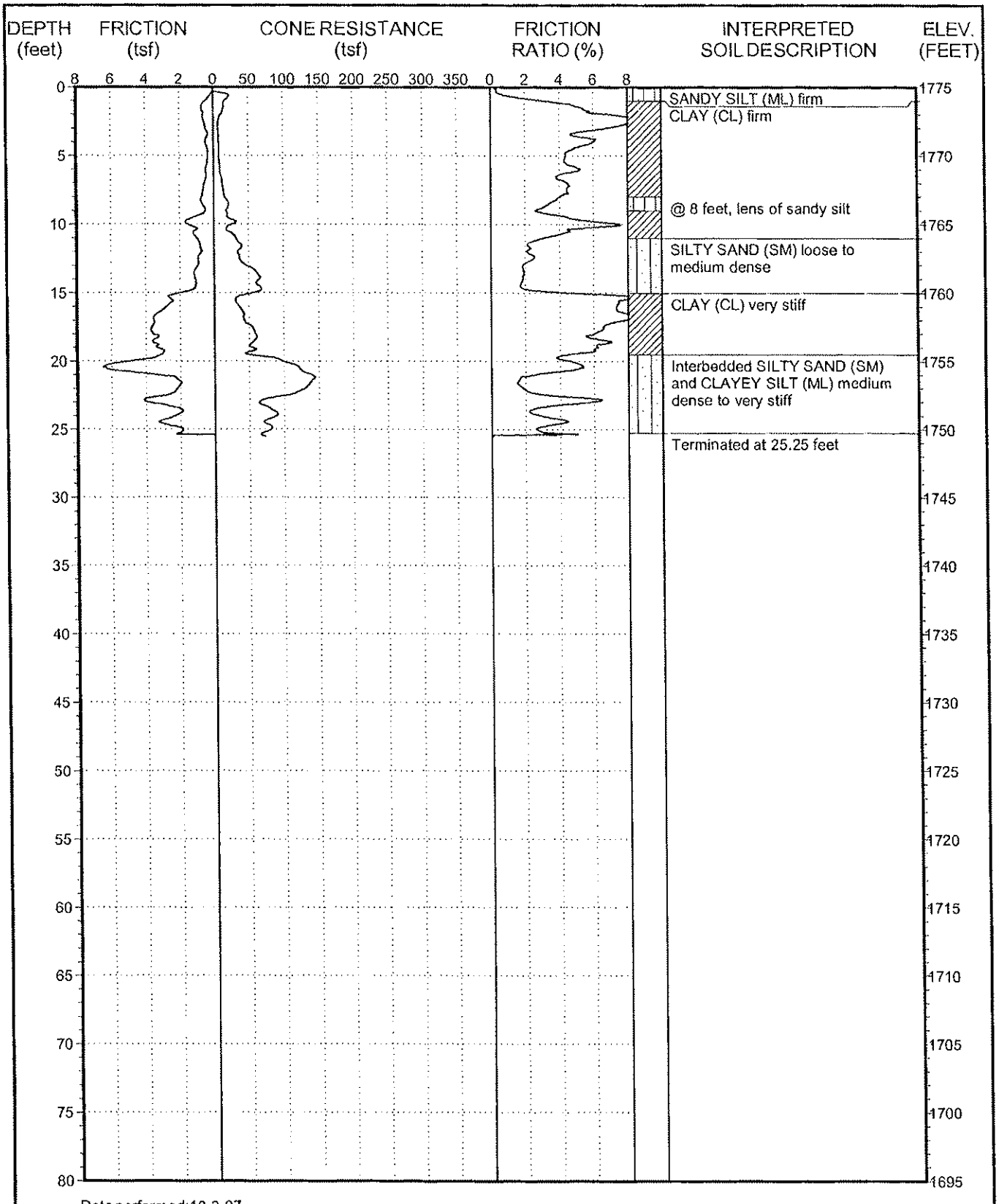
The CPT locations were laid out in the field by measuring from existing site features. Ground surface elevations at the CPT locations were estimated from topography on the preliminary conceptual grading plan prepared by Thienes Engineering (dated June 2007).



GEOTECHNICAL PROFESSIONALS, INC.

CONE PENETROMETER

FIGURE A-1



Date performed: 10-3-07

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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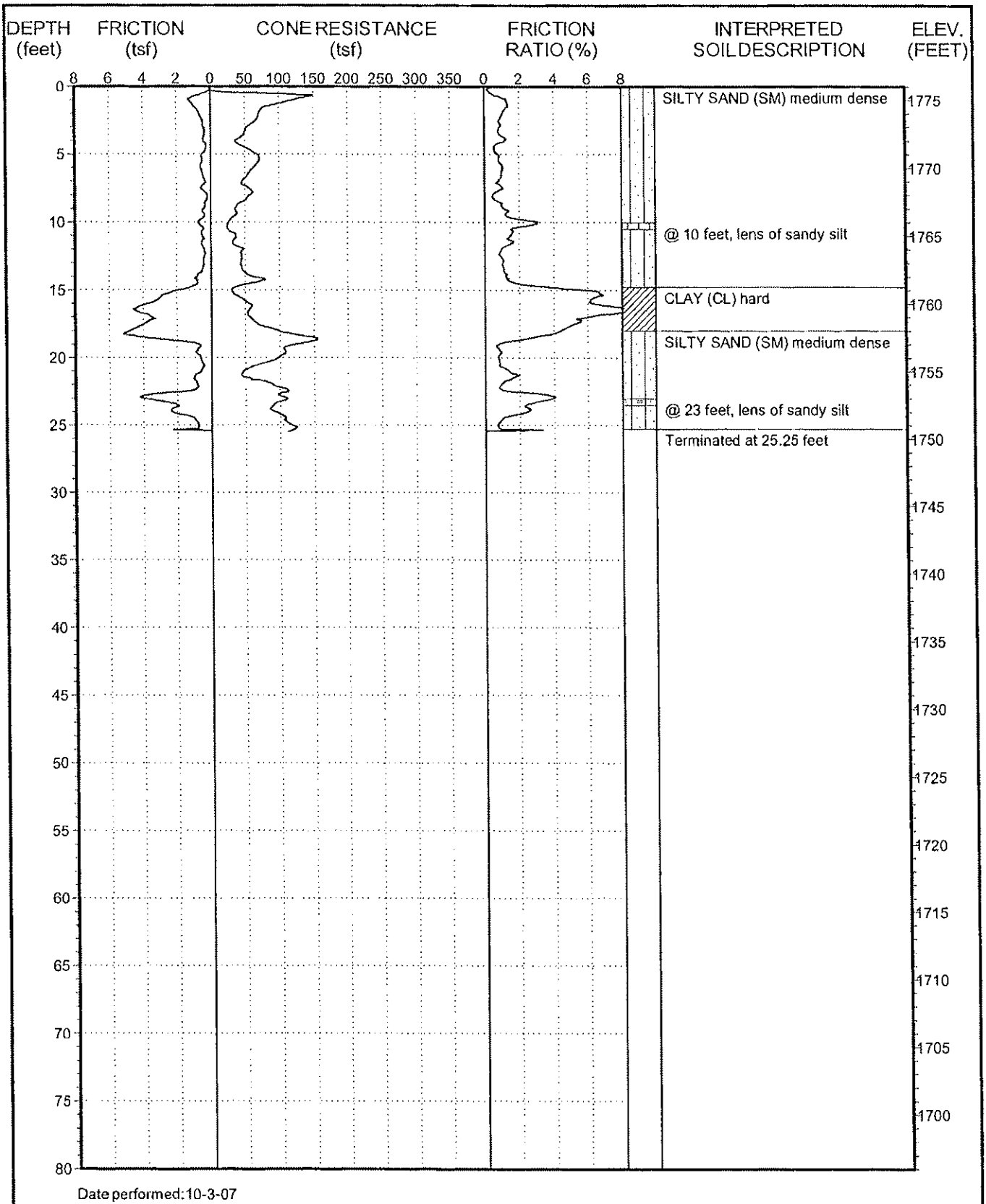
PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-101

FIGURE A-2



Date performed: 10-3-07

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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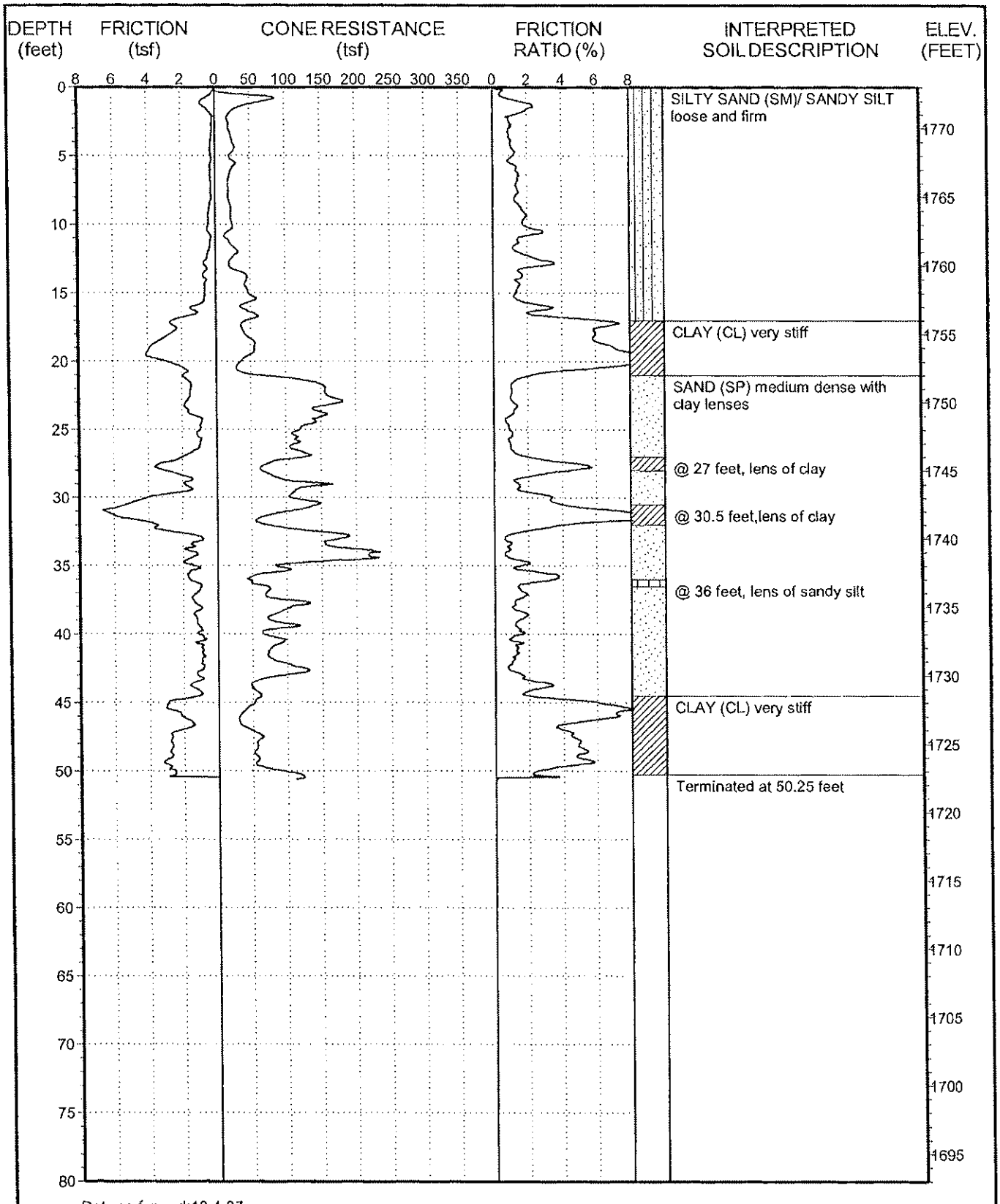
PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-102

FIGURE A-3



Date performed:10-4-07

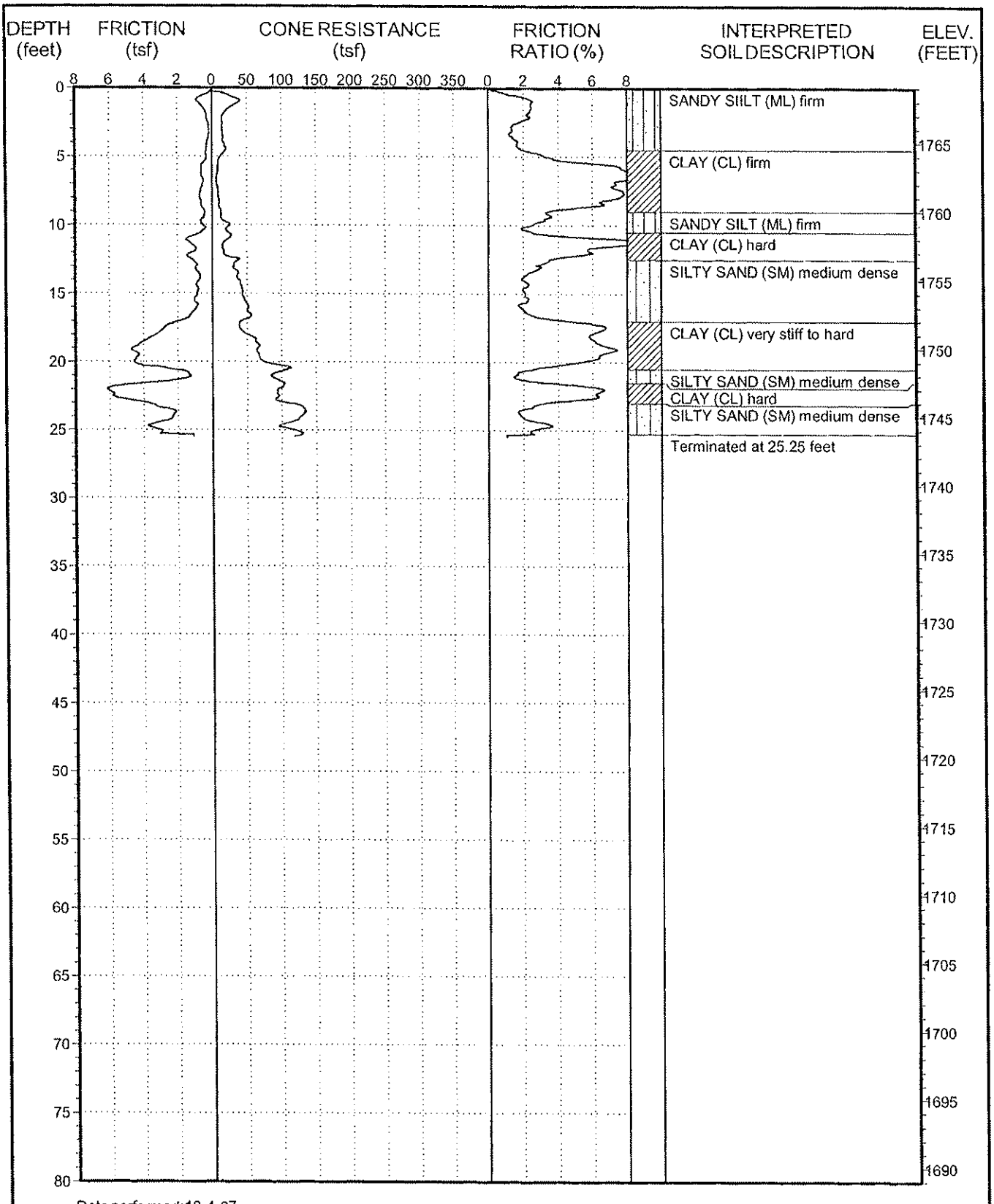
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-103

FIGURE A-4



Date performed: 10-4-07

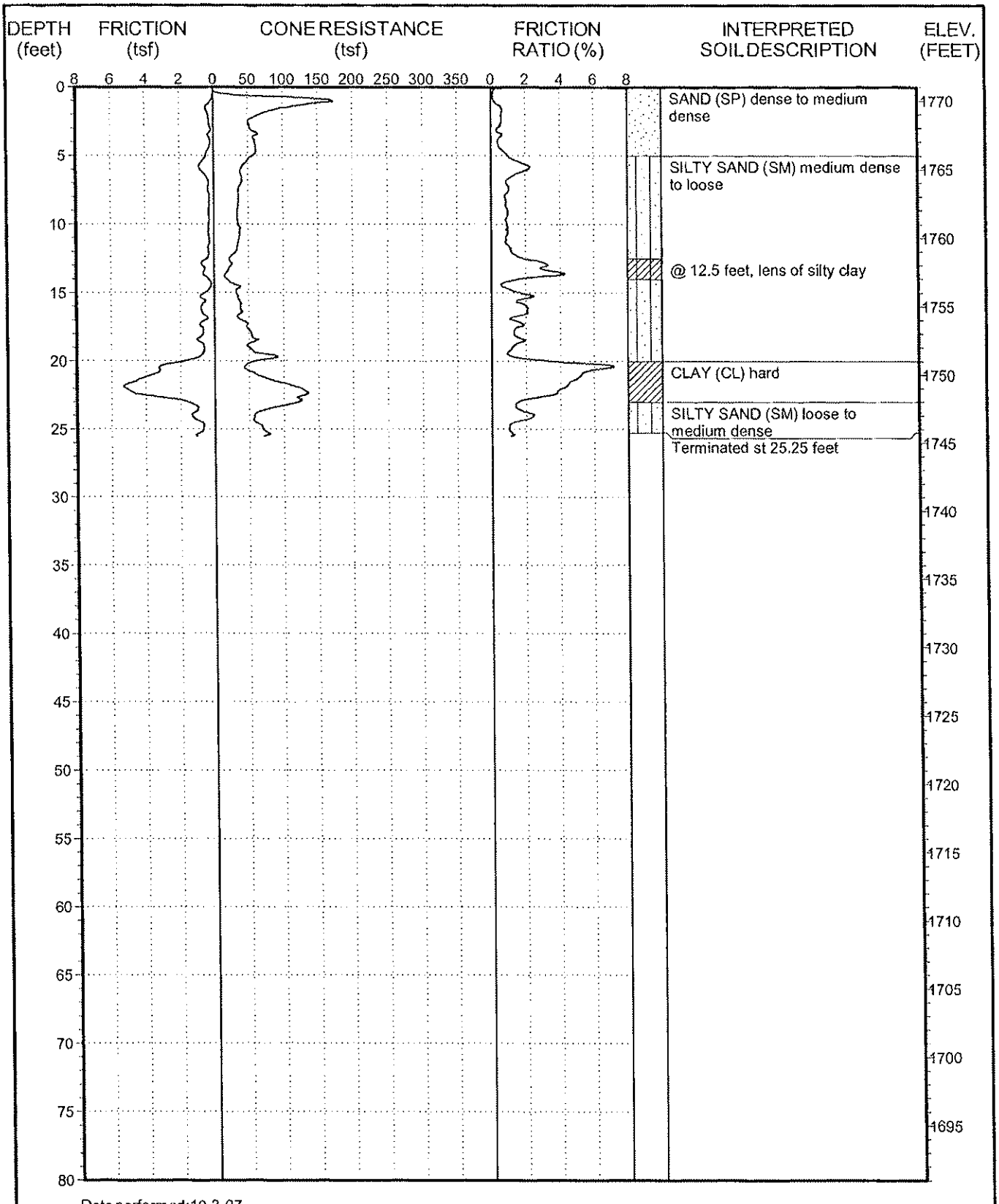
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GDI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-104

FIGURE A-5



Date performed:10-3-07

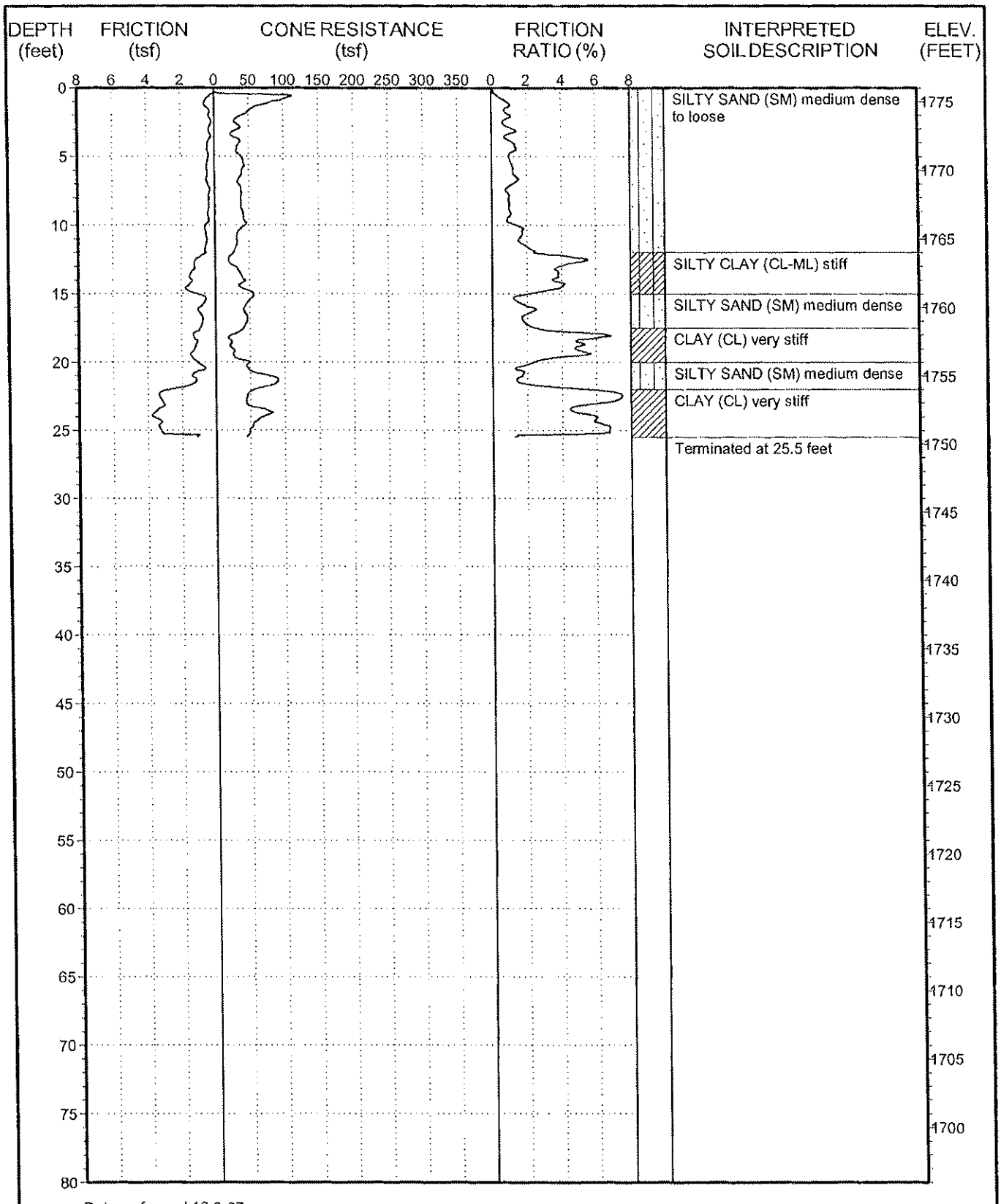
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-105

FIGURE A-6



Date performed:10-3-07

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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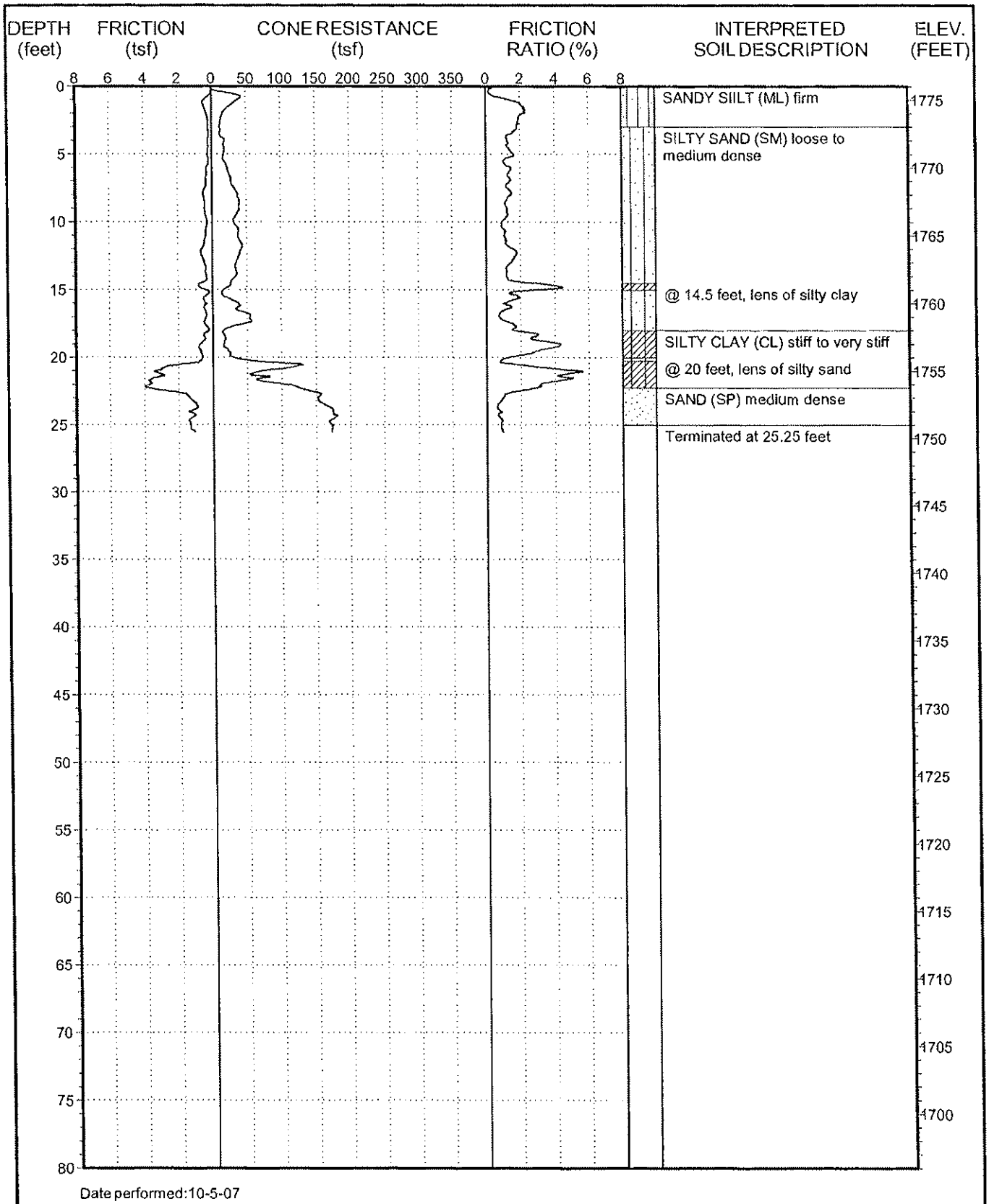
PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-201

FIGURE A-7



Date performed:10-5-07

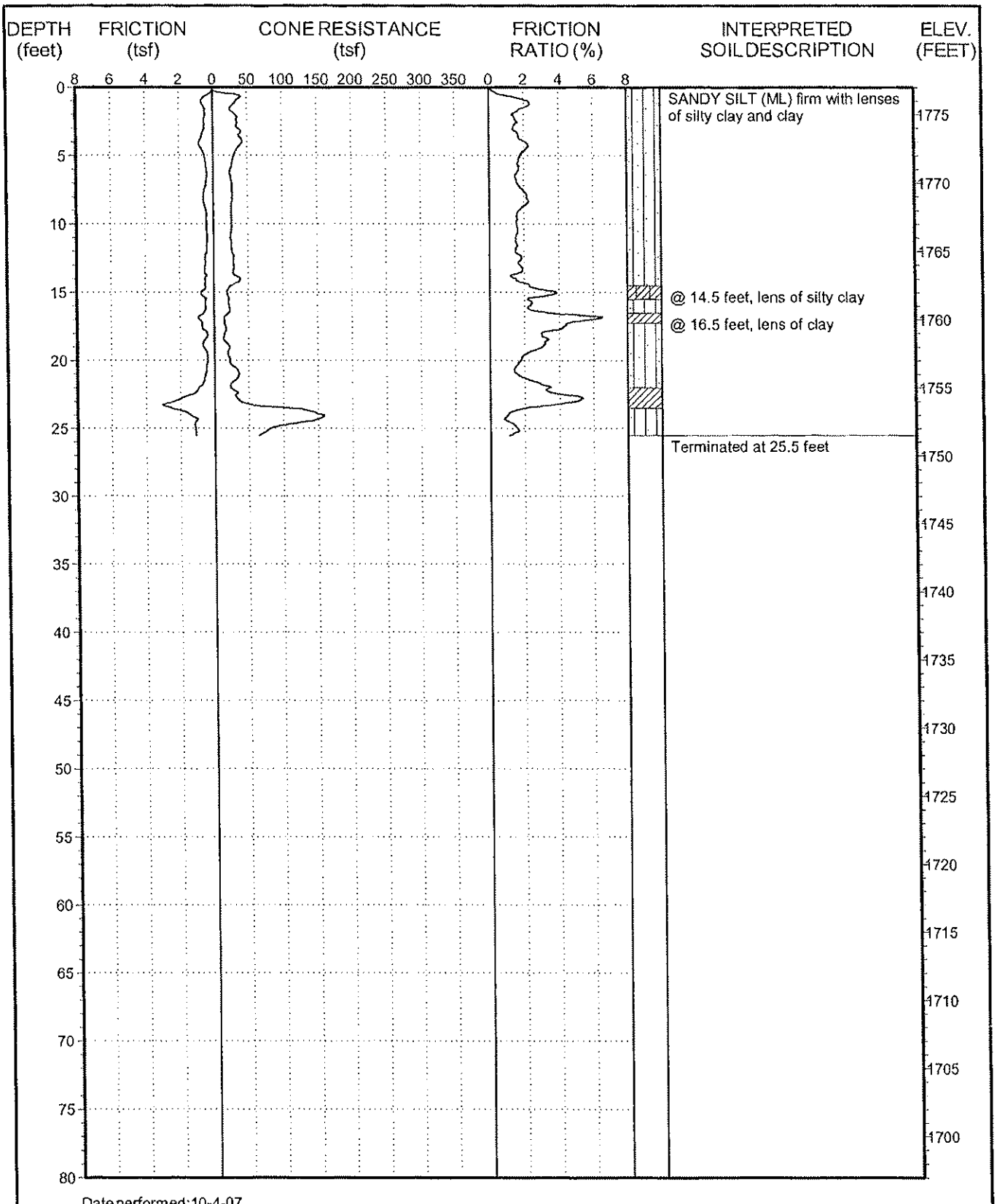
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-202

FIGURE A-8



Date performed: 10-4-07

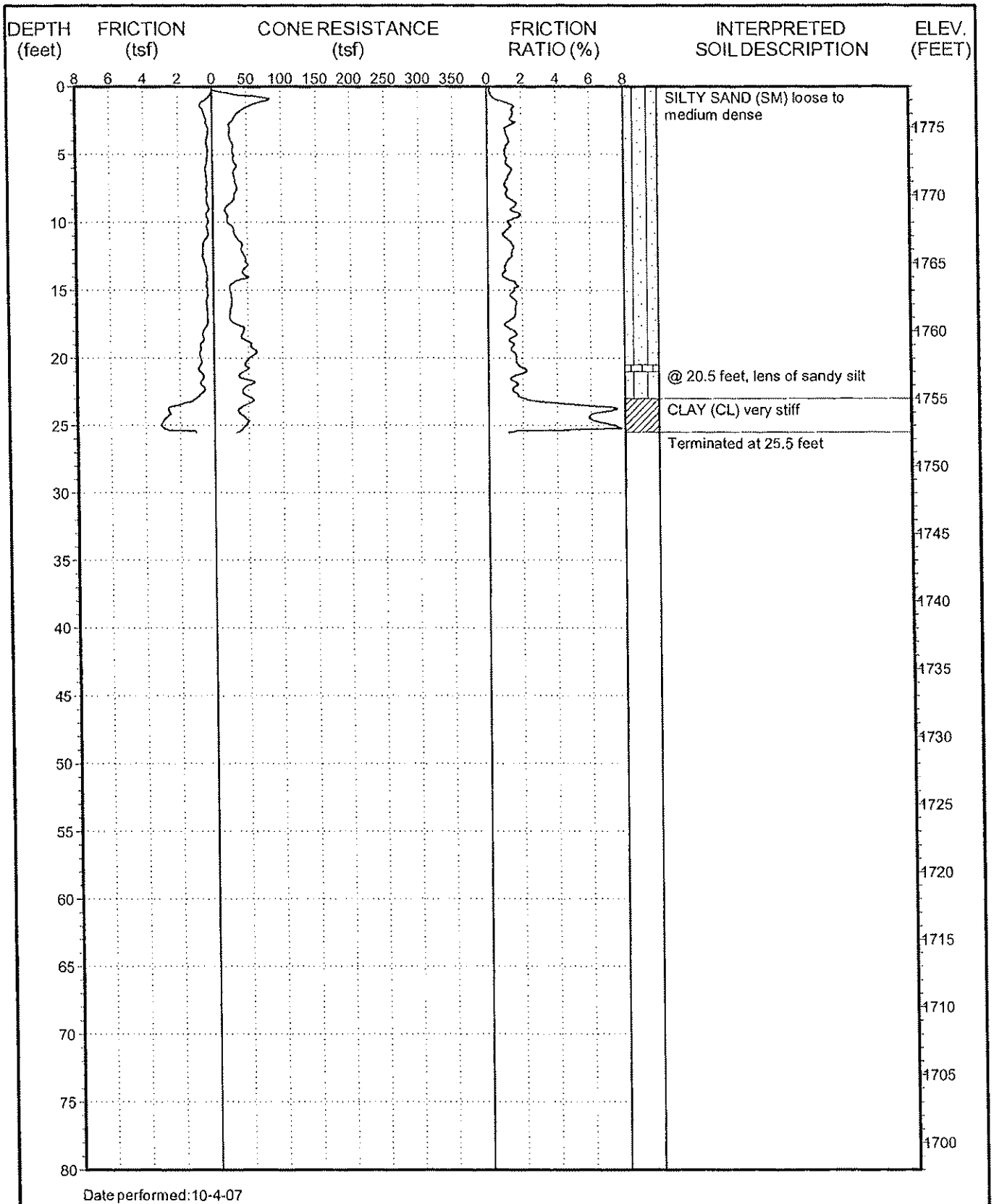
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-203

FIGURE A-9



Date performed: 10-4-07

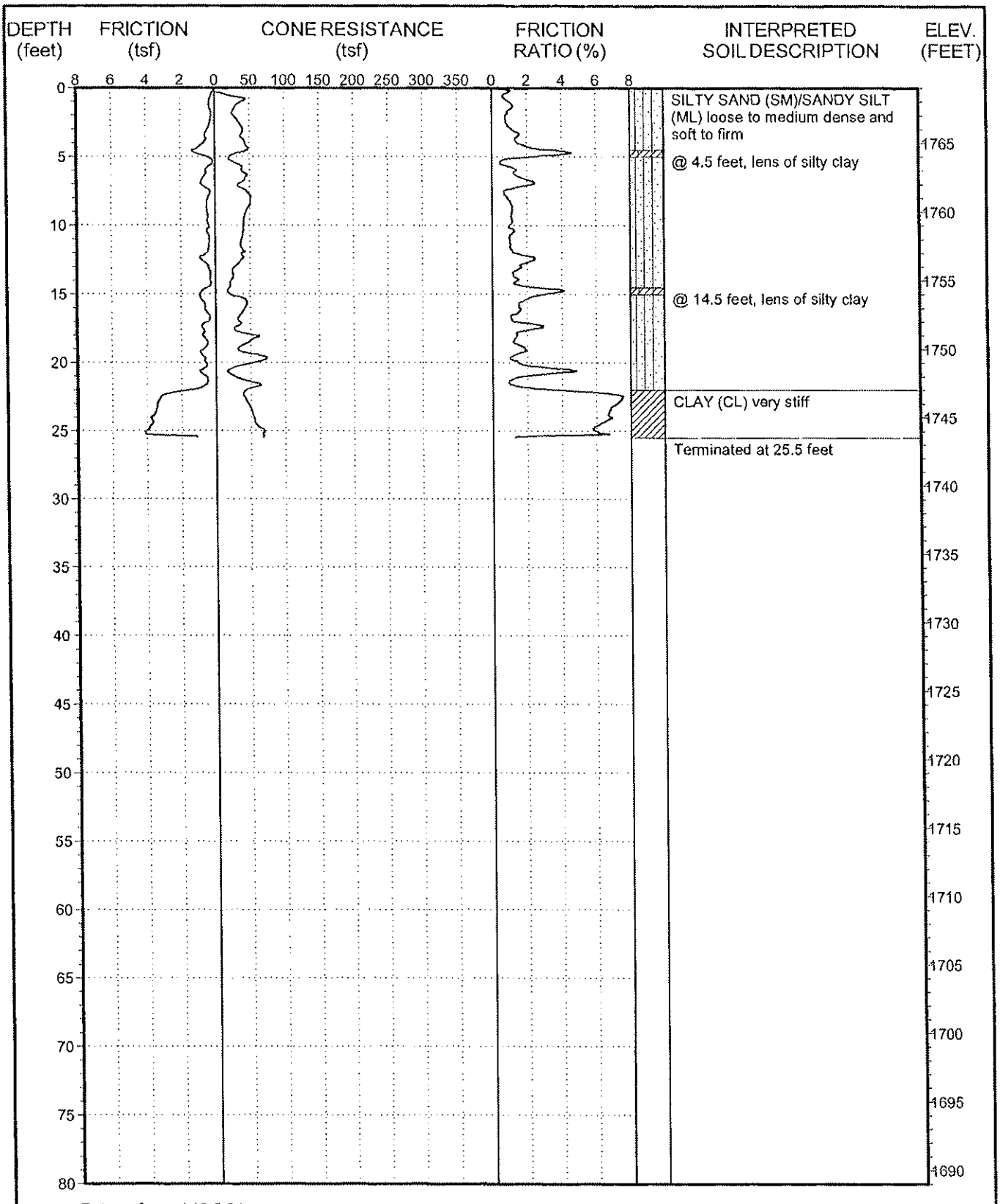
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-204

FIGURE A-10



Date performed:10-5-07

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

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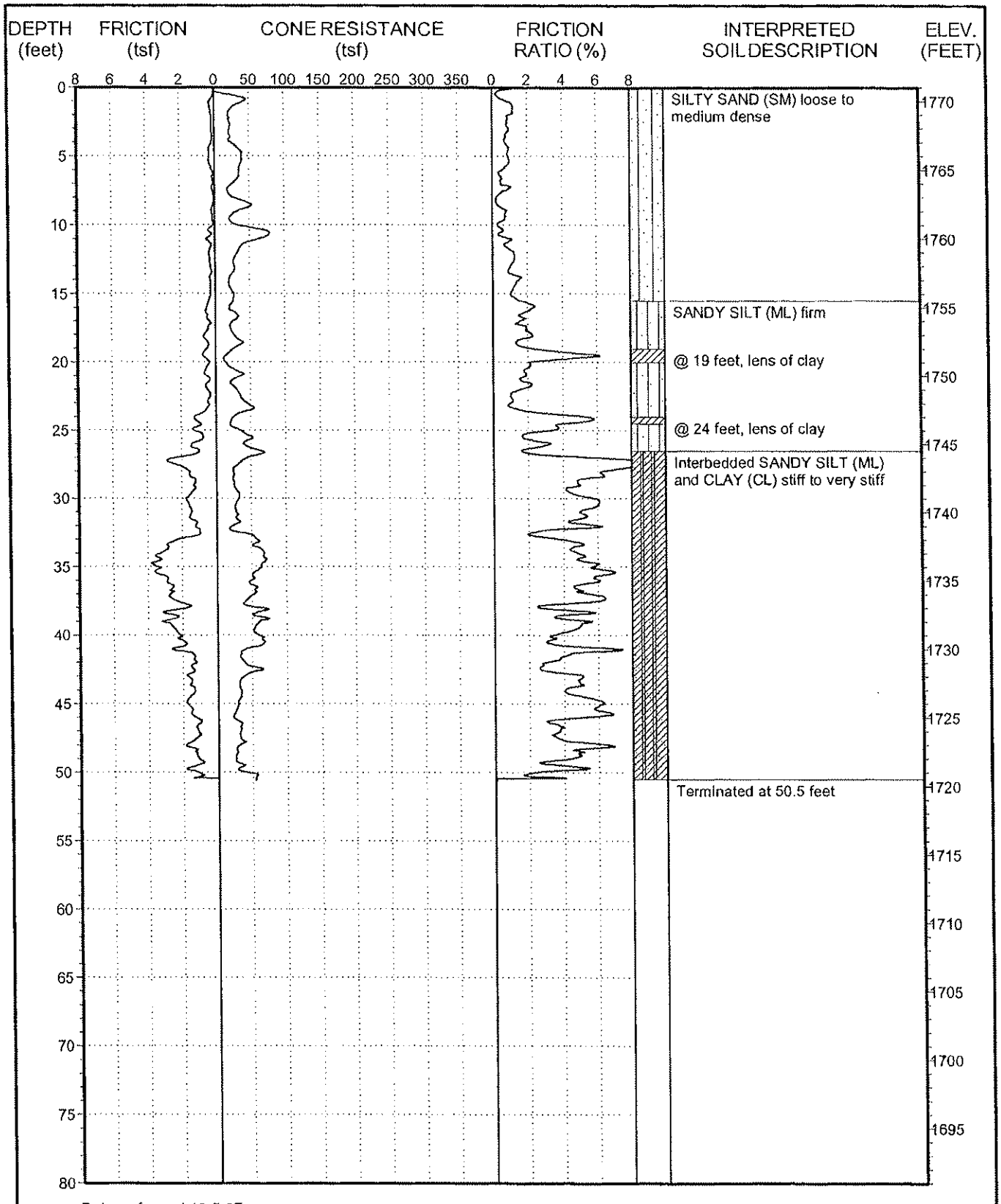
PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-205

FIGURE A-11



Date performed: 10-5-07

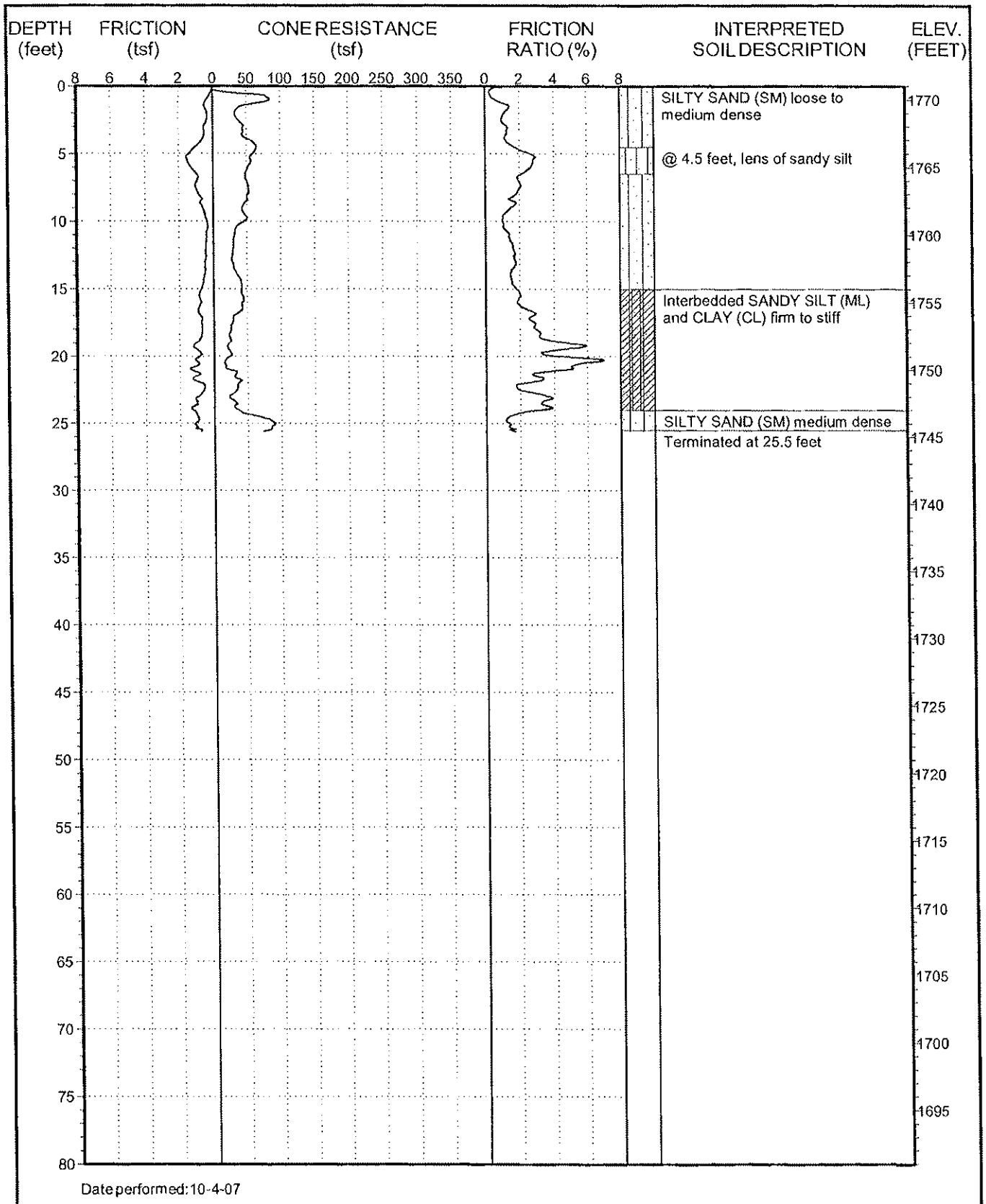
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-206

FIGURE A-12



Date performed: 10-4-07

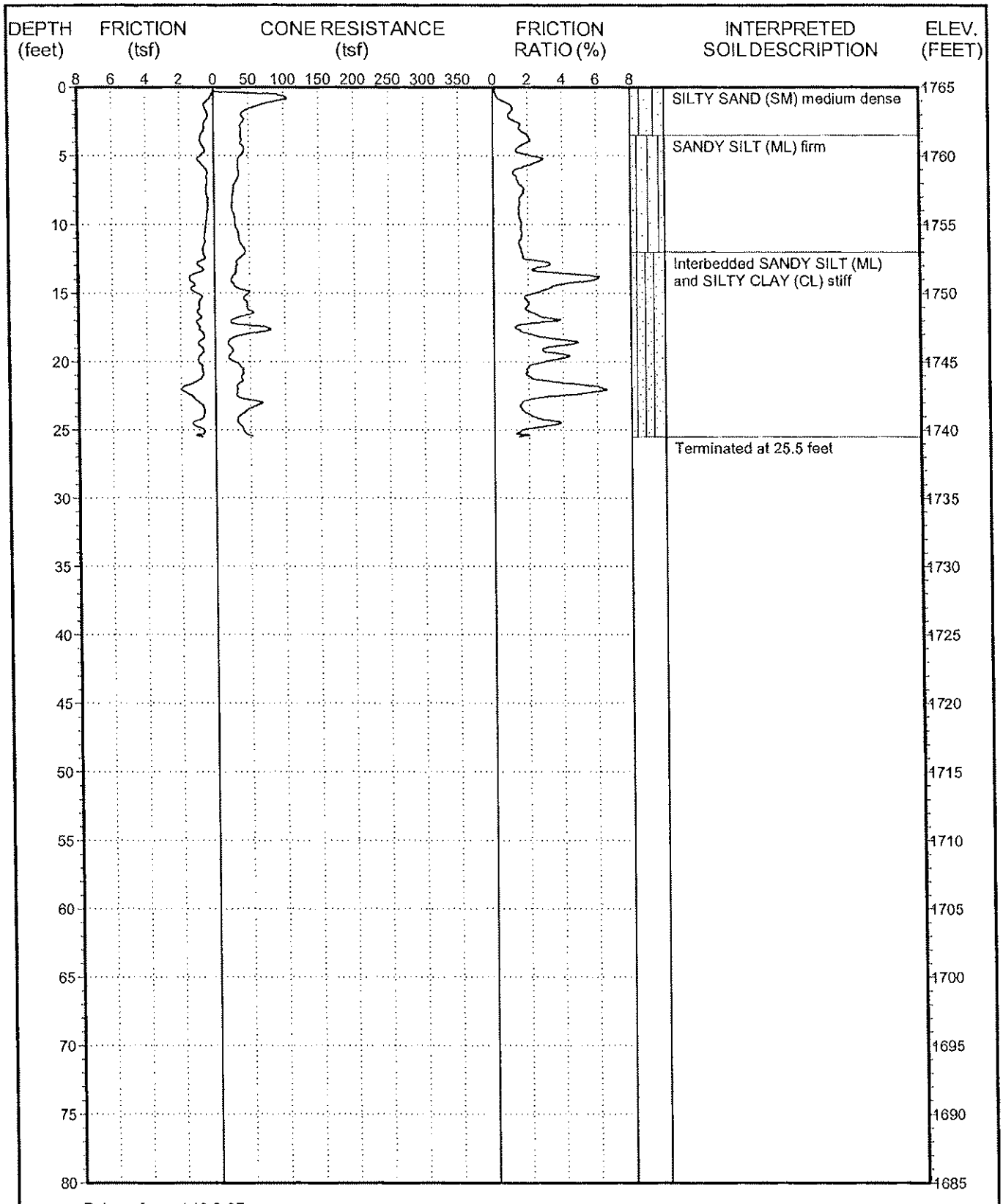
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GDI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-207

FIGURE A-13



Date performed:10-3-07

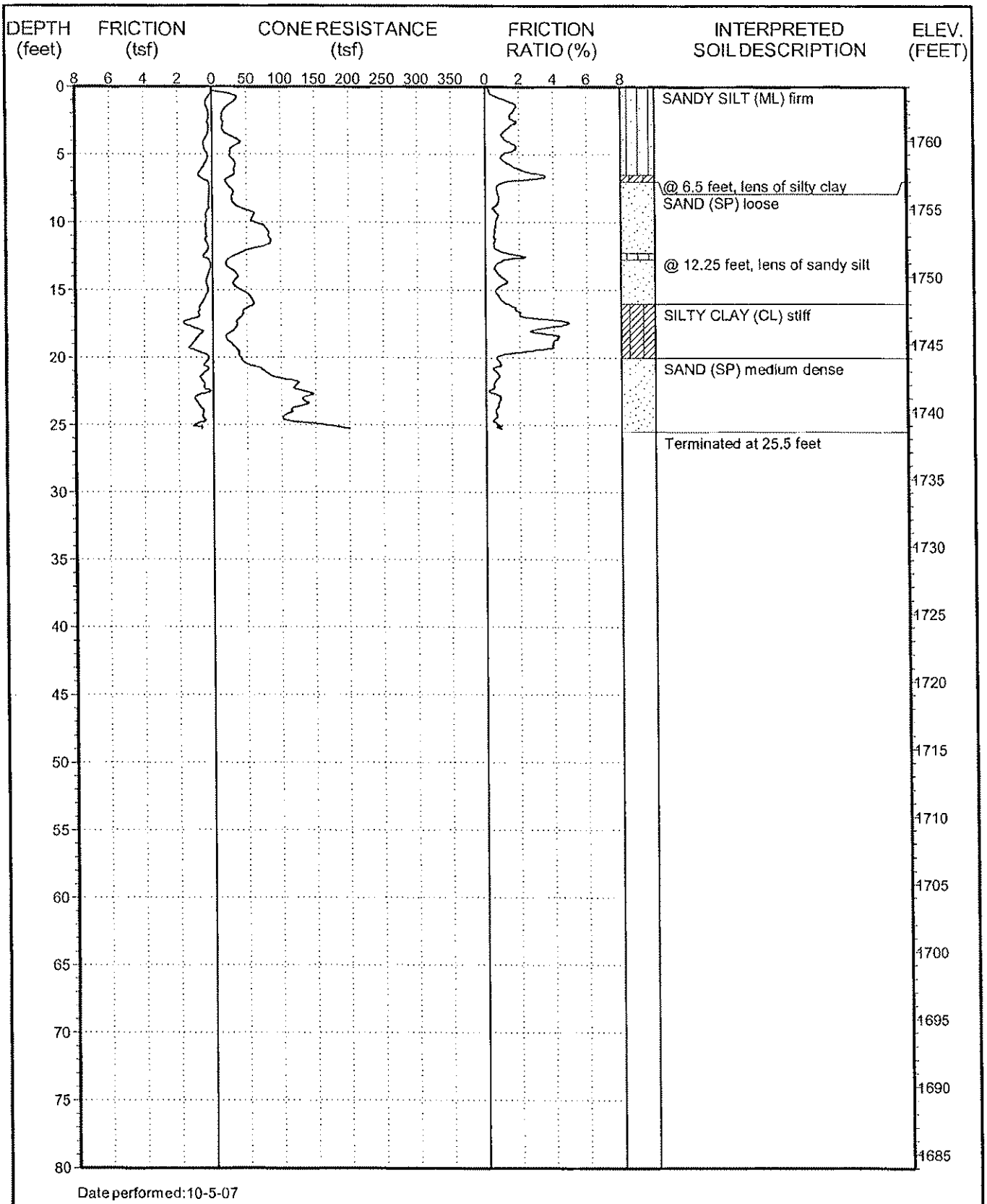
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-208

FIGURE A-14



Date performed: 10-5-07

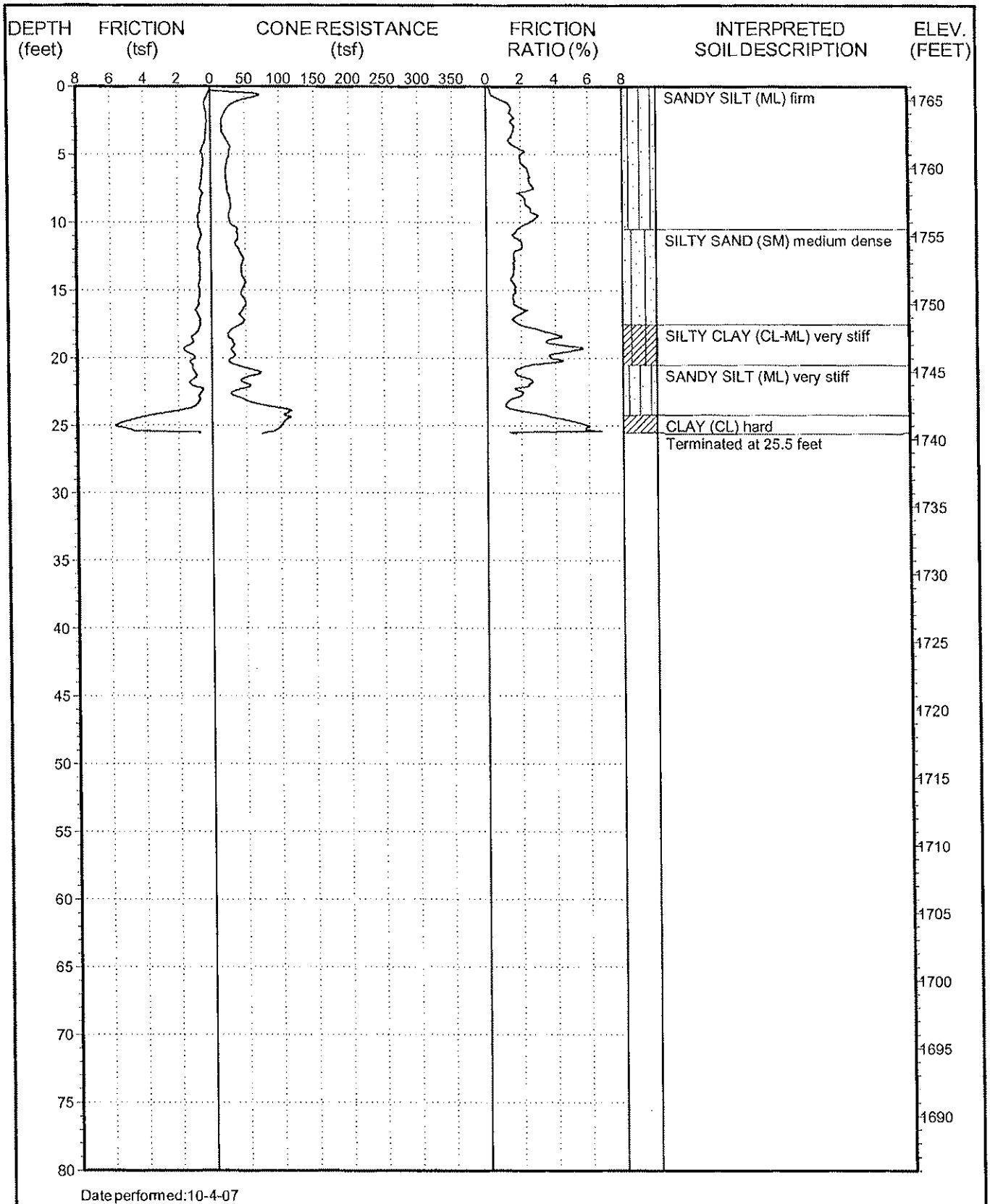
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-209

FIGURE A-15



Date performed:10-4-07

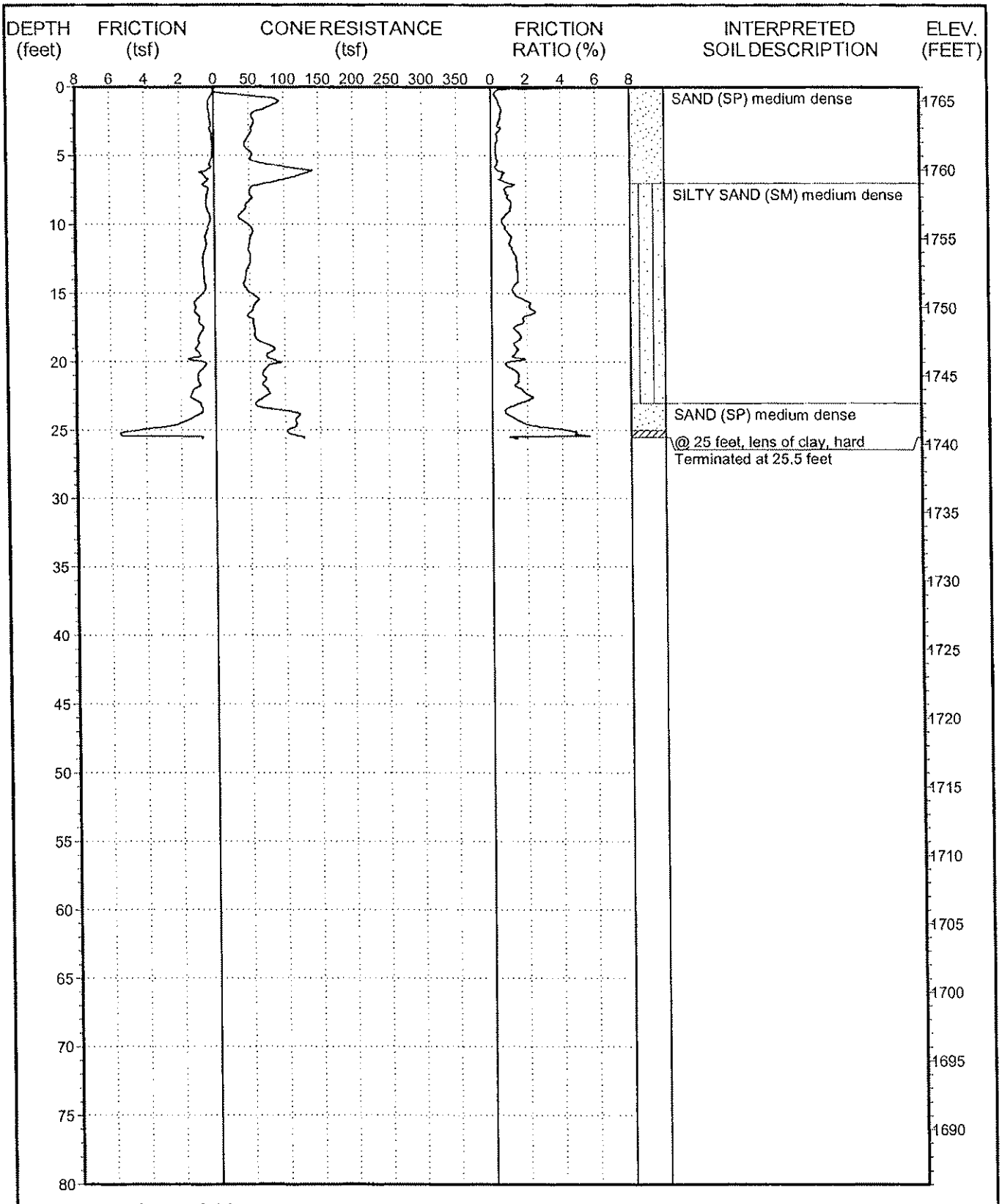
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-210

FIGURE A-16



Date performed: 10-4-07

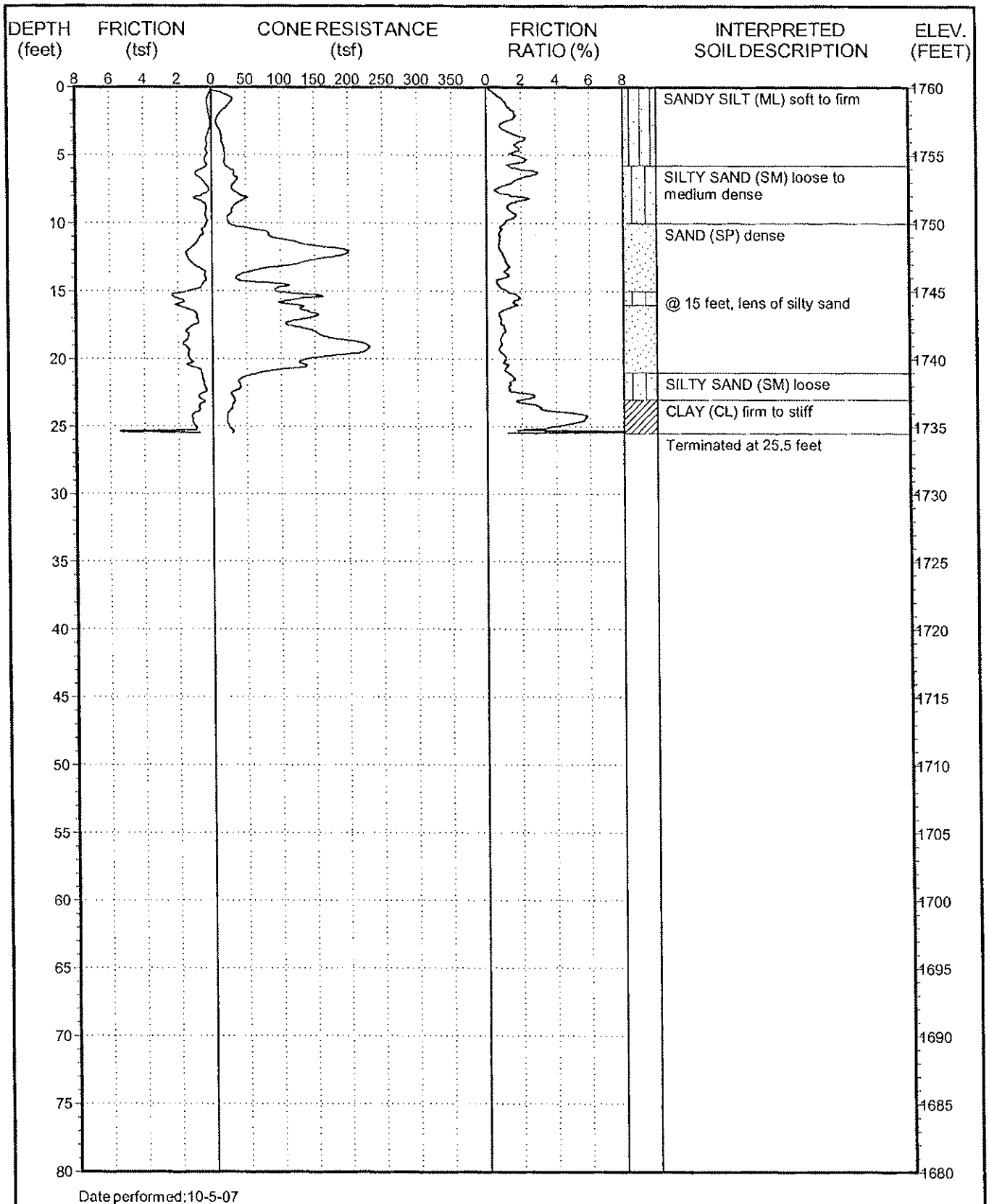
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-211

FIGURE A-17



Date performed:10-5-07

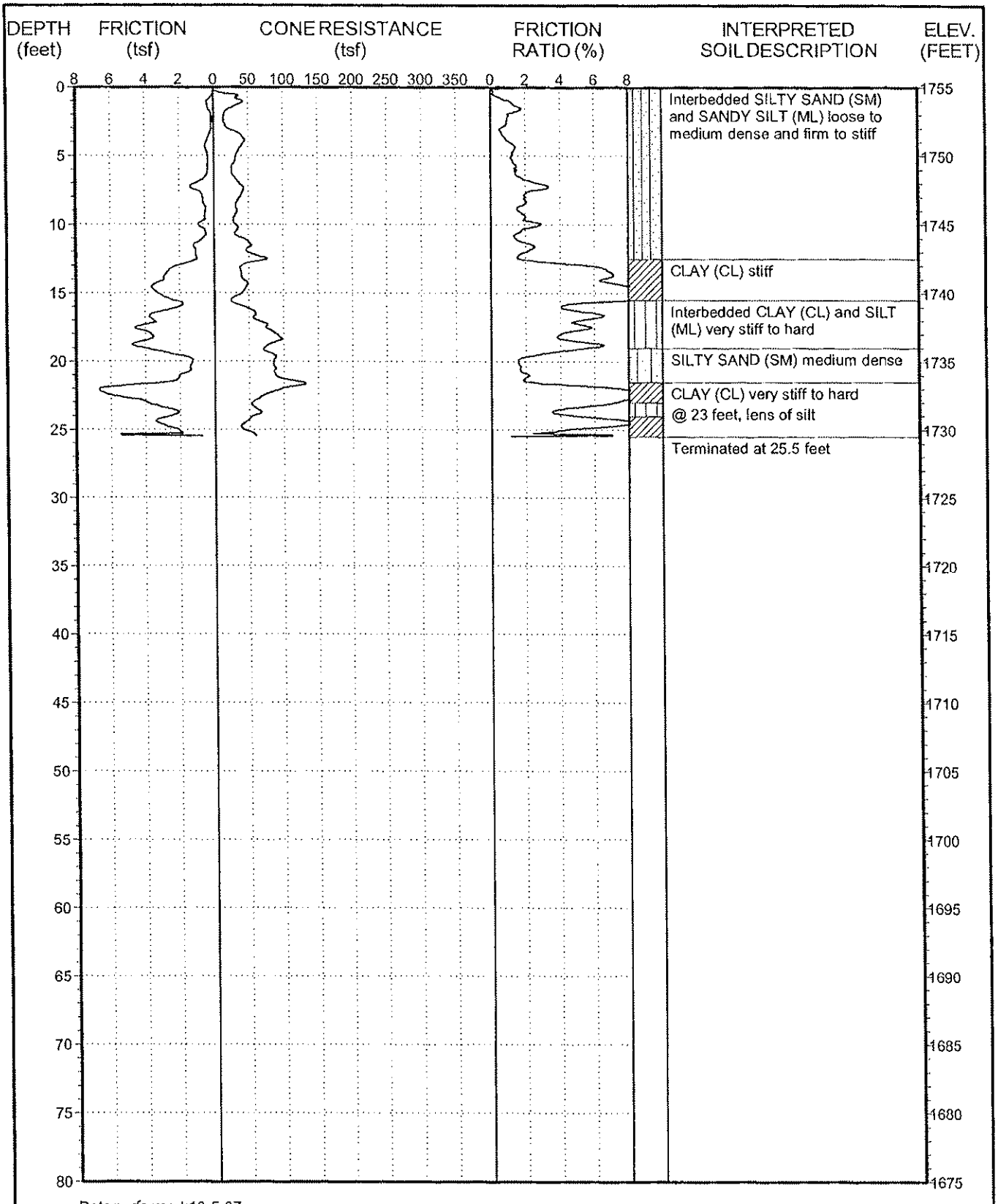
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1i
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-301

FIGURE A-18



Date performed: 10-5-07

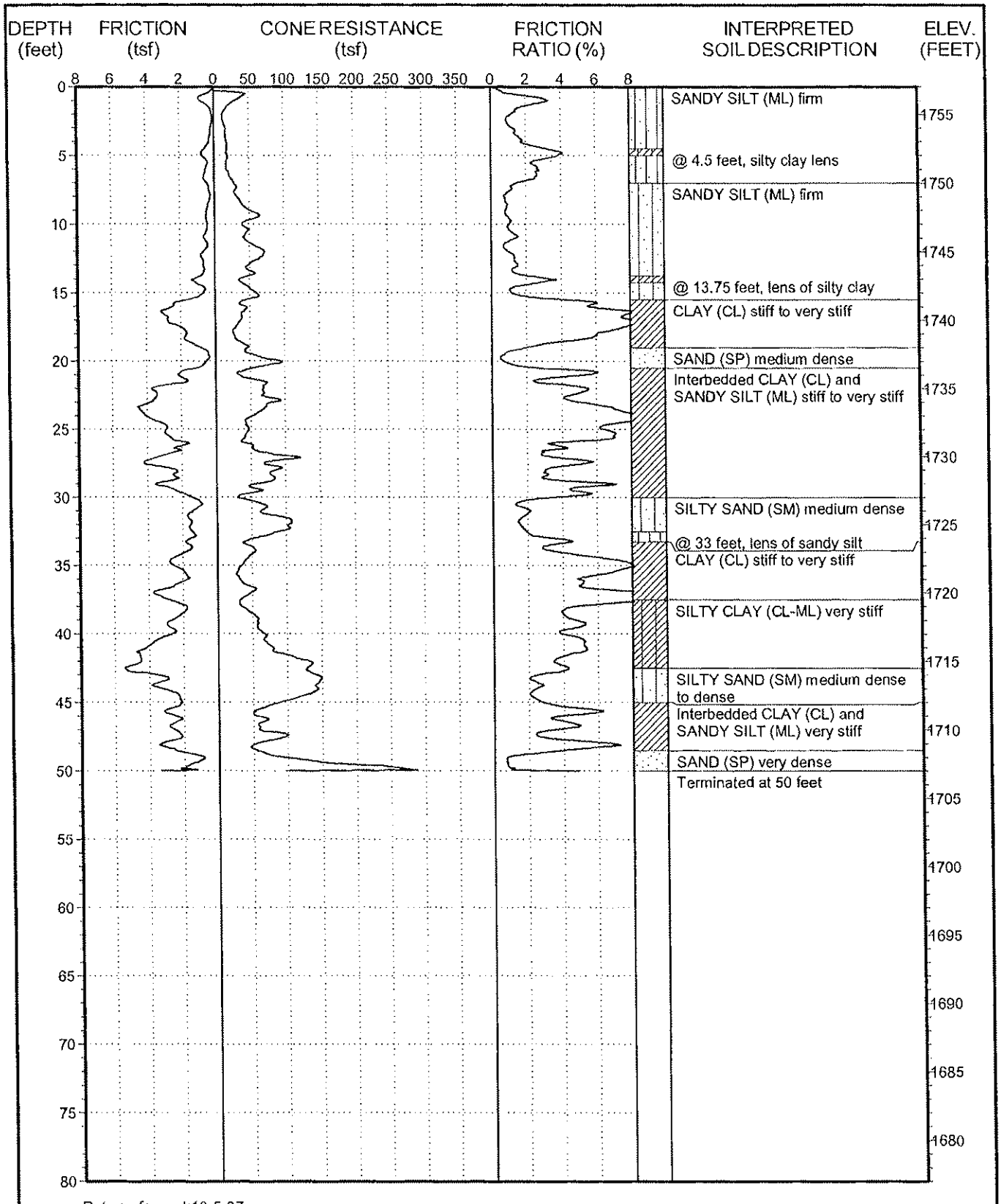
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-303

FIGURE A-19



Date performed: 10-5-07

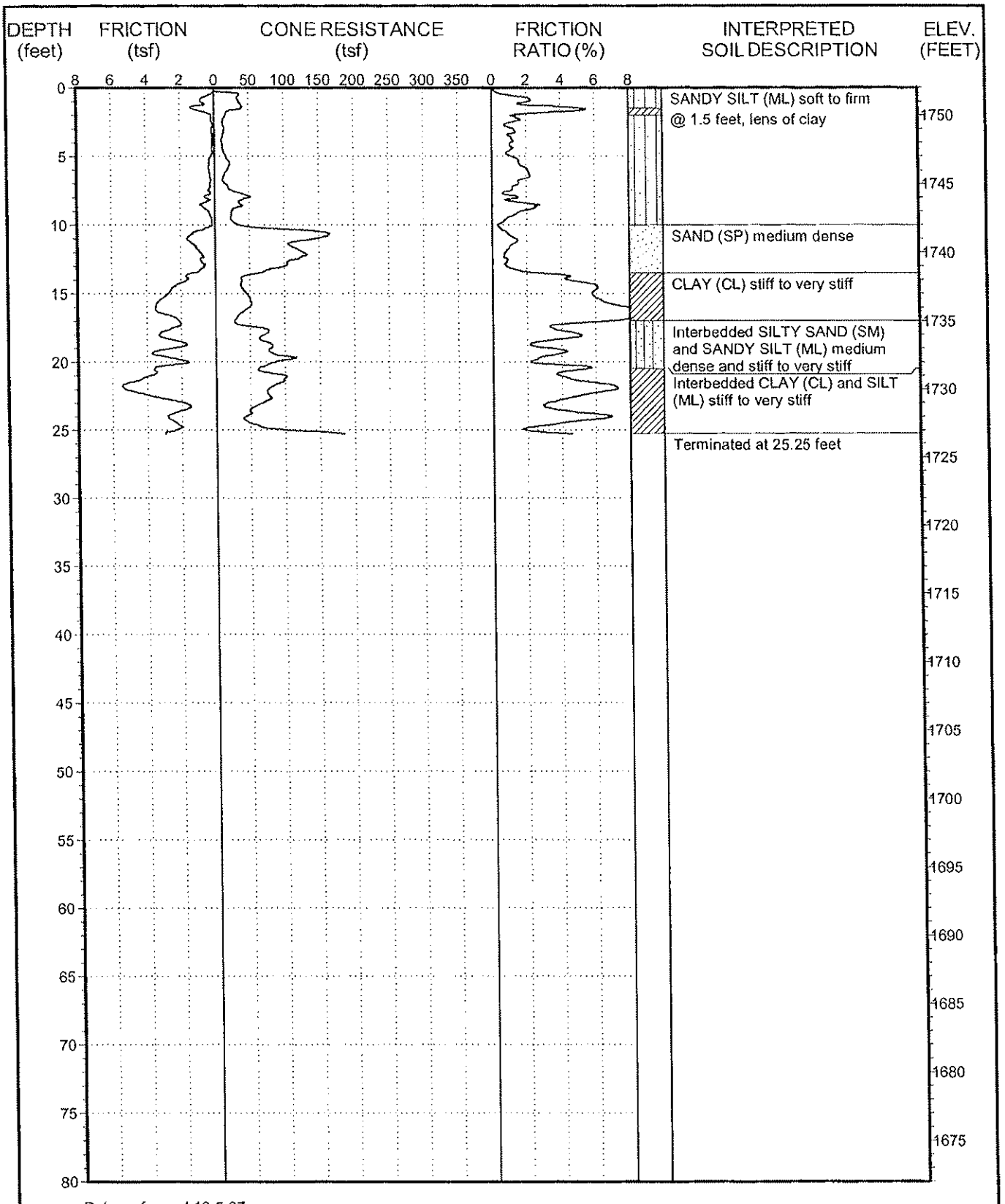
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GDI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-304

FIGURE A-20



Date performed:10-5-07

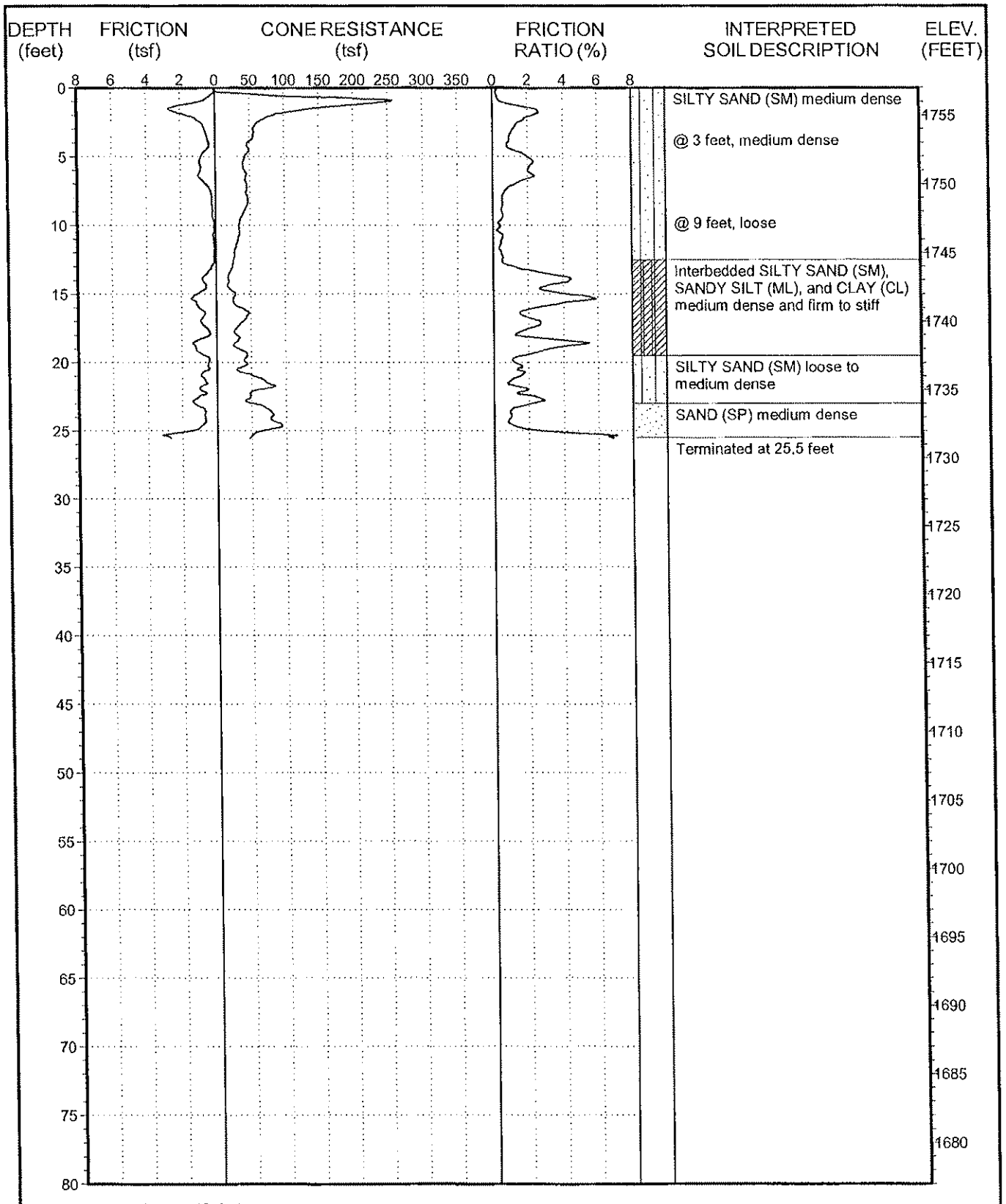
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GDI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-305

FIGURE A-21



Date performed: 10-4-07

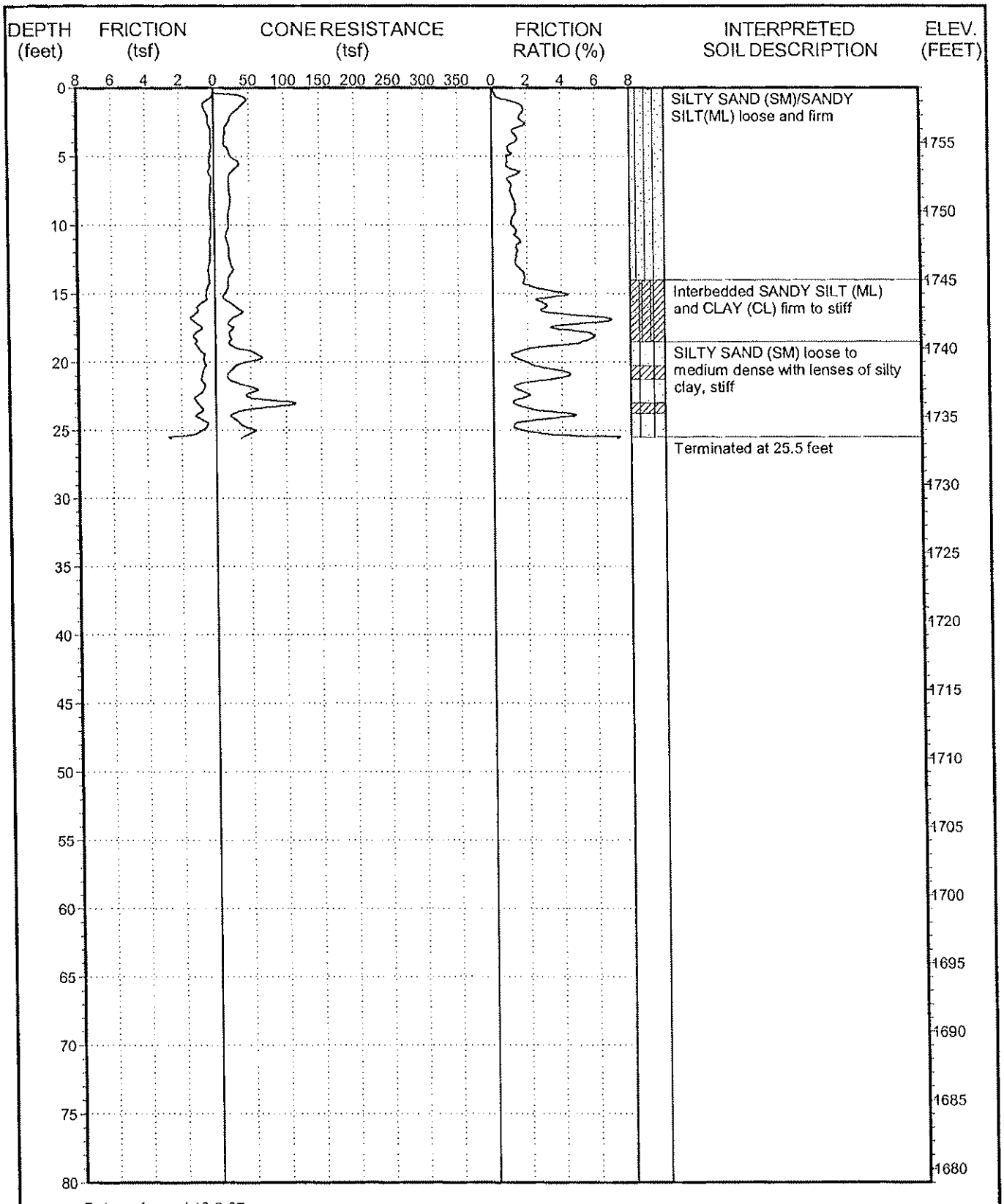
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-401

FIGURE A-22



Date performed: 10-3-07

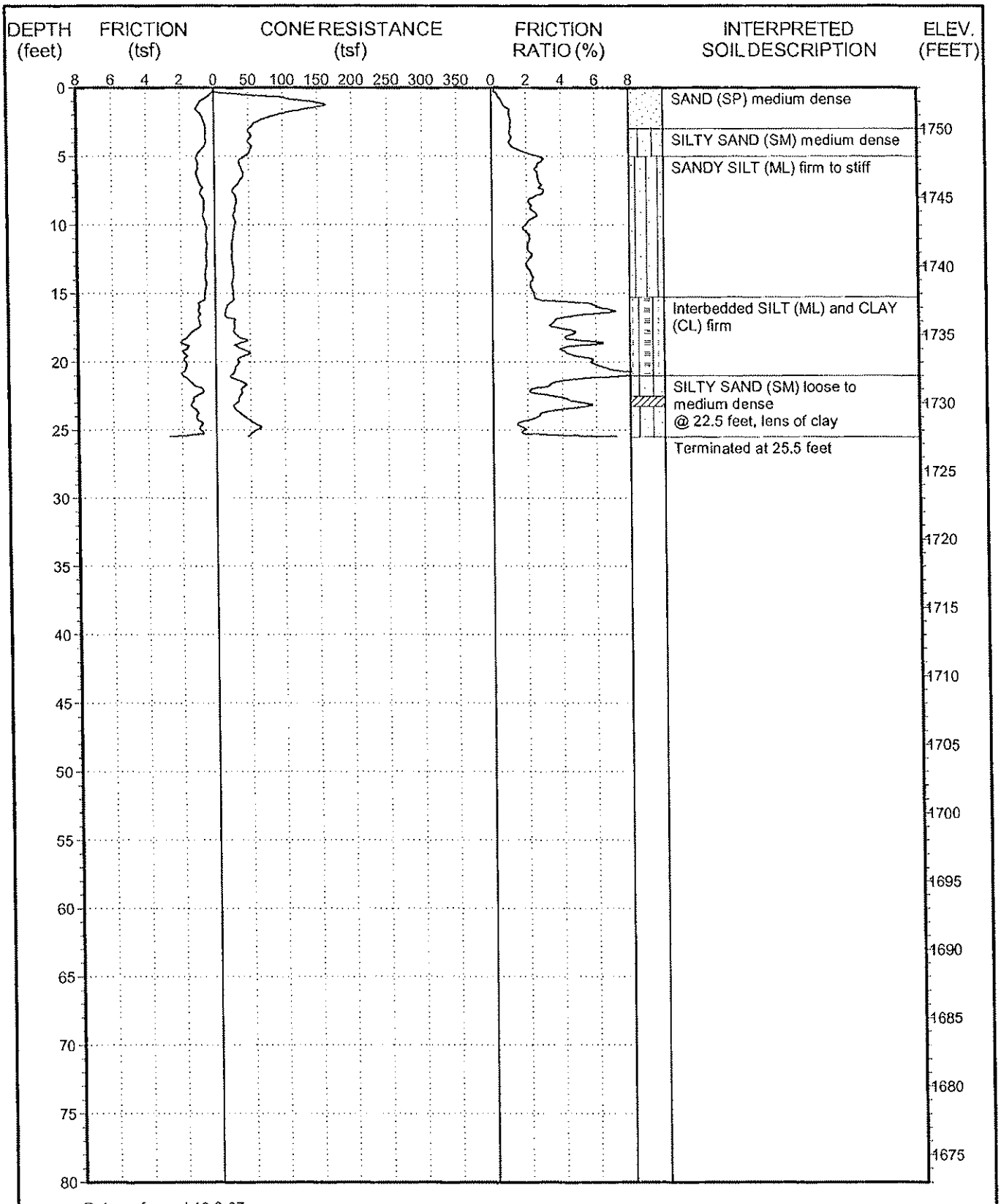
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-402

FIGURE A-23



Date performed: 10-3-07

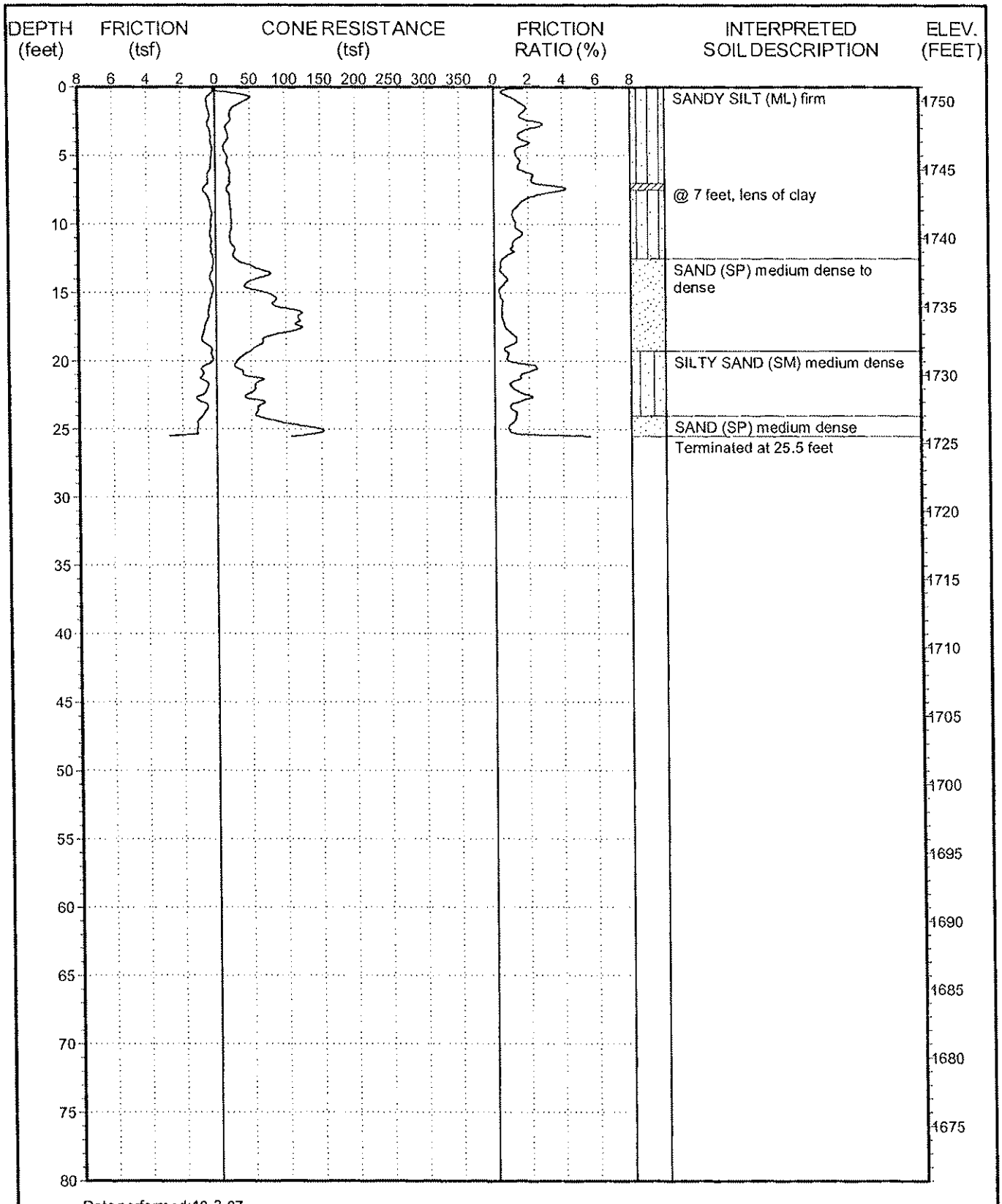
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-403

FIGURE A-24



Date performed: 10-3-07

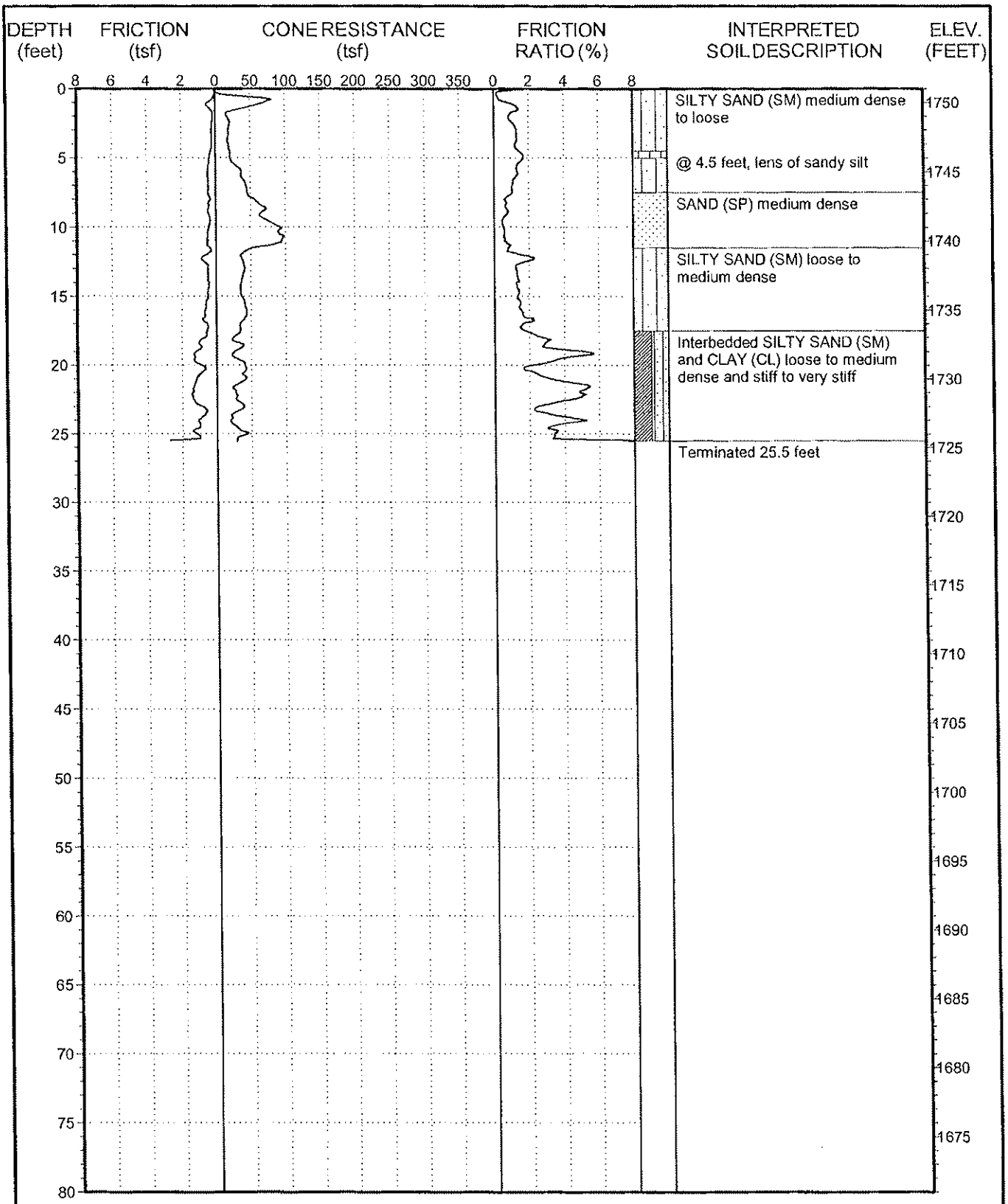
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-404

FIGURE A-25



Date performed: 10-4-07

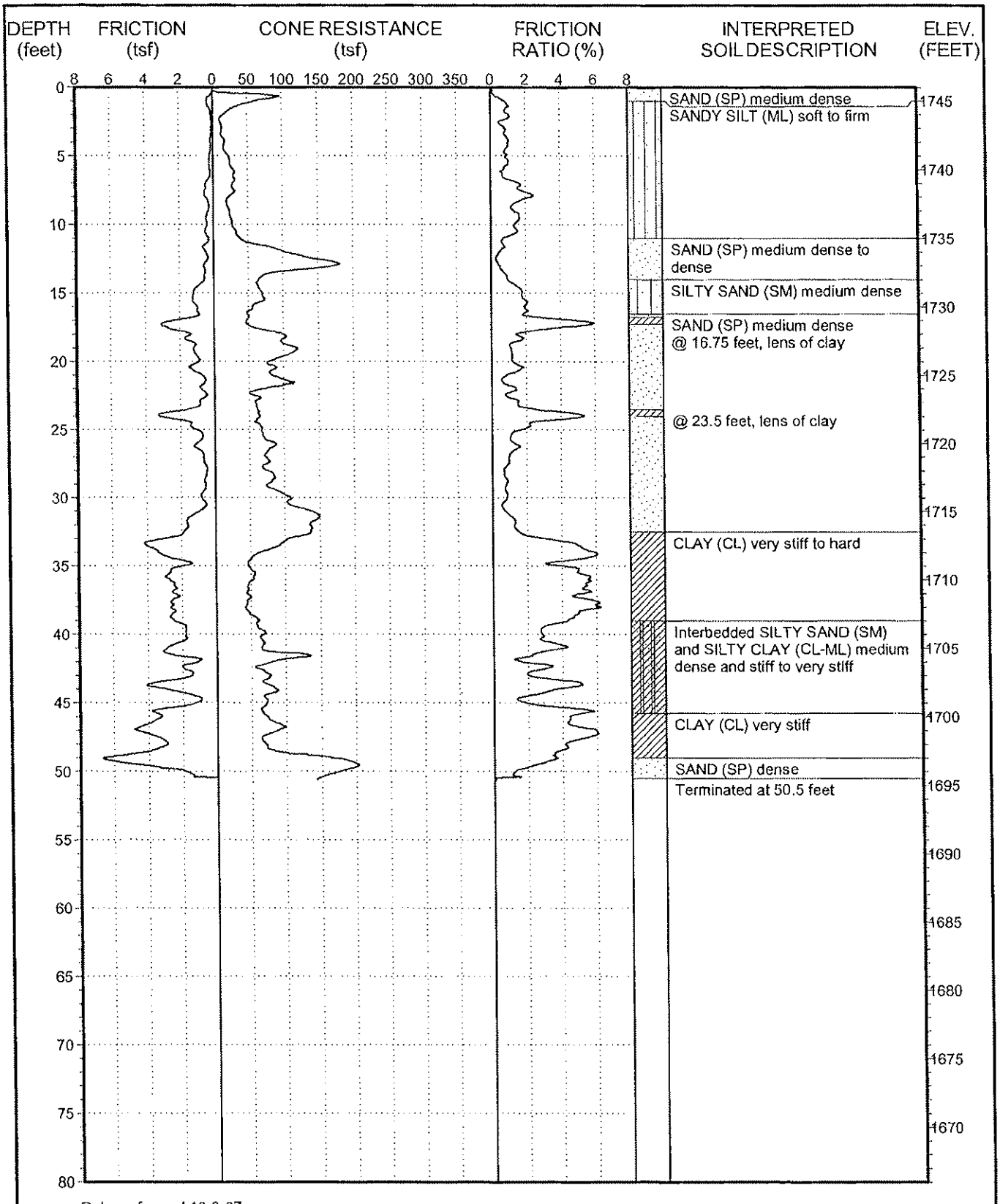
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-405

FIGURE A-26



Date performed:10-3-07

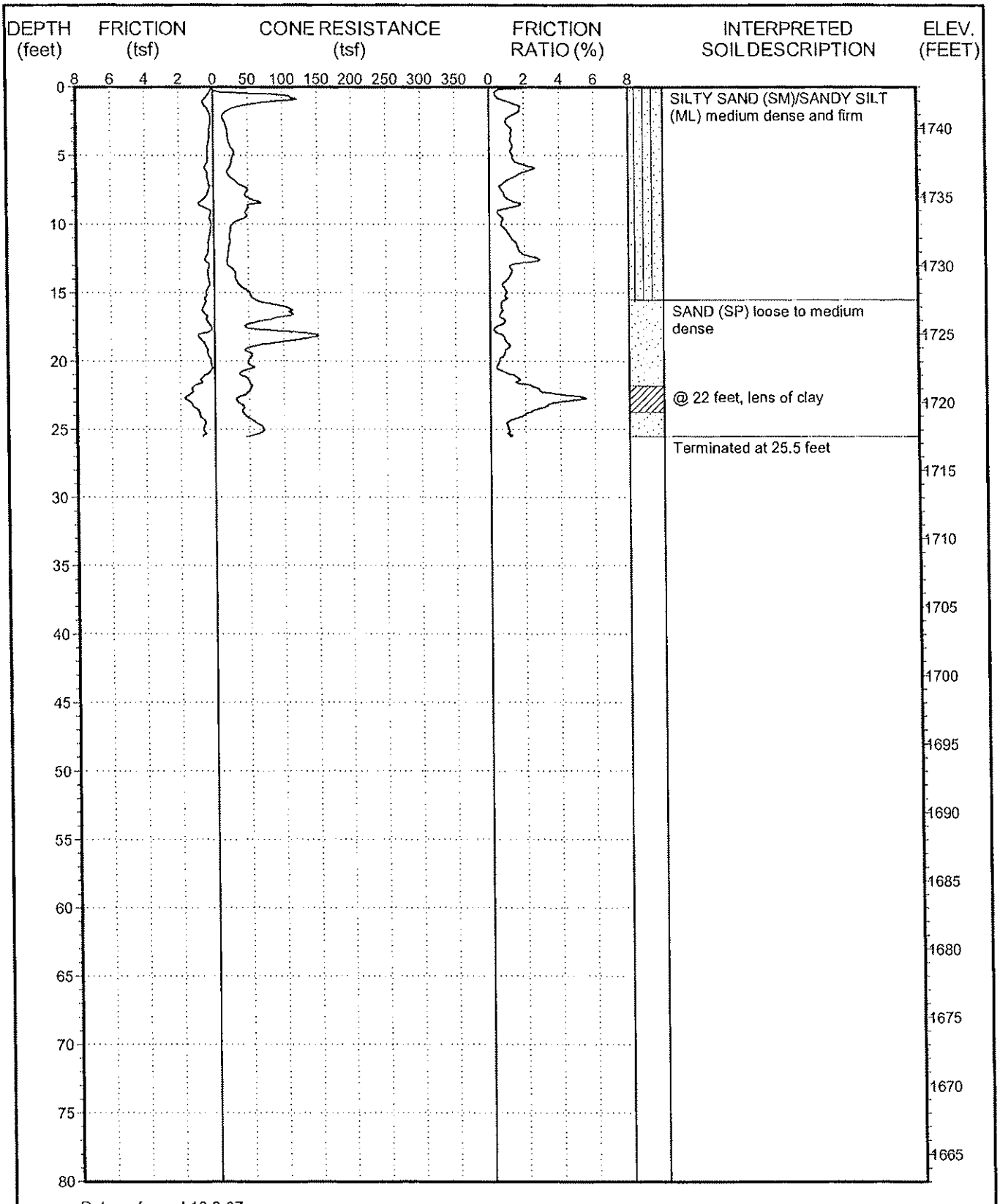
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GDI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-406

FIGURE A-27



Date performed:10-3-07

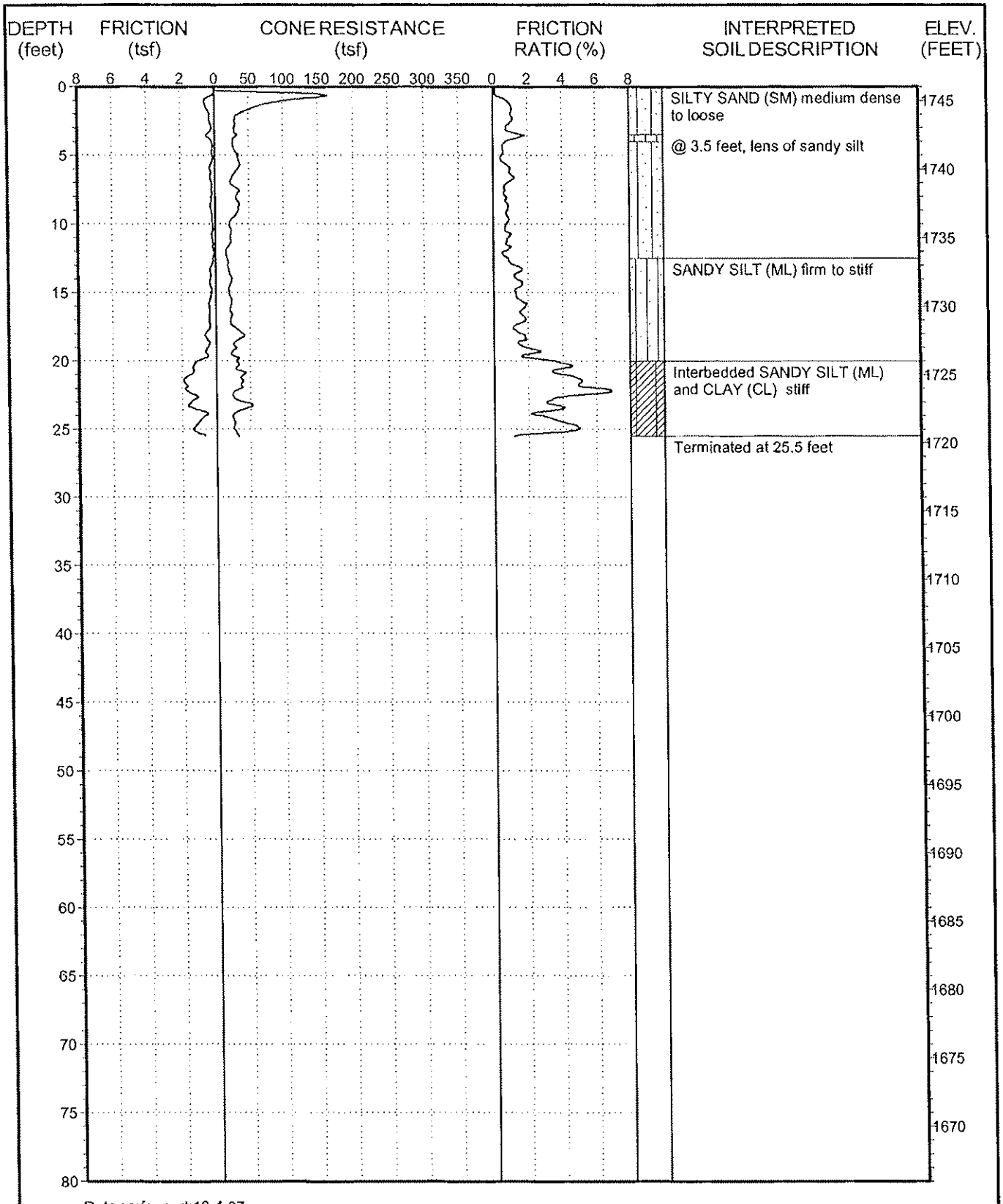
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GDI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-407

FIGURE A-28



Date performed: 10-4-07

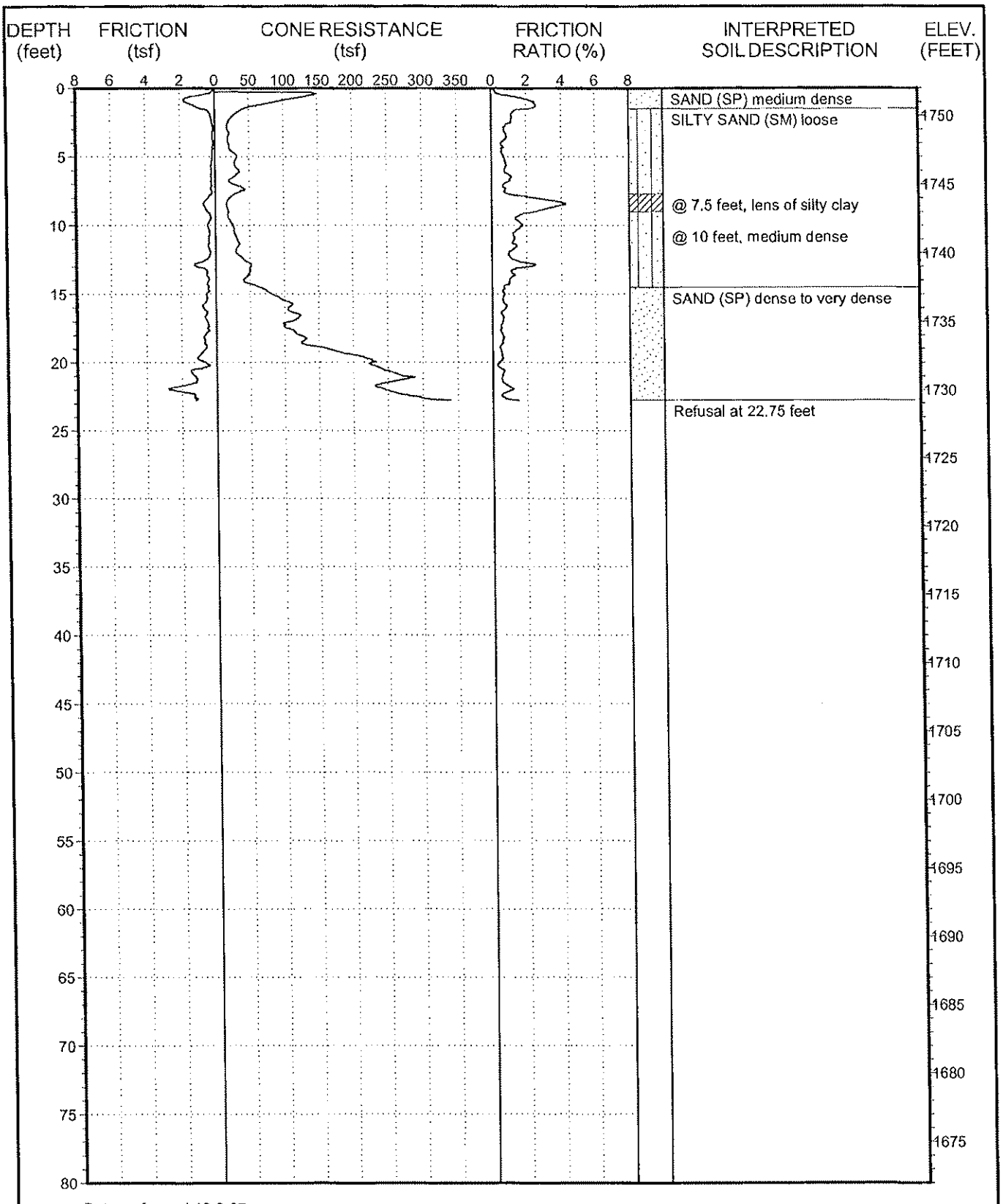
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-408

FIGURE A-29



Date performed:10-3-07

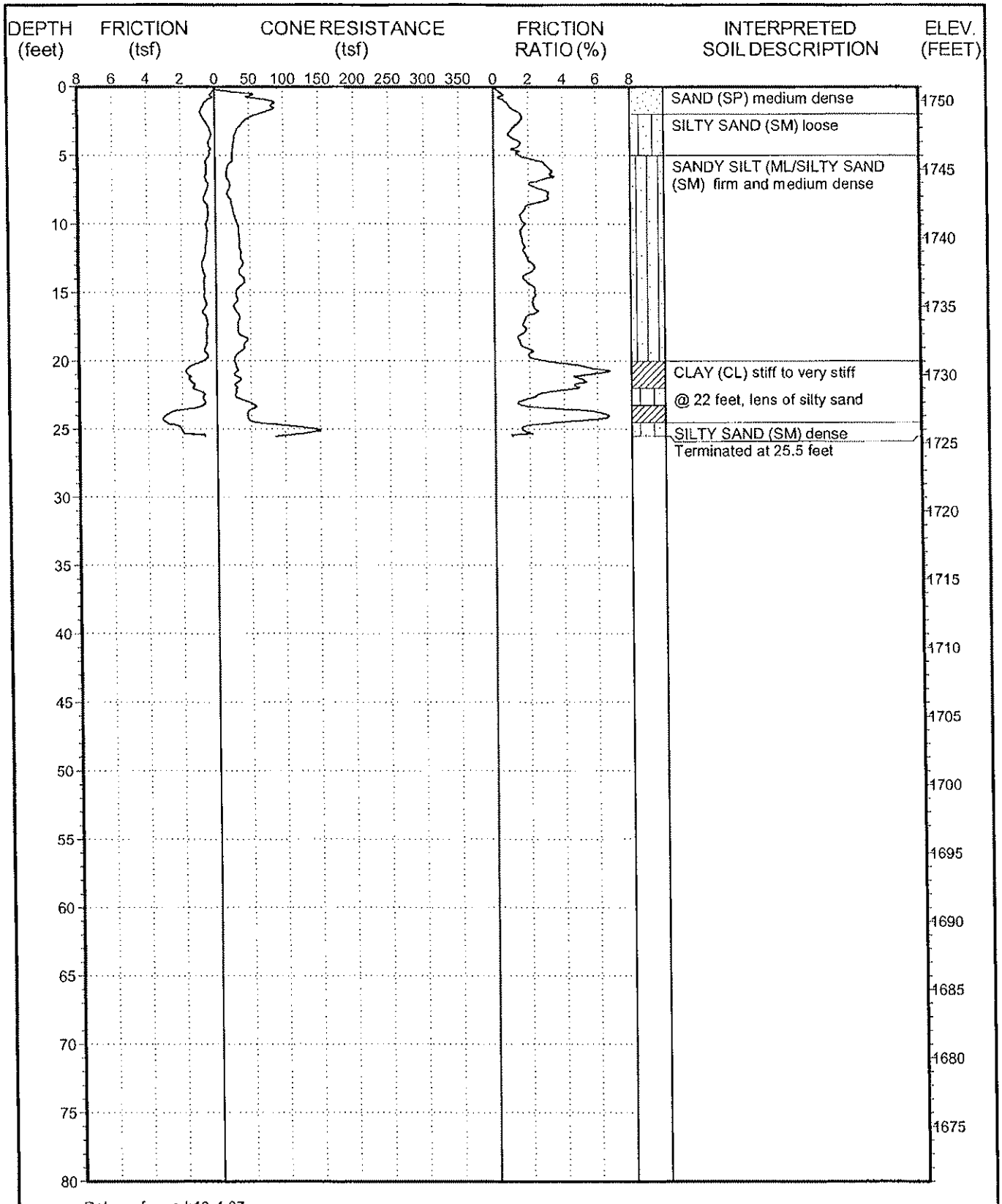
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-501

FIGURE A-30



Date performed: 10-4-07

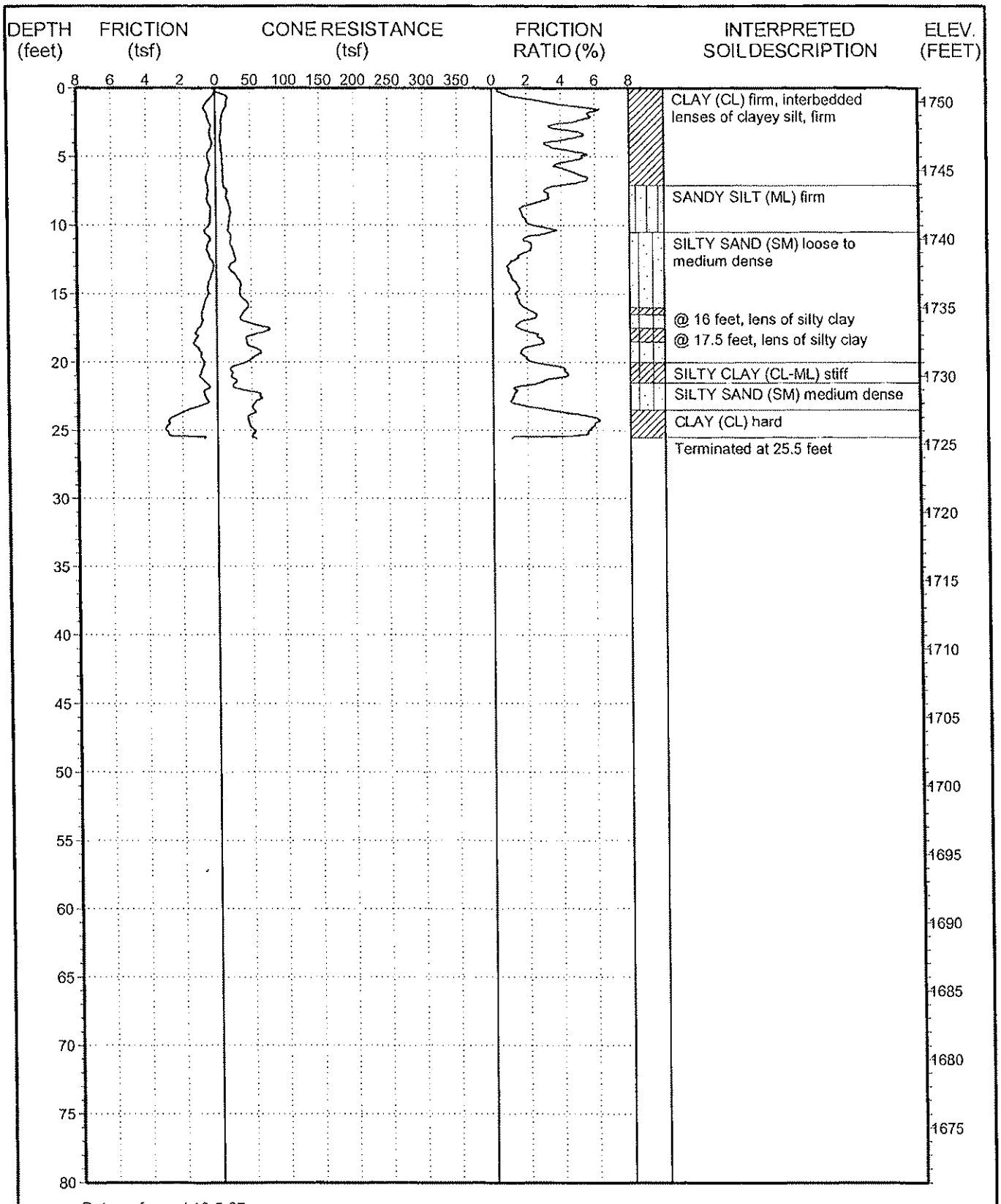
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-502

FIGURE A-31



Date performed:10-5-07

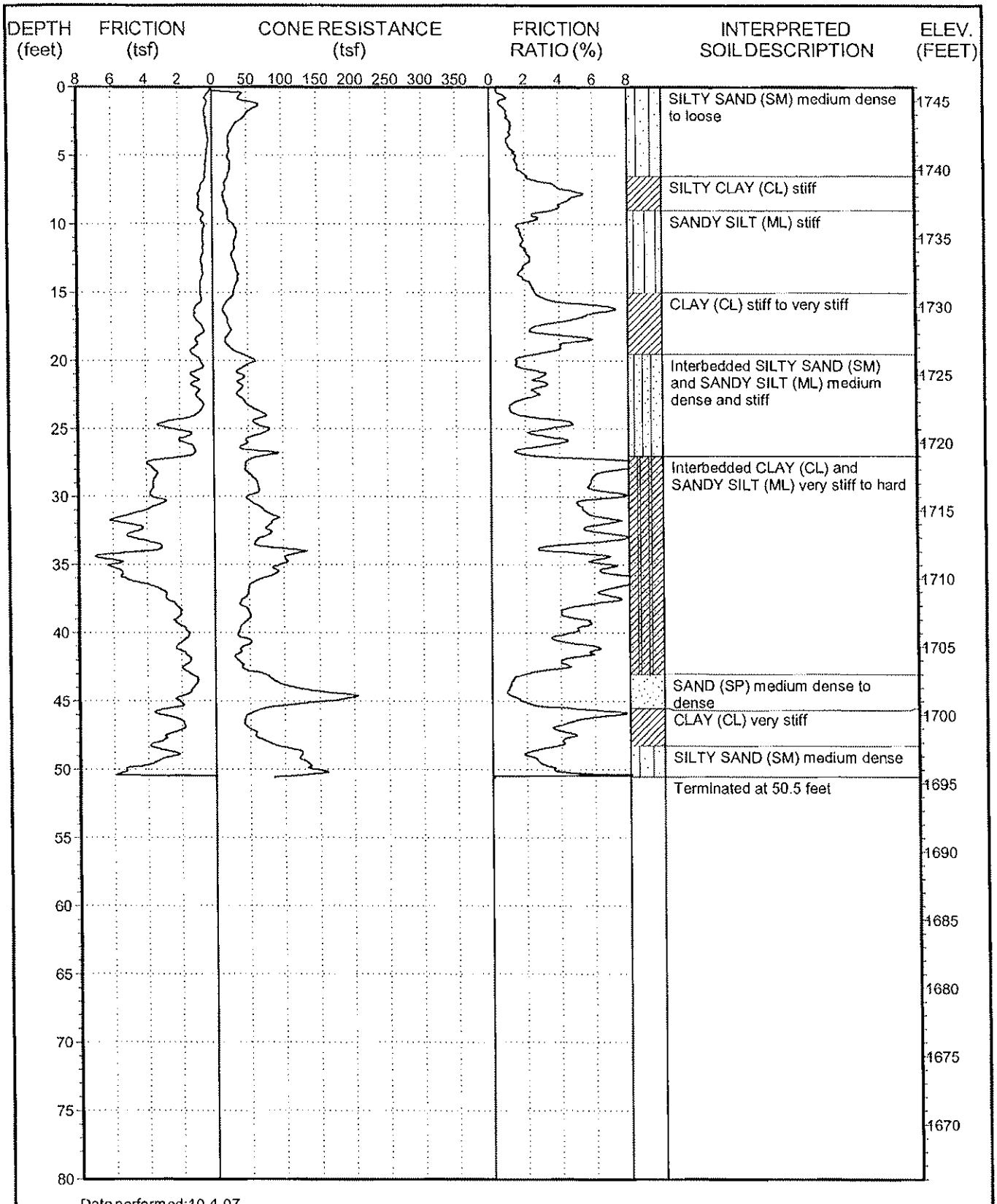
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-503

FIGURE A-32



Date performed:10-4-07

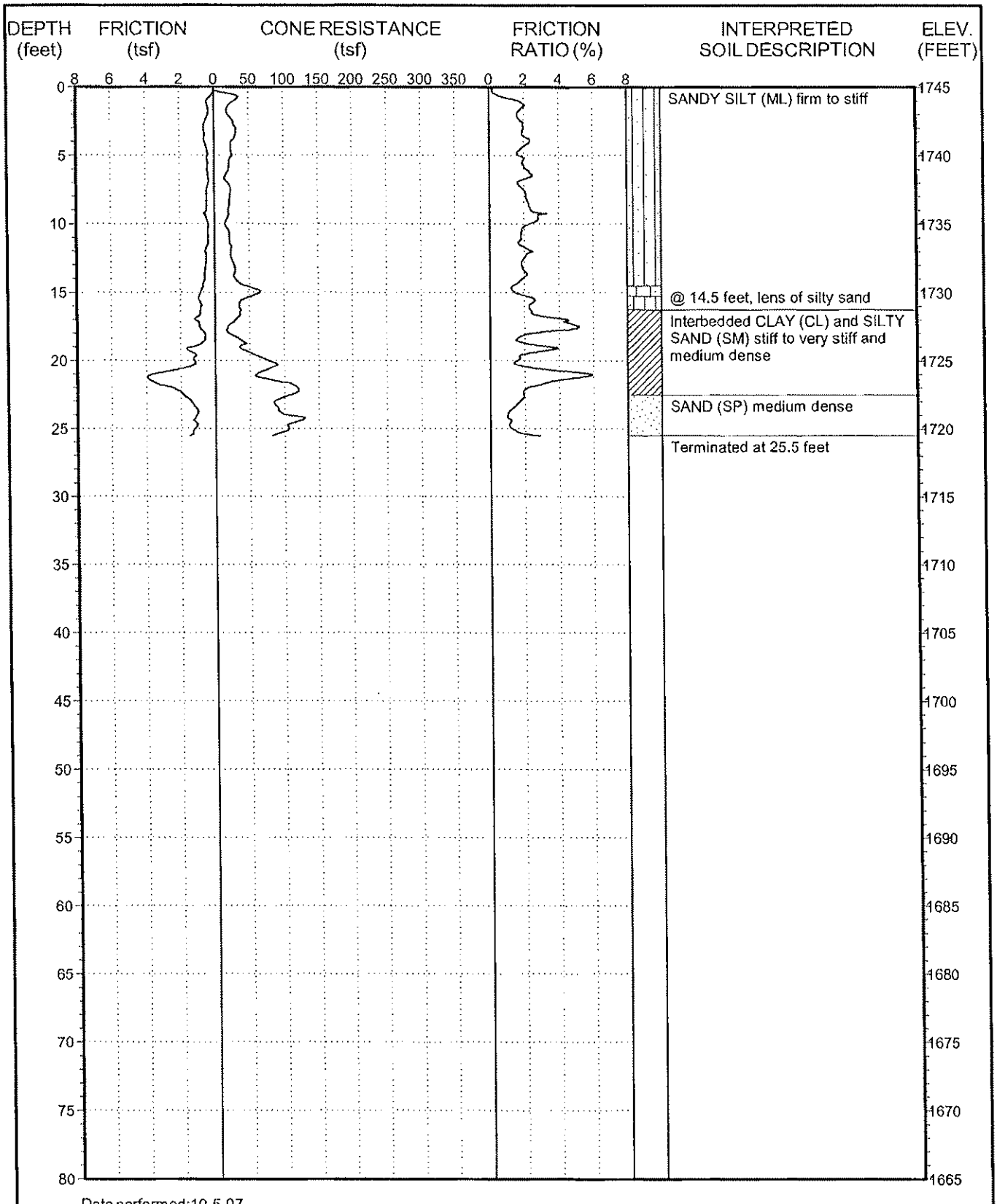
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-504

FIGURE A-33



Date performed:10-5-07

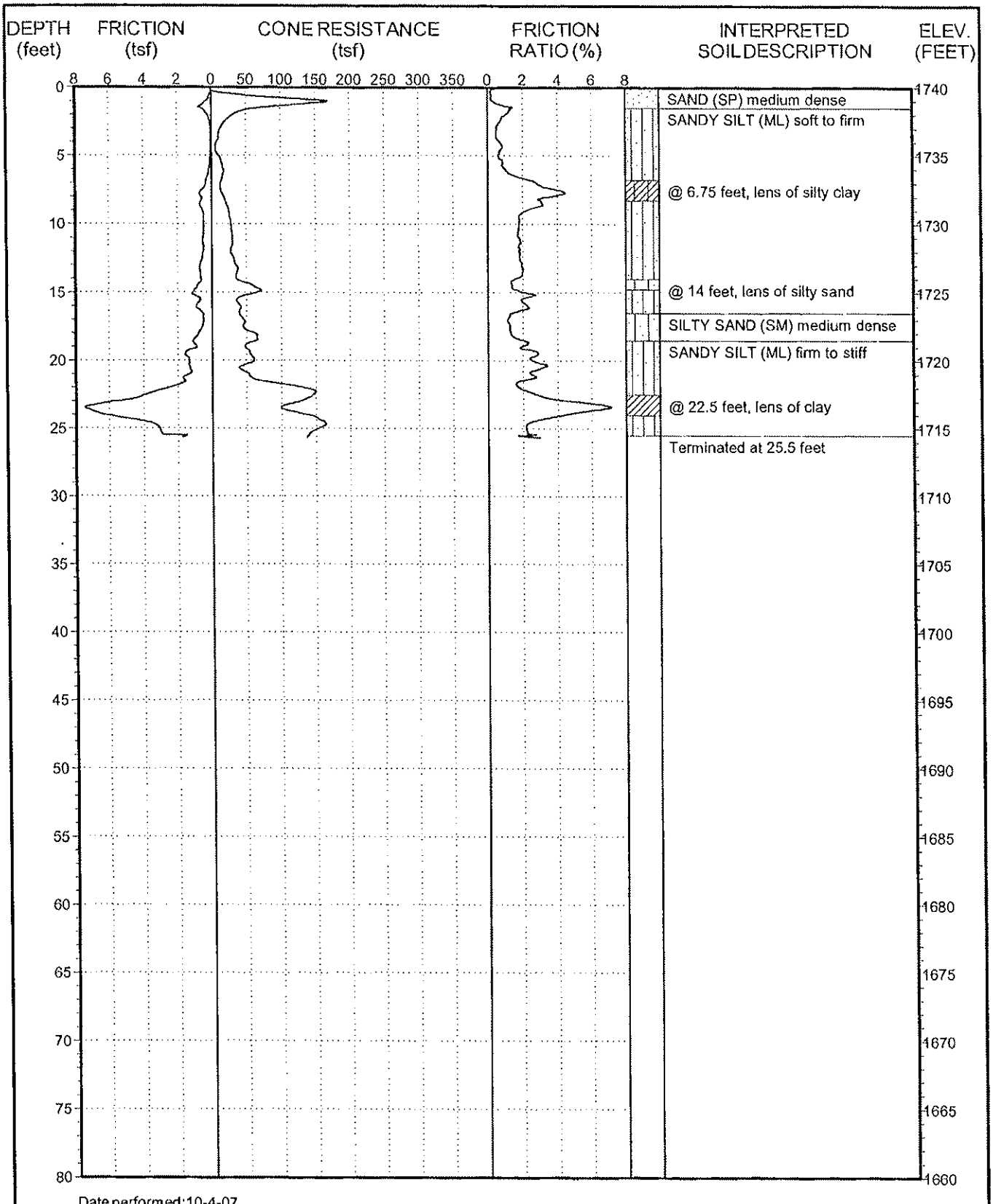
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GDI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-505

FIGURE A-34



Date performed:10-4-07

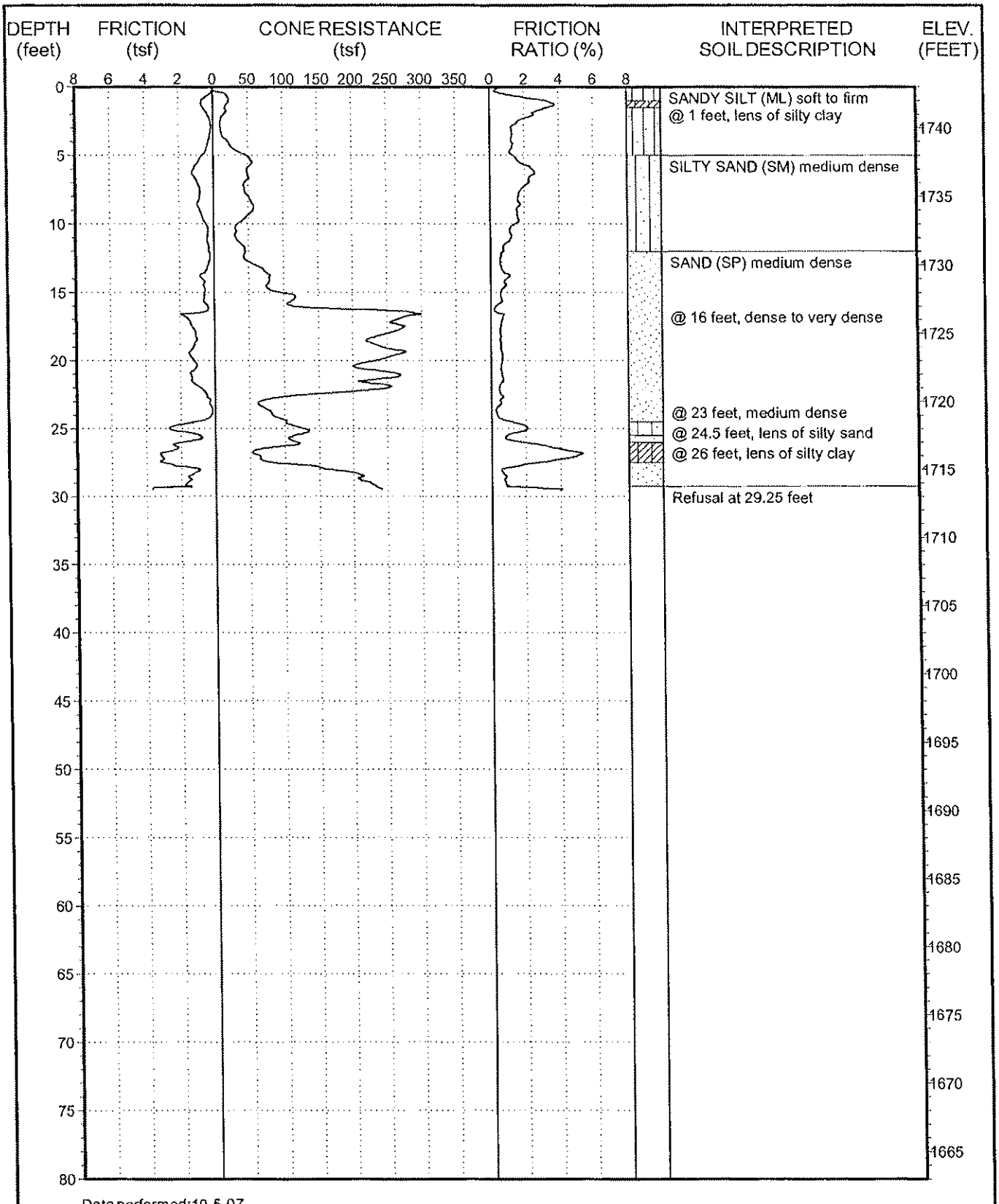
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-506

FIGURE A-35



Date performed:10-5-07

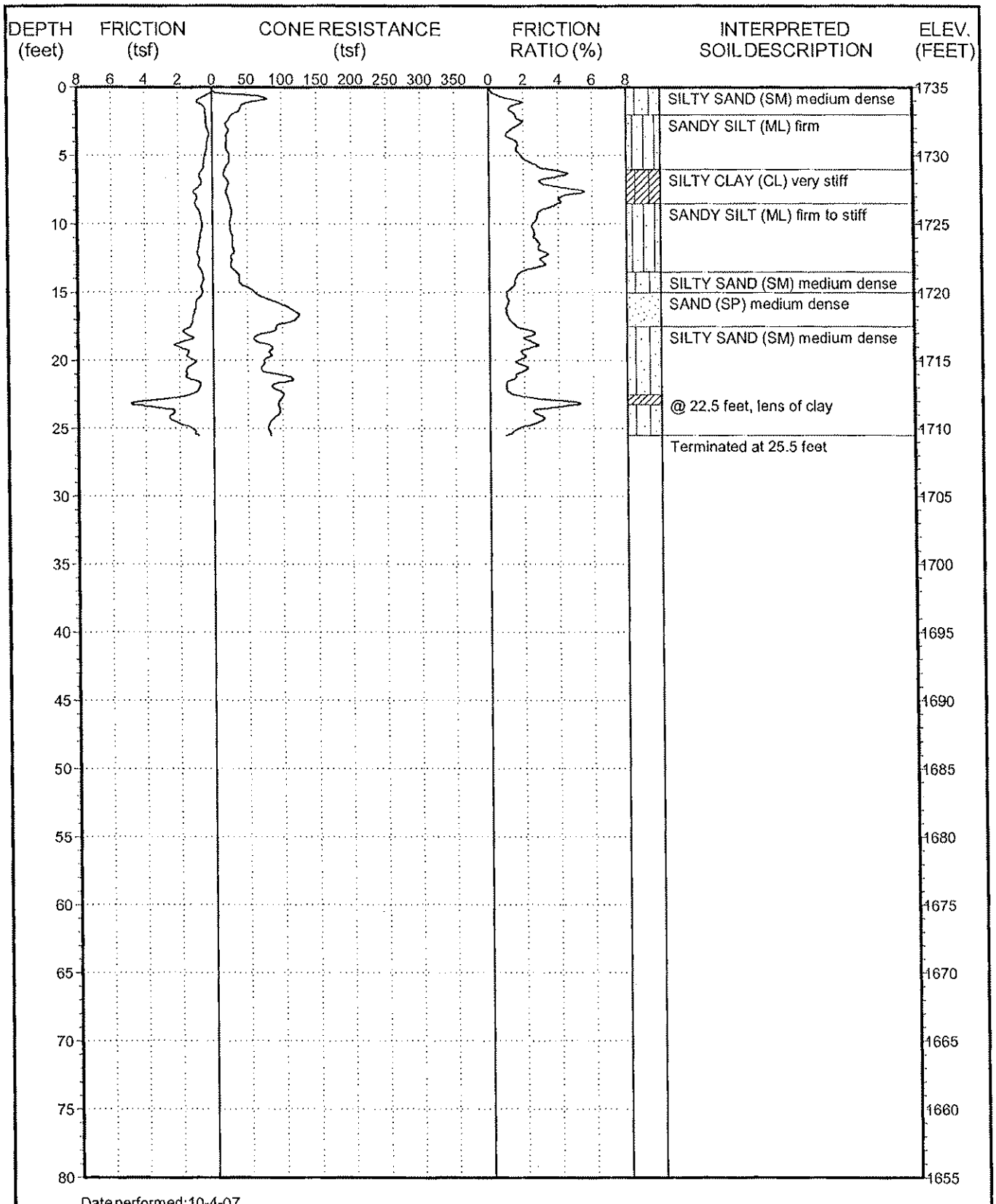
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-507

FIGURE A-36



Date performed: 10-4-07

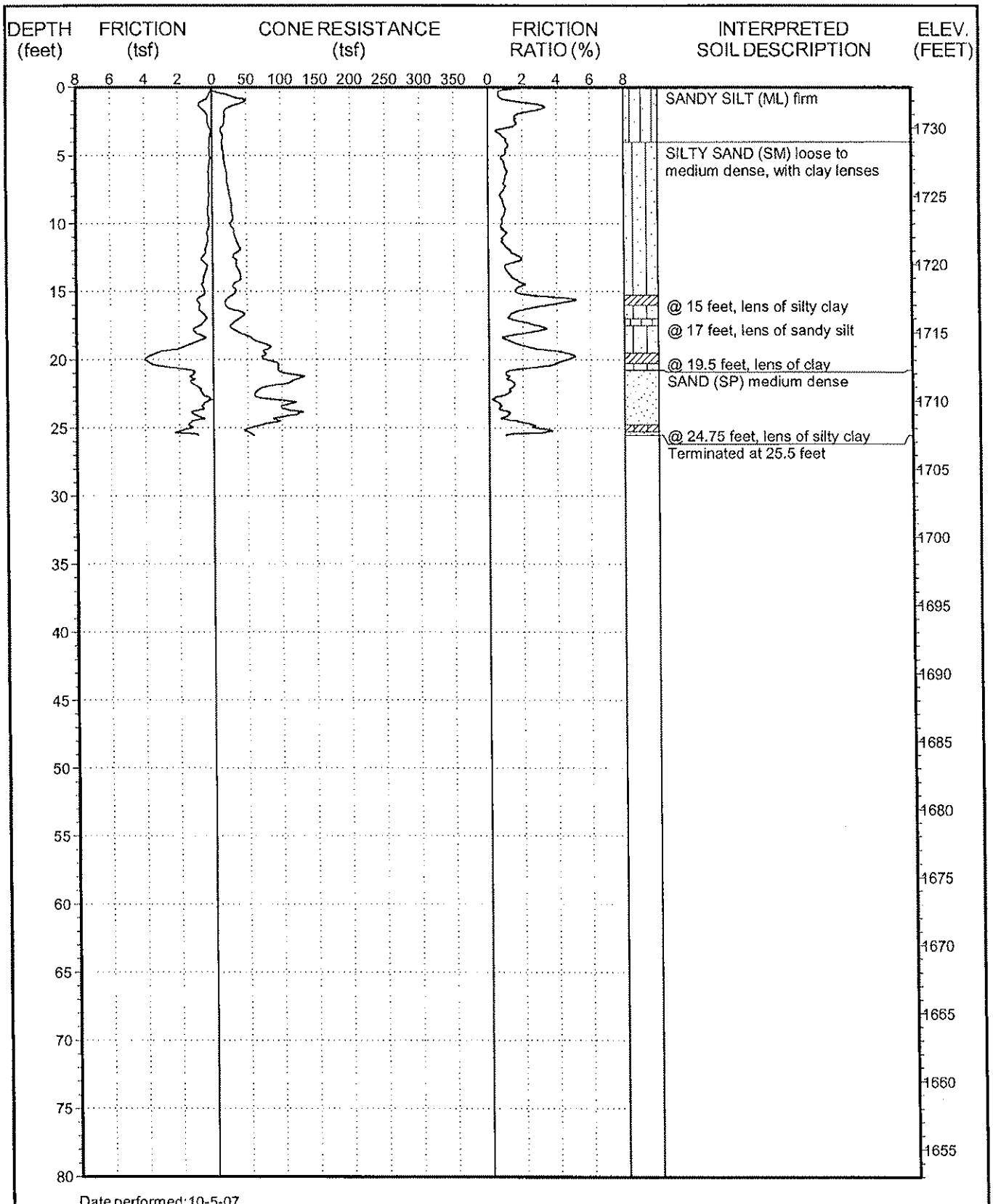
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-508

FIGURE A-37



Date performed: 10-5-07

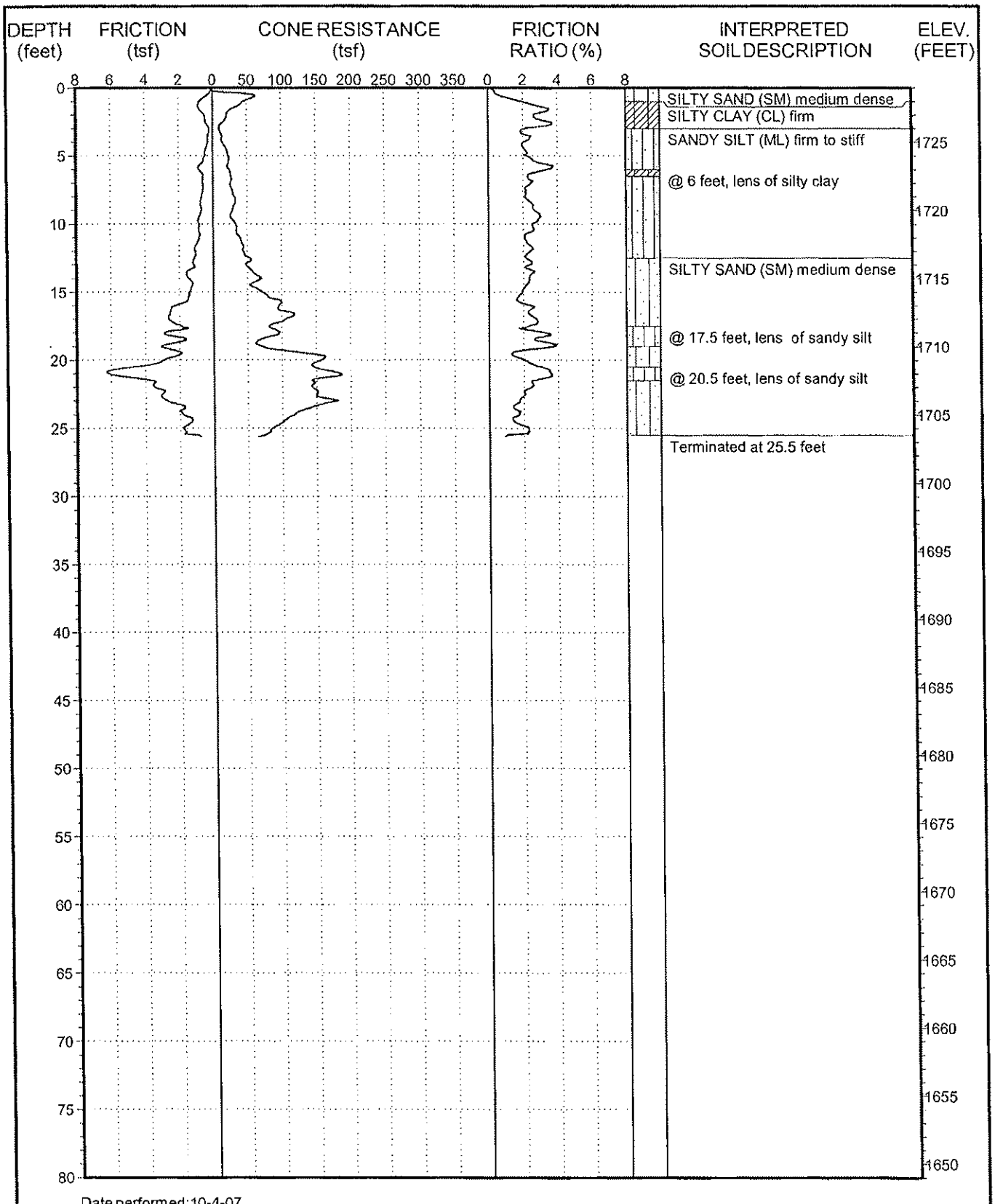
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-509

FIGURE A-38



Date performed:10-4-07

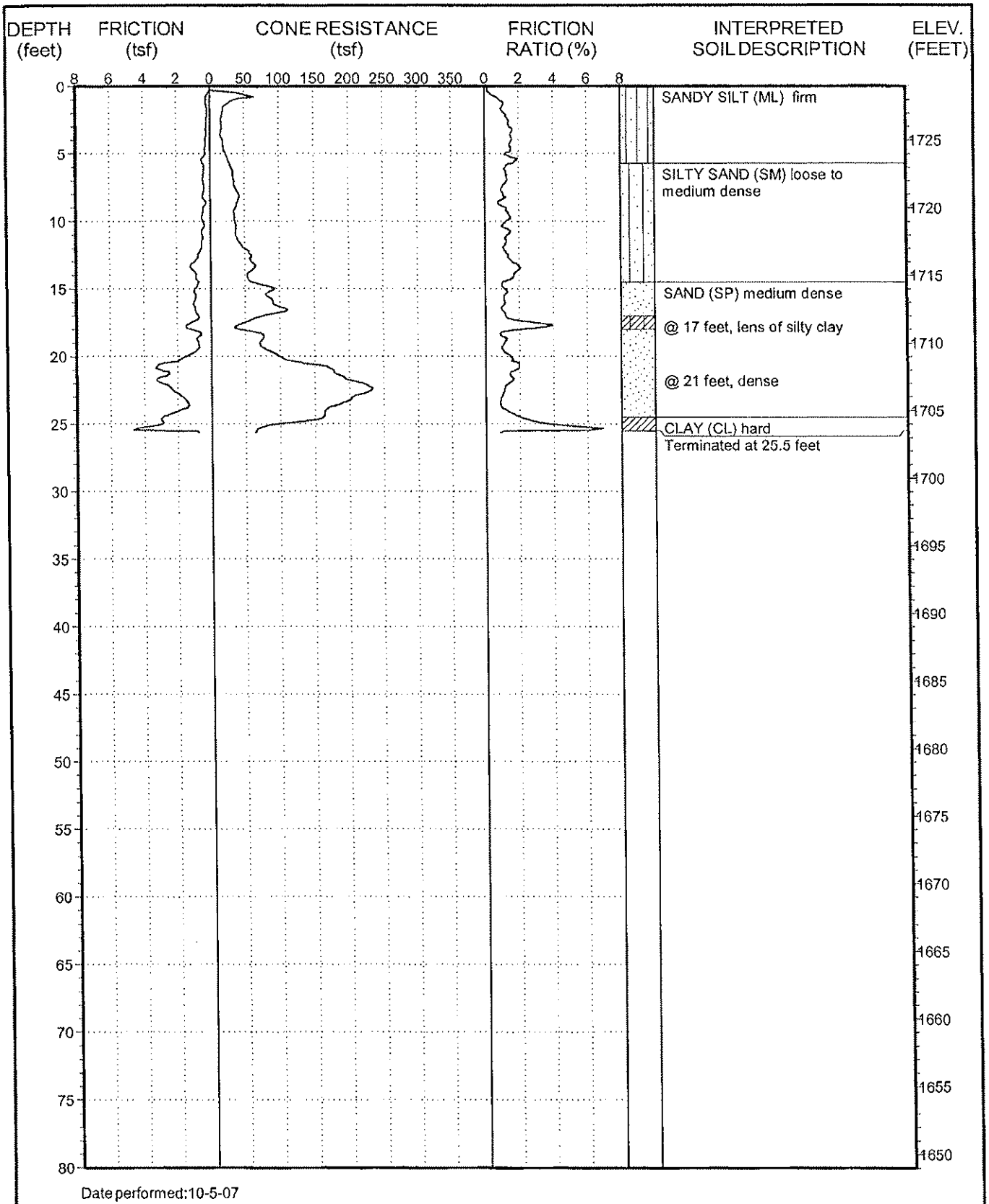
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-510

FIGURE A-39



Date performed:10-5-07

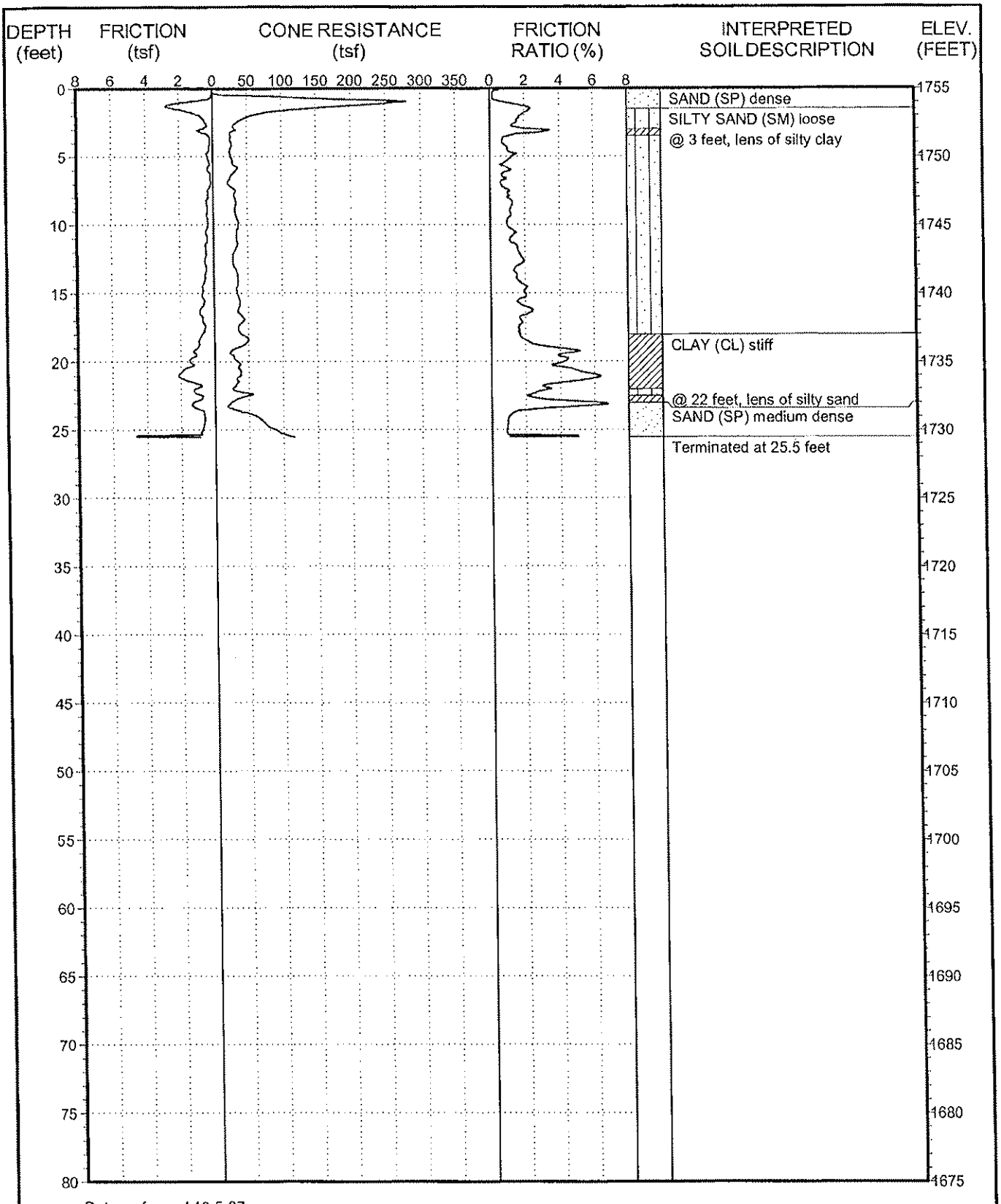
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-511

FIGURE A-40



Date performed:10-5-07

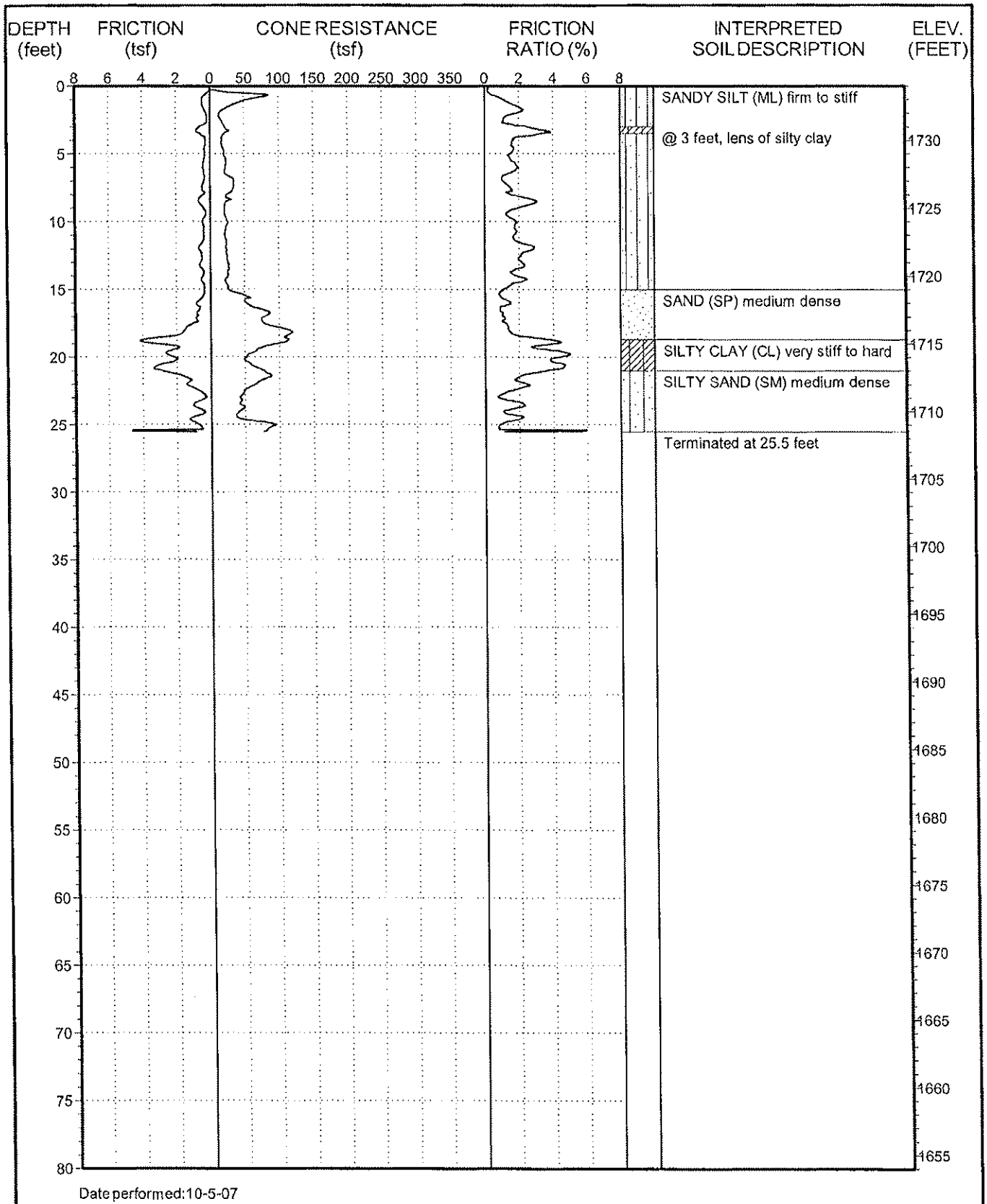
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-512

FIGURE A-41



Date performed:10-5-07

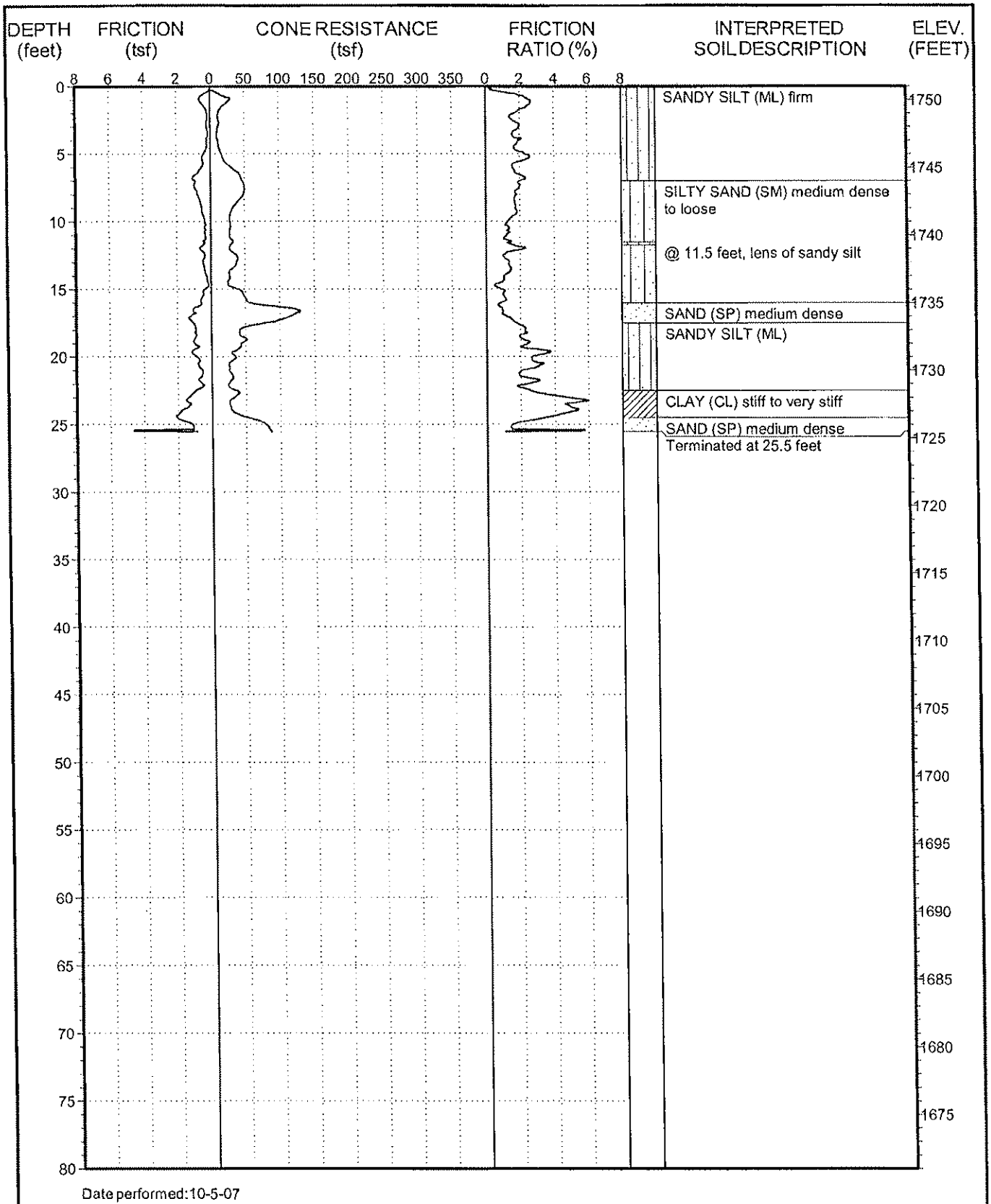
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-513

FIGURE A-42



Date performed:10-5-07

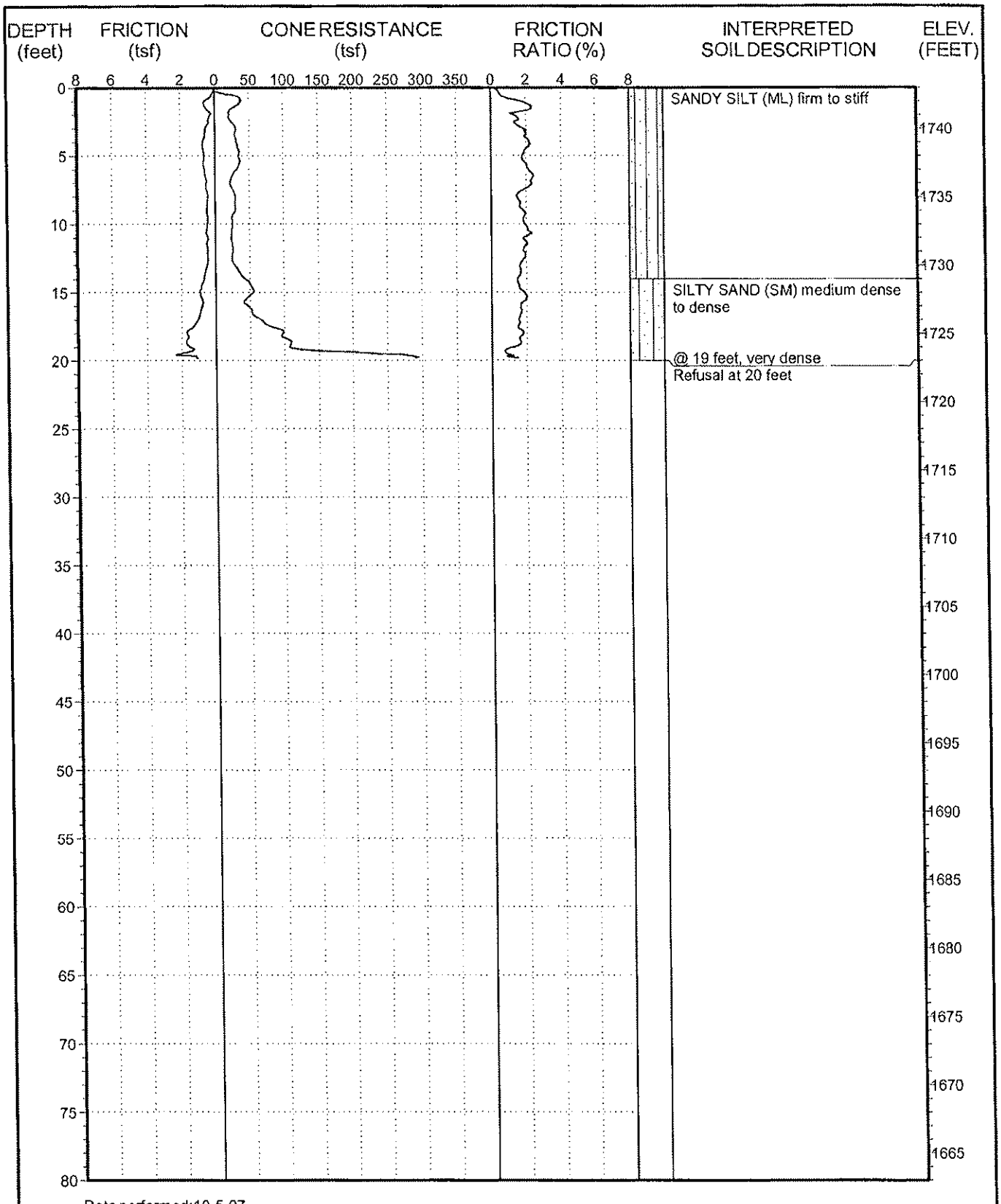
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GDI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-514

FIGURE A-43



Date performed:10-5-07

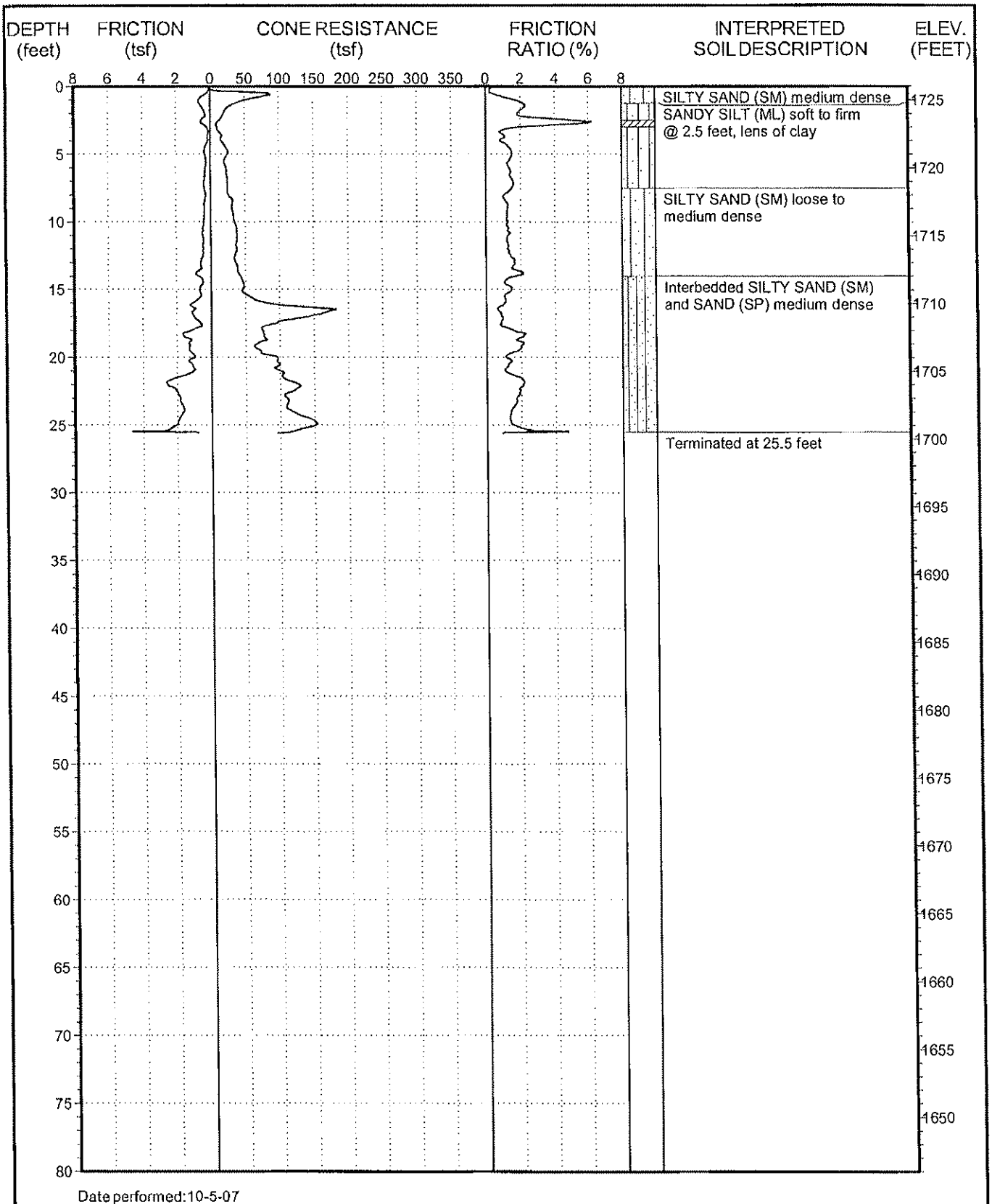
This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-515

FIGURE A-44



Date performed:10-5-07

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF CPT NO. C-516

FIGURE A-45

APPENDIX B

APPENDIX B

EXPLORATORY BORINGS

The subsurface conditions at the site were investigated by drilling and sampling 46 exploratory borings the present investigation. The borings were advanced to depths ranging from 6 to 50 feet below the existing ground surface. The locations of the explorations are shown on the Site Plan, Figure 2.

During a past investigation, four borings were performed to construct percolation wells. The borings performed for the percolation testing are included in Appendix D. The locations of these explorations are shown on the Site Plan, Figure 2.

Borings B-1 to B-46 were drilled using truck-mounted hollow-stem auger drill equipment. Relatively undisturbed samples were obtained using a brass-ring lined sampler (ASTM D 3550). The brass-rings have an inside diameter of 2.42 inches. The ring samples were driven into the soil by a 140-pound hammer dropping 30 inches. The number of blows needed to drive the sampler into the soil was recorded as the penetration resistance. Due to the use of a "free-fall" hammer (rather than a hammer attached to a rope), the blow-counts recorded with the drive (D) sampler are comparable to the Standard Penetration Test blow-count.

The field explorations for the investigation were performed under the continuous technical supervision of GPI's representative, who visually inspected the site, maintained detailed logs of the borings, classified the soils encountered, and obtained relatively undisturbed samples for examination and laboratory testing. The soils encountered in the borings were classified in the field and through further examination in the laboratory in accordance with the Unified Soils Classification System. Detailed logs of the borings are presented in Figures B-1 to B-46 in this appendix.

The boring locations were laid out in the field by measuring from existing site features. Upon completion, the boreholes were backfilled with excavated soil cuttings. Ground surface elevations at the boring locations were estimated from topography on the preliminary conceptual grading plan prepared by Thienes Engineering (dated June 2007).

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **CLAYEY SILT (ML-CL)** dark brown, moist, firm	1775
8.4	102	9	D		Natural: **CLAYEY SILT (ML-CL)** dark brown, slightly moist, firm	
5.4	100	5	D	5	**SILTY SAND (SM)** brown, slightly moist, loose	1770
9.6	97	5	D		**SANDY SILT (ML)** brown, dry, soft	
13.8	102	5	D	10	**CLAYEY SILT (ML-CML)** brown, moist, soft, trace porosity	1765
4.7	103	7	D	15	**SILTY SAND (SM)** brown, slightly moist, loose, trace gravel	1760
14.7	111	36	D	20	**SANDY CLAY (CL)** brown, moist, very stiff, trace caliche	1755
		21	D	25	**SAND (SP)** brown, moist, medium dense, trace gravel	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-101

FIGURE B-1

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SANDY CLAY (CL)** brown, moist, very stiff, trace caliche	
13.5	97	5	D		Natural: **SANDY SILT (ML)** brown, moist, soft to firm, trace caliche	1770
9.3		6	D	5	@ 5 feet, slightly moist	
14.8	99	4	D		**SILTY CLAY (CL-ML)** brown, moist, soft, trace porosity	1765
15.5	108	9	D	10	**SANDY CLAY (CL)** brown, moist, firm, trace caliche	1760
2.8	100	11	D	15	**SAND (SP)** brown, dry, loose, trace gravel	1755
12.5	115	24	D	20	**SANDY CLAY (CL)** brown, moist, very stiff, trace caliche	1750
13.9	103	25	D	25		
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

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LOG OF BORING NO. B-102

FIGURE B-2

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY SILT (ML)**light brown, moist, stiff, trace caliche and porosity	
4.1	96	15	D		Natural: **SILTY SAND (SM)** brown, dry, medium dense, trace gravel	1770
3.6	98	10	D	5	@ 5 feet, loose	
5.4	103	6	D		**SANDY SILT (ML)** brown, slightly moist, firm, trace gravel	1765
6.1	101	6	D	10		1760
13.5	101	11	D	15	**SILTY CLAY (CL-ML)** brown, moist, firm, trace gravel	1755
9.9	118	34	D	20	**SANDY CLAY (CL)** brown, slightly moist, very stiff, trace gravel	1750
		47	D	25	**SANDY SILT (ML)** brown, moist, hard, with gravel and caliche	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-103

FIGURE B-3

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill: **SILTY SAND (SM)** brown, slightly moist, loose, trace gravel	1770
5.0	107	9	D		Natural: **SILTY SAND (SM)** brown, slightly moist, loose, trace gravel	
2.9	105	10	D	5	**SAND (SP)** brown, dry, loose to medium dense, with gravel	1765
1.8	113	15	D			
6.1	107	7	D	10	**SILTY SAND (SM)** brown, slightly moist, loose, trace gravel	1760
4.4	107	17	D	15	**SAND (SP)** brown, slightly moist, medium dense, with gravel	1755
14.9	111	30	D	20	**SANDY CLAY (CL)** brown, moist, very stiff, with gravel	1750
5.5	110	17	D	25	**SILTY SAND (SM)** brown, slightly moist, medium dense, trace gravel	1745
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

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LOG OF BORING NO. B-104

FIGURE B-4

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SILTY CLAY (CL-ML)** brown, dry, firm, trace porosity	1775
5.6	101	10	D		Natural: **SILT (ML)** brown, dry, firm, trace porosity	
8.0	99	11	D	5		1770
4.5	102	10	D		**SANDY SILT (ML)** brown, dry, firm	
5.3	99	6	D	10		1765
9.9	104	7	D	15	@ 15 feet, moist	1760
5.9	96	8	D	20	**SAND (SP)** brown, slightly moist, loose	1755
					SANDY CLAY (CL) brown, moist, firm	
		25	D	25	**SILTY CLAY (CL-ML)** brown, moist, very stiff	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GDI

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-201

FIGURE B-5

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY CLAY (CL)** brown, slightly moist, firm, trace porosity and gravel	
8.5	105	6	D		Natural: **SANDY CLAY (CL)** brown, slightly moist, firm, trace porosity and gravel	1775
10.1	100	6	D	5	**SILTY SAND (SM)** brown, moist, loose, trace gravel	
6.2	101	13	D			1770
5.5	103	5	D	10	**SAND (SP)** brown, slightly moist, very loose, with gravel	
						1765
15.4	96	10	D	15	**CLAYEY SAND (SC)** brown, moist, loose	
						1760
		5	D	20	@ 20 feet, dark brown, very loose, trace porosity and gravel	
						1755
3.0	107	6	D	25	**SAND (SP)** brown, dry, loose, with gravel	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-202

FIGURE B-6

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SILTY CLAY (CL-ML)** brown, slightly moist, firm	
8.0	99	6	D		Natural: **CLAY (CL)** brown, slightly moist, firm	1775
9.1	90	8	D	5	@ 5 feet, trace gravel	
11.1	100	7	D			1770
5.2	112	8	D	10	**SILTY SAND (SM)** brown, slightly moist, loose, trace gravel	1765
3.2	111	15	D	15	**SAND (SP)** brown, dry, medium dense, with gravel	1760
4.8	109	36	D	20	@ 20 feet, slightly moist	1755
		14	D	25	**CLAY (CL)** brown, moist, stiff, trace caliche	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

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LOG OF BORING NO. B-203

FIGURE B-7

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SANDY SILT (ML)** light brown, dry, firm, trace porosity	1770
4.8	93	11	D		Natural: **SANDY SILT (ML)** light brown, dry, firm, trace porosity	
6.7	98	7	D	5	**SILT (ML)** light brown, slightly moist, firm, trace porosity	1765
6.4	102	7	D		**SANDY SILT (ML)** light brown, slightly moist, firm	
5.7	99	7	D	10		1760
12.5	107	10	D	15	**SANDY CLAY (CL)** dark brown, moist, firm, trace porosity and caliche	1755
		11	D	20	**SILTY CLAY (CL-ML)** dark brown, moist, firm, trace porosity	1750
					SAND (SP) brown, moist, loose, trace gravel	
8.0	99	11	D		**SILTY CLAY (CL-ML)** brown, slightly moist, firm	
				25	**SILTY SAND (SM)** brown, moist, loose	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-204

FIGURE B-8

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SILTY SAND (SM)** brown, moist, loose	1770
7.5	99	4	D		Natural: **SANDY SIILT (ML)** brown, slightly moist, soft	
7.7	98	9	D	5	@ 5 feet, firm	1765
9.0	102	6	D			
6.9	105	6	D	10	@ 10 feet, trace porosity	1760
9.5	104	8	D	15		1755
4.1	107	8	D	20	**SAND (SP)** brown, slightly moist, loose	1750
					CLAYEY SAND (SC) brown, moist, firm	
		20	D	25	Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-205

FIGURE B-9

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SANDY SILT (ML)** brown, dry, firm, trace porosity	
10.0	115	8	D		Natural: **SANDY SILT (ML)** brown, dry, firm, trace porosity	1770
5.0	94					
6.9	86	9	D	5	**SANDY SIILT (ML)** brown, slightly moist, firm, trace porosity	
8.6	94	6	D			1765
9.3	100	6	D	10		
						1760
7.1	99	7	D	15		
						1755
		16	D	20	**SANDY CLAY (CL)** dark brown, moist, firm, trace porosity	
						1750
10.8	115	22	D	25	**SILTY SAND (SM)** brown, moist, medium dense, trace gravel	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-206

FIGURE B-10

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY SILT (ML)** brown, dry, stiff, trace porosity	
5.2	99	13	D		Natural: **SANDY SILT (ML)** brown, dry, stiff, trace porosity	1770
2.3	102	7	D	5	@ 5 feet, trace gravel	
					SAND (SP) light brown, dry, medium dense, with gravel	
1.1		23	D		@ 7 feet, organics	1765
3.9	103	8	D	10	**SILTY SAND (SM)** brown, dry, loose	
						1760
7.9	102	7	D	15	**SANDY SILT (ML)** brown, slightly moist, firm	
						1755
13.2	98	7	D	20	**SILTY CLAY (CL-ML)** brown, moist, firm, trace porosity	
						1750
		32	D	25	**SAND (SP)** brown, moist, medium dense, trace gravel	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-207

FIGURE B-11

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY SIILT (ML)** brown, dry, firm, trace porosity	1765
6.0	91	7	D		Natural: **SANDY SILT(ML)** brown, dry, firm, trace porosity	
7.3	103	7	D	5		1760
3.4	102	6	D		**SAND (SP)** brown, dry, loose, trace gravel	
2.1	112	12	D	10		1755
12.6	126	7	D	15	**SANDY CLAY (CL-ML)** brown, moist, firm, trace porosity	1750
		11	D	20	**CLAYEY SAND (SC)** brown, moist, loose to medium dense, trace gravel	1745
12.6	112	27	D			
				25	Total Depth 25 feet	1740

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-208

FIGURE B-12

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill: **SILTY CLAY (CL-ML)** brown, dry, firm, trace gravel	1765
4.9	103	12	D		Natural: **SILTY SAND (SM)** brown, dry, loose, trace gravel	
2.2	104	8	D	5		1760
13.9	93	6	D		**CLAYEY SAND (SC)** brown, dry, loose, trace gravel	
5.5	103	6	D	10	**SILTY SAND (SM)** brown, slightly moist, loose, trace gravel	1755
3.3	104	14	D	15	**SAND (SP)** brown, dry, loose, with gravel	1750
2.7	102	35	D	20	@ 20 feet, medium dense	1745
		63	D	25	@ 25 feet, dense	1740
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-209

FIGURE B-13

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SILTY SAND (SM)** brown, moist, very loose	1765
9.0	101	5	D		Natural: **SILTY SAND (SM)** brown, moist, very loose	
15.4	99	4	D	5	**SILTY CLAY (CL-ML)** brown, moist, soft	1760
5.3	106	6	D		**CLAYEY SAND (SC)** brown, slightly moist, loose, trace gravel	
7.8	100	6	D	10	**SILTY SAND (SM)** brown, moist, loose	1755
6.5	102	7	D	15	@ 15 feet, slightly moist	1750
		9	D	20	**SAND (SP)** brown, moist, loose, with gravel	
					SANDY CLAY (CL) dark brown, moist, very stiff	1745
14.8	109	23	D	25		
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-210

FIGURE B-14

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY CLAY (CL)** dark brown, slightly moist, firm, trace gravel	
8.7	78	7	D		Natural: **SANDY CLAY (CL)** dark brown, slightly moist, firm, trace gravel	1755
10.4	107	8	D	5		
11.7	111	10	D			1750
12.0	106	14	D	10	**SANDY SILT (ML)** dark brown, moist, firm to stiff, trace porosity, trace caliche	
						1745
11.6	104	11	D	15		
						1740
15.7	108	16	D	20	**CLAY (CL)** dark brown, moist, stiff, trace porosity	
						1735
		55	D		**SANDY CLAY (CL)** brown, moist, hard, trace caliche	
				25	Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-8-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-301

FIGURE B-15

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY CLAY (CL)** brown, moist, firm	
13.1	98	9	D		Natural: **SILTY CLAY (CL-ML)** brown, moist, firm	
						1755
13.5	93	10	D	5		
14.4	97	9	D		**SANDY SILT (ML)** light brown, moist, firm	
						1750
18.5	101	9	D	10	**SILTY CLAY (CL-ML)** light brown, very moist, firm	
						1745
12.1	117	25	D	15	**CLAYEY SAND (SC)** brown, slightly very moist, medium dense, trace gravel	
						1740
		26	D	20		
16.8	102	27	D		@ 24 feet, wet	1735
				25	Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-8-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-302

FIGURE B-16

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SILTY CLAY (CL-ML)** brown, slightly moist, firm	1755
9.0	132	7	D		Natural: **SILTY CLAY (CL-ML)** brown, slightly moist, firm	
9.9	90					
10.7	100	7	D	5	@ 5 feet, trace porosity	1750
4.0	111	18	D		**SAND (SP)** brown, moist, medium dense, trace gravel	
3.0	102	15	D	10	@ 10 feet, with gravel	1745
5.0	108	55	D	15	@ 15 feet, slightly moist, dense	1740
		63	D	20		1735
1.8	108	37	D	25	@ 24 feet, dry, medium dense	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-8-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-304

FIGURE B-17

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SANDY CLAY (CL)** brown, slightly moist, firm, trace porosity, trace gravel	
10.8	103	6	D		Natural: **SANDY CLAY (CL)** brown, slightly moist, firm, trace porosity, trace gravel	1750
10.3	106	6	D	5		
11.2	104	8	D			1745
12.4	104	14	D	10	**SANDY SILT (ML)** brown, moist, stiff, with gravel	1740
4.0	117	56	D	15	**SAND (SP)** brown, slightly moist, dense, with gravel	1735
		40	D	20	**SANDY CLAY (CL)** brown, moist, very stiff, trace gravel	1730
14.6	110	51	D	25	**CLAY (CL)** brown, slightly moist, hard, trace caliche	
					Total Depth 25 feet	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 10-8-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-306

FIGURE B-18

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
				0	Fill: **SILTY CLAY (CL-ML)** brown, slightly moist, firm	
			B			
9.2	94	8	D		Natural: **SILTY CLAY (CL-ML)** brown, slightly moist, firm	1750
9.0	89	7	D	5		
10.4	113	13	D		@ 7.5 feet, stiff	1745
7.7	103	9	D	10	**SANDY CLAY (CL)** brown, dry, firm, with gravel	1740
10.8	109	17	D	15	**SILTY CLAY (CL-ML)** brown, slightly moist, stiff	1735
10.6	112	32	D	20	**CLAY (CL)** brown, slightly moist, very stiff, trace caliche	1730
12.6	113	27	D	25	**SANDY CLAY (CL)** brown, moist, very stiff, trace porosity and gravel	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-8-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-307

FIGURE B-19

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SILTY SAND (SM)** brown, dry, loose, trace porosity	
2.0	104	9	D		Natural: **SILTY SAND (SM)** brown, dry, loose, trace porosity	1755
11.2	82	9	D	5	**SANDY SILT (ML)** brown, moist, firm	
9.0	96	8	D		@ 7.5 feet, slightly moist	1750
8.5	104	7	D	10		1745
13.3	96	9	D	15	**SILTY CLAY (CL-ML)** brown, moist, firm	1740
9.8	110	14	D	20	**SANDY CLAY (CL)** dark brown, slightly moist, stiff, trace porosity and gravel	1735
		26	D	25		
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-401

FIGURE B-20

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill: **SANDY SILT (ML)** light brown, dry, firm, trace porosity	
4.9	108	9	D		Natural: **SILTY SAND (SM)** light brown, slightly moist, firm, trace porosity	1750
11.1	83	6	D	5	**SILTY CLAY (CL-ML)** light brown, slightly moist, firm, porosity	
6.7	97	7	D		**SANDY SILT (ML)** light brown, slightly moist, firm	1745
11.8	91	6	D	10	@ 10 feet, moist	1740
11.4	99	8	D	15	**SILTY SAND (SM)** dark brown, very moist, loose, trace clay	1735
		11	D	20	**SANDY SILT (ML)** brown, moist, firm	1730
10.0	98	13	D	25	@ 25 feet, stiff	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-402

FIGURE B-21

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	1755
					Fill: **SILTY CLAY (CL-ML)** light brown, dry, firm	
7.0	94	10	D		**CLAYEY SILT (ML-CL)** light brown, slightly moist, firm	
7.9	94	7	D	5		1750
6.2	101	7	D		**SANDY SILT (ML)** light brown, slightly moist, firm	
3.8	99	7	D	10	**SILTY SAND (SM)** light brown, dry, loose	1745
8.8	101	7	D	15	**SANDY SILT (ML)** light brown, slightly moist, firm	1740
14.0	100	10	D	20	**CLAY (CL)** dark brown, moist, firm, trace porosity	1735
		11	D	25	**SILTY CLAY (CL-ML)** dark brown, moist, firm, trace porosity	1730
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-403

FIGURE B-22

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	1750
			B		Fill: **SANDY SILT (SM)** brown, slightly moist, soft, trace porosity	
6.6	95	5	D		Natural: **SANDY SILT (SM)** brown, moist, soft, trace porosity	
10.4	101	7	D	5	@ 5 feet, moist, firm	1745
11.5	97	5	D		**CLAYEY SILT (ML-CL)** brown, moist, soft, trace porosity	
3.7	103	9	D	10	**SAND (SP)** brown, dry, loose	1740
14.6	102	7	D	15	**SANDY SILT (ML)** brown, moist, firm	1735
		9	D	20	**SILTY CLAY (CL-ML)** dark brown, moist, firm	1730
14.1	104	11	D	25	**SANDY CLAY (CL)** dark brown, moist, firm	1725
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-404

FIGURE B-23

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	1745
			B		Fill: **SILTY CLAY (CL)** brown, slightly moist, firm, trace porosity	
11.5	113	8	D		Natural: **SANDY SILT (ML)** brown, slightly moist, firm, trace porosity	
8.9	96					
12.5	93	8	D	5	@ 5 feet, moist	1740
3.1	100	9	D		**SAND (SP)** brown, dry, loose, trace gravel	
14.0	98	8	D	10	**SILTY CLAY (CL)** brown, moist, firm	1735
3.8	109	15	D	15	**SAND (SP)** brown, dry, medium dense, trace gravel	1730
4.0	104	15	D	20	**CLAYEY SAND (SC)** brown, slightly moist, medium dense, trace gravel, trace porosity	1725
		49	D	25	**SAND (SP)** light brown, slightly moist, dense, with gravel	1720
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-405

FIGURE B-24

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
				0	Fill: **CLAYEY SILT (ML-CL)** light brown, dry, firm	
5.1	100	8	D		Natural: **CLAYEY SILT (ML-CL)** light brown, dry, firm	1745
2.4	104	7	D	5	**SILTY SAND (SM)** brown, dry, loose, with gravel	
					@ 6 feet, lens of silty clay	
4.3	97	8	D			1740
5.4	100	7	D	10		
						1735
10.1	98	11	D	15	**SILTY CLAY (CL-ML)** brown, slightly moist, firm to stiff	
						1730
		18	D	20	@ 20 feet, trace caliche	
						1725
3.1	99	16	D	25	**SILTY SAND (SM)** brown, dry, medium dense, trace porosity, trace gravel	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-406

FIGURE B-25

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill: **SILTY SAND (SM)** brown, moist, firm, trace porosity	1745
5.5	101	8	D		Natural: **SILTY SAND (SM)** brown, slightly moist, loose, trace porosity	
5.6	98	6	D	5		1740
12.0	97	8	D		**SANDY SILT (ML)** brown, moist, firm, trace porosity	
13.3	99	6	D	10	**CLAYEY SILT (ML-CL)** brown, moist, firm, trace porosity	1735
4.7	93	12	D	15	**SAND (SP)** light brown, slightly moist, loose, with gravel	1730
7.5	102	15	D	20	**CLAYEY SAND (SC)** dark brown, moist, medium dense, trace porosity	1725
		15	D	25	**SAND (SP)** trace clay, brown, moist, medium dense	1720
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GDI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-407

FIGURE B-26

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY CLAY (CL)** brown, dry, firm, trace porosity	1750
5.0	108	10	D		Natural: **SANDY CLAY (CL)** brown, dry, firm, trace porosity	
7.0	94	10	D	5	**SANDY SILT (ML)** brown, slightly moist, firm	1745
13.9	95	9	D		**SANDY CLAY (CL)** brown, moist, firm	
6.8	103	10	D	10	@ 10 feet, dry, trace gravel	1740
5.7	103	13	D	15	@ 15 feet, stiff	1735
6.1	98	25	D	20	@ 20 feet, trace porosity, trace gravel, very stiff	1730
		80	D		@ 25 feet, hard	
				25	Total Depth 25 feet	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 10-8-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-501

FIGURE B-27

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	1750
					Fill: **SILTY CLAY (CL-ML)** brown, moist, firm, trace porosity	
12.7	103	7	D		Natural: **SILTY CLAY (CL-ML)** brown, moist, firm, trace porosity	
12.0	95	6	D	5		1745
10.4	91	7	D		**SANDY SILT (M)** brown, slightly moist, firm, trace porosity	
8.8	99	7	D	10		1740
6.9	100	7	D	15		1735
11.3	109	14	D	20	**SANDY CLAY (CL)** dark brown, slightly moist, stiff, trace porosity, trace caliche	1730
		23	D	25	**SANDY SILT (ML)** brown, moist, very stiff	1725
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-5-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-502

FIGURE B-28

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill: **SANDY SILT (ML)** brown, dry, firm, trace gravel	1745
3.3	91	7	D		Natural: **SANDY SILT (ML)** brown, dry, firm, trace gravel	
6.8	100	5	D	5	@ 5 feet, slightly moist, soft, trace porosity	1740
17.4	84	7	D		**SILTY CLAY (CL-ML)** brown, moist, firm, trace porosity	
6.8	103	7	D	10	**SANDY SILT (ML)** brown, slightly moist, firm, trace porosity	1735
7.0	102	8	D	15		1730
12.5	100	10	D	20	**SANDY CLAY (CL)** dark brown, moist, firm, trace caliche	1725
		23	D	25	**SILTY CLAY (CL-ML)** dark brown, moist, very stiff, trace gravel	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-5-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-503

FIGURE B-29

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SILTY CLAY (CL)** dark brown, slightly moist, firm	
11.0	128	10	D		Natural: **CLAY (CL)** dark brown, slightly moist, firm	
17.4	103					1740
7.7	89	9	D	5	**SILTY CLAY (CL-ML)** brown, slightly moist, firm	
5.3	96	13	D		@ 7.5 feet, dry	1735
4.0	96	10	D	10	**SANDY SILT (ML)** brown, dry, firm	1730
2.7	109	13	D	15	**SAND (SP)** light brown, dry, loose, with gravel	1725
9.3	110	11	D	20	**CLAYEY SILT (ML-CL)** brown, slightly moist, firm	
					CLAY (CL) dark brown, slightly moist, firm, trace caliche	1720
		31	D	25	**SANDY CLAY (CL)** brown, slightly moist, very stiff, trace caliche	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-5-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-504

FIGURE B-30

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	1740
					Fill: **SILTY CLAY (CL-ML)** brown, dry, firm, trace porosity	
6.4	123	6	D		Natural: **SILTY CLAY (CL-ML)** brown, dry, firm, trace porosity	
12.6	126	5	D	5	@ 5 feet, moist, soft	1735
12.9	99	10	D		@ 7 feet, firm	
8.6	100	8	D	10	@ 10 feet, slightly moist, firm	1730
8.0	96	11	D	15	@ 15 feet, trace caliche	1725
4.8	112	39	D	20	**CLAY (CL)** dark brown, dry, very stiff, trace caliche	1720
		46	D	25	**CLAYEY SAND (SC)** brown, slightly moist, dense, trace gravel	1715
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-5-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-505

FIGURE B-31

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary appiles only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill: **SILTY CLAY (CL-ML)** brown, slightly moist, firm, with porosity	1740
10.8	83	8	D		Natural: **SILTY CLAY (CL-ML)** brown, slighly moist, firm, with porosity	
12.3	94	7	D	5	@ 5 feet, moist	1735
9.7	92	8	D		@ 7 feet, slightly moist	
7.9	101	10	D	10		1730
2.3	102	27	D	15	**SAND (SP)** light brown, dry, medium dense, with gravel	1725
		69	D	20	@ 20 feet, dense	1720
6.3	106	18	D	25	**SILTY SAND (SM)** brown, slightly moist, medium dense, trace gravel	1715
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-5-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-506

FIGURE B-32

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SILTY CLAY (CL-ML)** brown, dry, stiff, trace porosity	
5.7	93	4	D		Natural: **SILTY CLAY (CL-ML)** brown, dry, soft, trace porosity	1730
10.9	85	6	D	5	@ 5 feet, slightly moist, firm	
9.8	94	6	D			1725
7.2	99	6	D	10	**SANDY CLAY (CL)** brown, dry, firm, trace porosity	1720
2.0	107	17	D	15	**CLAYEY SAND (SC)** brown, dry, medium dense, trace porosity	1715
6.6	64	18	D	20	**SAND (SP)** brown, moist, medium dense, trace gravel	
					CLAY (CL) brown, moist, stiff, with porosity	1710
		17	D	25	**SANDY CLAY (CL)** brown, moist, stiff, trace porosity	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-5-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-507

FIGURE B-33

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill: **SILTY CLAY (CL-ML)** brown, dry, slightly moist, trace porosity	
5.9	103	7	D		Natural: **SILTY CLAY (CL-ML)** brown, firm, dry, trace porosity	1730
11.1	107	8	D	5	@ 5 feet, slightly moist	
4.6	104	7	D		**SANDY SILT (ML)** brown, dry, firm	1725
5.9	98	5	D	10	@ 10 feet, soft	1720
8.4	102	8	D	15	@ 15 feet, slightly moist, firm	1715
		13	D	20	**SILTY CLAY (CL-ML)** dark brown, moist, stiff	1710
8.2	107	15	D	25	**SANDY SILT (ML)** brown, slightly moist, stiff	
					Total Depth 25 feet	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 10-5-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-508

FIGURE B-34

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0		1730
			B		Fill: **SILTY CLAY (CL-ML)** brown, slightly moist, firm, trace porosity,	
8.9	89	8	D		Natural: **SILTY CLAY (CL-ML)** brown, slightly moist, firm, trace porosity,	
15.0	82	6	D	5	@ 5 feet, moist	1725
11.5	97	10	D			
6.5	88	10	D	10	**SANDY SILT (ML)** brown, slighty moist, firm, trace gravel	1720
3.4	103	9	D	15	@ 15 feet, dry	1715
4.3	94	14	D	20	**CLAYEY SAND (SC)** brown, slightly moist, loose to medium dense, trace gravel	1710
		31	D			
				25	Total Depth 25 feet	1705

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-509

FIGURE B-35

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill: **SILTY CLAY (CL-ML)** brown, slightly moist, firm, trace porosity	
8.1	96	6	D		Natural: **SILTY CLAY (CL-ML)** brown, slightly moist, firm to stiff, trace porosity	1770
8.2	99	16	D	5		
4.9	105	16	D		**SILTY SAND (SM)** brown, slightly moist, medium dense	1765
9.0	97	7	D	10	**SAND (SP)** brown, moist, loose	1760
5.9	100	17	D	15	@ 15 feet, slightly moist, medium dense, trace gravel	1755
1.2	109	25	D	20	@ 20 feet, light brown, dry, with gravel	
2.4	114	38	D			1750
				25	Total Depth 25 feet	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 10-5-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GDI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-510

FIGURE B-36

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY SILT (ML)** brown, slightly moist, firm, trace porosity	
9.4	91	6	D		Naural: **SANDY SILT (ML)** brown, slightly moist, firm, trace porosity	1740
3.6	96	6	D	5	@ 5 feet, dry, trace gravel	
5.3	95	6	D			1735
7.1	103	9	D	10		
						1730
12.2	95	7	D	15	**SILTY CLAY (CL-ML)** brown, moist, firm, trace porosity	
						1725
21.6	99	16	D	20	**CLAY (CL)** brown, very moist, stiff, trace caliche	
						1720
		12	D	25	**SANDY CLAY (CL)** dark brown, moist, stiff, trace porosity	
					Total Depth 25 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

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PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-511

FIGURE B-37

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	1740
					Fill: **SANDY SILT (ML)** brown, dry, firm	
3.5	104	7	D		Natural: **SANDY SILT (ML)** brown, dry, firm	
5.3	95	4	D	5	@ 5 feet, soft	1735
3.9	107		D		**SILTY SAND (SM)** light brown, dry, loose	
					SAND (SP) light brown, dry, loose, with gravel	
8.0	94	9	D	10	**CLAYEY SILT (ML-CL)** brown, slightly moist, firm, trace porosity	1730
9.9	95	8	D	15	@ 15 feet, trace porosity	1725
		15	D	20	**SANDY SILT (ML)** brown, slightly moist, stiff	1720
3.8	102	13	D		**SAND (SP)** brown, dry, loose	
				25	Total Depth 25 feet	1715

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-512

FIGURE B-38

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
				0	Fill: **SANDY SILT (ML)** light brown, dry, stiff, trace porosity	
			B			
2.5	99	14	D		Natural: **SANDY SILT (ML)** light brown, dry, stiff, trace porosity	1760
5.6	90	11	D	5	**SILT (ML)** light brown, dry, firm, trace porosity	
5.4	103	9	D			1755
6.9		6	D		@ 9 feet, slightly moist	
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-2-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-601

FIGURE B-39

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	1760
			B		Fill: **SILTY CLAY (CL-ML)** brown, dry, firm, trace porosity, trace gravel	
4.3	90	8	D		Fill: **SANDY SIILT (ML)** brown, dry, firm, trace porosity, trace gravel	
5.5	101	8	D	5		1755
10.2	91	6	D		**SILTY CLAY (CL-ML)** brown, slightly moist, firm, trace porosity	
6.4	105	9	D		**CLAYEY SILT (ML-CL)** brown, slightly moist, firm, trace porosity	
				10	Total Depth 10 feet	1750

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-3-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-602

FIGURE B-40

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SILTY SAND (SM)** brown, dry, loose, trace gravel	
2.5	99	9	D		Natural: **SILTY SAND (SM)** brown, dry, loose, trace gravel	1750
8.0	89	6	D	5	**SILTY CLAY (CL-ML)** brown, slightly moist, firm, trace porosity	
10.0	100	9	D			
2.3	102	7	D		**SAND (SP)** brown, dry, loose, with gravel	1745
				10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-603

FIGURE B-41

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SANDY SILT (ML)** brown, slightly moist, firm, trace porosity	
6.4	102	8	D		Natural: **SANDY SILT (ML)** brown, slightly moist, firm, trace porosity	1750
4.0	96	7	D	5	@ 5 feet, dry	
4.1	98	7	D			1745
5.8	90	8	D	10		
						1740
3.4	106	18	D	15	**SAND (SP)** light brown, dry, medium dense, with gravel	
						1735
		15	D	20	@ 20 feet, trace gravel	
						1730
		27	D	25	**SILTY CLAY (CL-ML)** brown, moist, very stiff, trace caliche	
						1725
16.2	112	33	D	30	**CLAY (CL)** brown, moist, very stiff, trace caliche	
					Total Depth 30 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-4-07
EQUIPMENT USED: 8 "" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.11
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-604

FIGURE B-42

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SILTY CLAY (CL-ML)** brown, moist, firm	1780
		7	D		Natural: **SILTY CLAY (CL-ML)** brown, moist, firm	
		10	D	5	@ 5 feet, trace gravel	1775
1.6	82	8	D		**SAND (SP)** light brown, dry, loose, with gravel	
		12	D	10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-8-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-605

FIGURE B-43

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SILTY CLAY (CL-ML)** brown, dry, firm	1780
7.4	97	8	D		Natural: **SILTY CLAY (CL-ML)** brown, dry, firm	
6.0	81	10	D	5	@ 5 feet, trace gravel	
					Refusal/Obstruction at 6 feet	1775

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-8-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-606

FIGURE B-44

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					Fill: **SANDY CLAY (CL)** brown, dry, firm, trace porosity	1755
5.9	101	6	D		Natural: **SANDY SILT (ML)** brown, dry, firm, trace porosity	
7.2	92	13	D	5	**SILTY CLAY (CL-ML)** light brown, dry, stiff	
8.7	102	8	D		**SANDY CLAY (CL)** brown, slightly moist, firm	1750
		8	D			
8.4	106			10	Total Depth 10 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-8-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-607

FIGURE B-45

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
			B		Fill: **SILTY CLAY (CL-ML)** brown, dry, firm, trace porosity	
7.5	90	8	D		Natural: **SILTY CLAY (CL-ML)** brown, dry, firm, trace porosity	1740
		7	D	5		
		8	D			1735
		15	D	10		
					SILTY SAND (SM) brown, moist, loose, trace porosity, trace gravel	
					Total Depth 11 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 10-5-07

EQUIPMENT USED: 8 "" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1I
PROLOGIS MORENO VALLEY

LOG OF BORING NO. B-608

FIGURE B-46

APPENDIX C

APPENDIX C

LABORATORY TESTS

INTRODUCTION

Representative undisturbed soil samples and bulk samples were carefully packaged in the field and sealed to prevent moisture loss. The samples were then transported to our Cypress office for examination and testing assignments. Laboratory tests were performed on selected representative samples as an aid in classifying the soils and to evaluate the physical properties of the soils affecting foundation design and construction procedures. Detailed descriptions of the laboratory tests are presented below under the appropriate test headings. Test results are presented in the figures that follow.

MOISTURE CONTENT AND DRY DENSITY

Moisture content and dry density were determined from a number of the ring samples. The samples were first trimmed to obtain volume and wet weight and then were dried in accordance with ASTM D 2216. After drying, the weight of each sample was measured, and moisture content and dry density were calculated. Moisture content and dry density values are presented on the boring logs in Appendix B.

PERCENT PASSING NO. 200 SIEVE

A total of eight soil samples were dried, weighed, soaked in water until individual soil particles were separated, and then washed on the No. 200 sieve. That portion of the material retained on the No. 200 sieve was oven-dried and weighed to determine the percentage of the material passing the No. 200 sieve. The percentages passing the No. 200 sieve are tabulated below.

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	PERCENT PASSING No. 200 SIEVE
B-103	5	Silty Sand (SM)	44
B-207	2.5	Sandy Silt (ML)	50
B-208	5	Sandy Silt (ML)	53
B-209	5	Silty Sand (SM)	24
B-407	2.5	Silty Sand (SM)	42
B-502	5	Clayey Silt (ML-CL)	52
B-502	10	Sandy Silt (ML)	52
B-608	2.5	Silty Clay (CL)	64

ATTERBERG LIMITS

Liquid and plastic limits were determined for four samples of cohesive material in accordance with ASTM D 4318. The results of the Atterberg Limits testing are provided in Figure C-1.

DIRECT SHEAR

Direct shear tests were performed on undisturbed and remolded bulk samples in accordance with ASTM D 3080. The bulk sample was remolded to approximately 90 percent of the maximum dry density (ASTM D 1557). The samples were placed in the shear machine, and a normal load comparable to the in-situ overburden stress was applied. The samples were inundated, allowed to consolidate, and then were sheared to failure. The tests were repeated on additional test specimens under increased normal loads. Shear stress and sample deformation were monitored throughout the test. The results of the direct shear tests are presented in Figures C-2 to C-9.

CONSOLIDATION

One-dimensional consolidation testing was performed on eight undisturbed samples in accordance with ASTM D 2435. After trimming the ends, the samples were placed in the consolidometer and loaded to 0.4 ksf. Thereafter, the samples were incrementally loaded to a maximum load of 25.6 ksf. The samples were inundated at 1.6 ksf (2.0 ksf on the Wykeham Farrance machine). Sample deformation was measured to 0.0001 inch. Rebound behavior was investigated by unloading the samples back to either 0.4 ksf or 0.8 ksf (0.25 ksf on the Wykeham Farrance machine). Results of the consolidation tests, in the form of percent consolidation versus log pressure, are presented in Figures C-10 to C-16.

COLLAPSE

Three collapse tests were performed on undisturbed samples of sandy silt and silt in accordance with ASTM D 5333. After trimming the ends, the sample was placed in the consolidometer and loaded to 0.4 ksf. Thereafter, the samples were incrementally loaded to a maximum load of 1.6 ksf at the in-situ moisture content and then saturated. Sample deformation was measured to 0.0001 inch. The amount of collapse is shown below as percent compression of the sample.

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	IN-SITU MOISTURE CONTENT (%)	TOTAL COMPRESSION (%)	
				BEFORE SATURATION	AFTER SATURATION
B-102	7	Sandy Silt (ML)	9.3	2.0	2.9
B-201	2	Silt (ML)	5.6	1.8	3.1
B-209	7½	Clayey Sand (SM)	13.9	2.0	2.8
B-401	10	Sandy Silt (ML)	8.5	2.0	3.6
B-403	7	Sandy Silt (ML)	6.2	1.9	3.5
B-502	10	Sandy Silt (ML)	8.8	1.9	3.0
B-507	10	Sandy Silt (ML)	7.2	2.1	3.3

COMPACTION TEST

Two maximum dry density/optimum moisture tests were performed in accordance with ASTM D 1557 on a representative bulk sample of the surficial soils. The test results are as follows:

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)
B-206	1-3	Sandy Silt (ML)	10	128
B-304	1-3	Silty Clay (CL-ML)	9	132
B-405	1-4	Silty Clay (CL-ML)	11.5	125
B-504	1-4	Silty Clay (CL-ML)	11	128
B-602	1-4	Silty Clay (CL-ML)	9	130
B-605	1-4	Silty Clay (CL-ML)	8	131

EXPANSION INDEX

Two expansion index tests were performed on bulk samples of the surficial soils. The tests were performed in accordance with ASTM D 4829 to assess the expansion potential of the on-site soils. The results of the tests are summarized below:

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	EXPANSION INDEX
B-101	1-4	Clayey Silt (ML-CL)	14
B-304	1-3	Silty Clay (CL-ML)	25
B-504	1-4	Silty Clay (CL-ML)	61
B-605	1-4	Silty Clay (CL-ML)	25

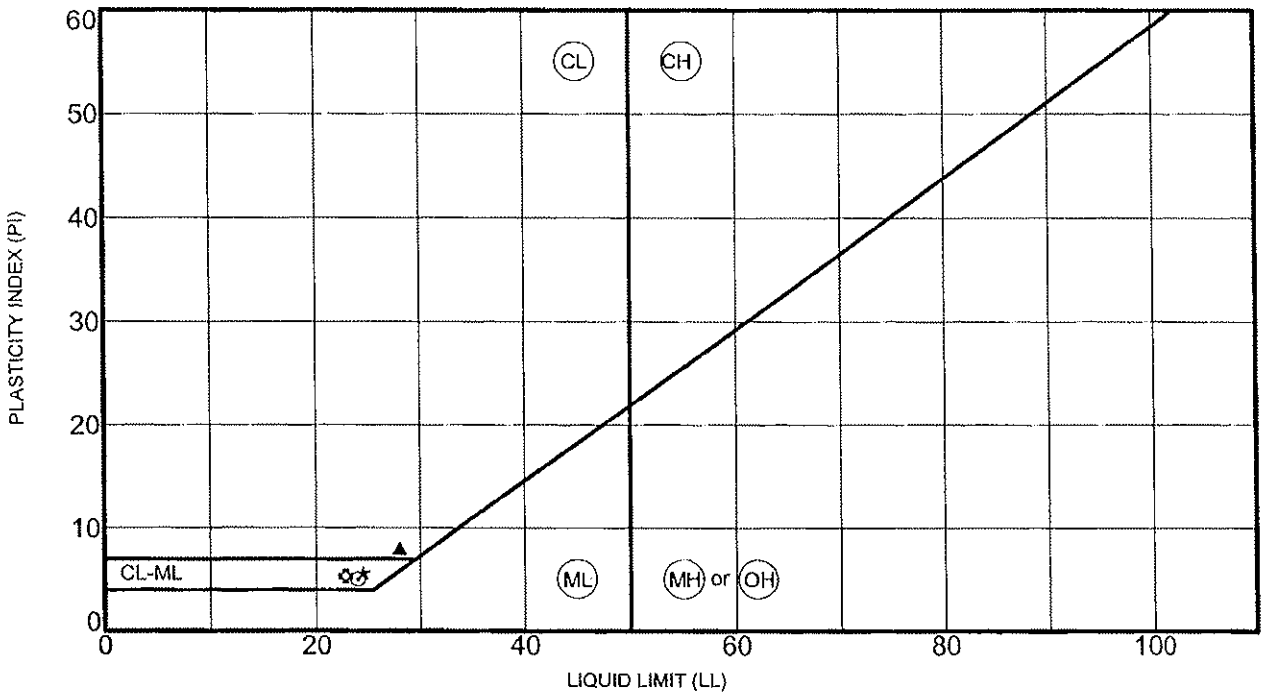
R-VALUE

Suitability of the near-surface soils for pavement was evaluated by conducting an R-value test. The test was performed in accordance with ASTM D2844. The result of the test is as follows:

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	R-VALUE
B-602	1-4	Silty Clay (CL-ML)	45
B-604	1-4	Sandy Silt (ML)	40
B-605	1-4	Silty Clay (CL-ML)	46
B-608	1-4	Silty Clay (CL-ML)	33

CORROSIVITY

Soil corrosivity testing was performed by Schiff Associates on soil samples provided by GPI. The test results are summarized in Table 1 of this Appendix.



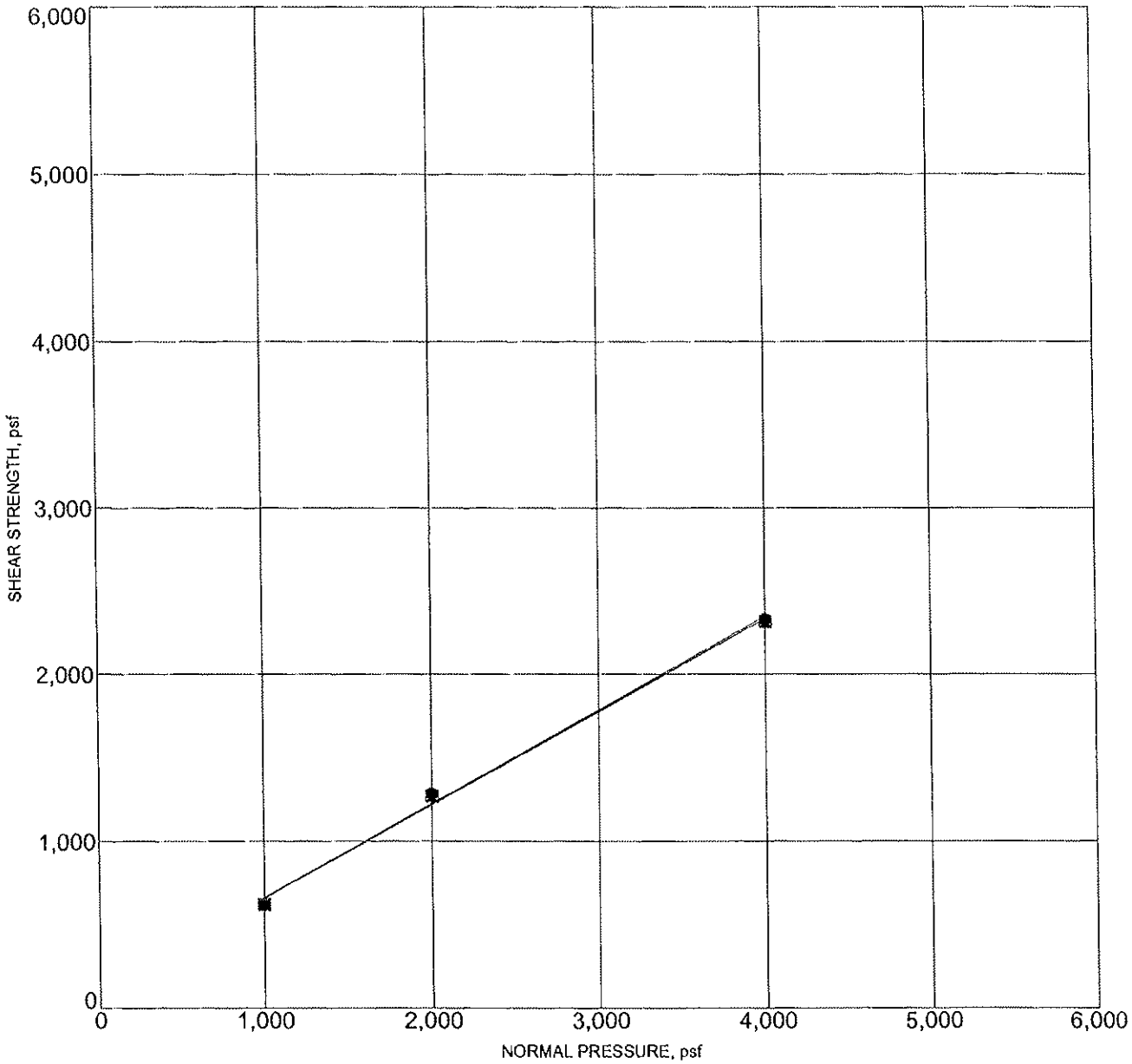
	SAMPLE LOCATION		LL	PL	PI	Fines, %	Classification
▲	B-203	2.5	28	20	8		CLAY (CL)
★	B-501	20.0	25	19	6		SILTY CLAY (CL-ML)
⊙	B-502	5.0	24	19	5		SILTY CLAY (CL-ML)
✿	B-507	10.0	23	17	5		SILTY CLAY (CL-ML)

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO. 2175.1I

GPI

ATTERBERG LIMITS TEST RESULTS

FIGURE C-1



● **PEAK STRENGTH**
Friction Angle= 29 degrees
Cohesion= 102 psf

⧓ **ULTIMATE STRENGTH**
Friction Angle= 29 degrees
Cohesion= 102 psf

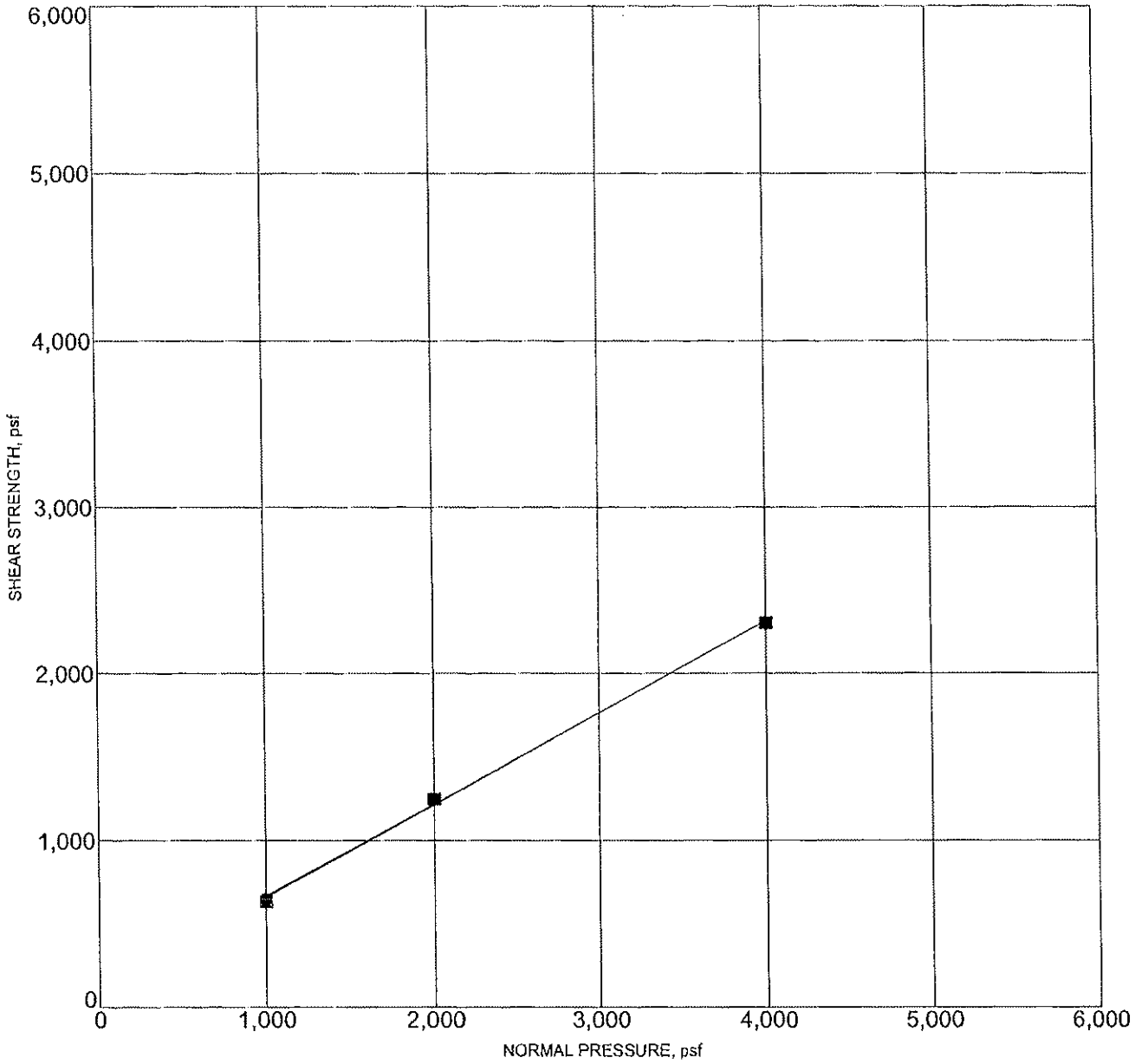
Sample Location		Classification	DD,pcf	MC,%
B-101	10.0	CLAYEY SILT (ML-CL)	102	13.8

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.:2175.1I

GPI

DIRECT SHEAR TEST RESULTS

FIGURE C-2



● **PEAK STRENGTH**
Friction Angle= 29 degrees
Cohesion= 120 psf

⊠ **ULTIMATE STRENGTH**
Friction Angle= 29 degrees
Cohesion= 108 psf

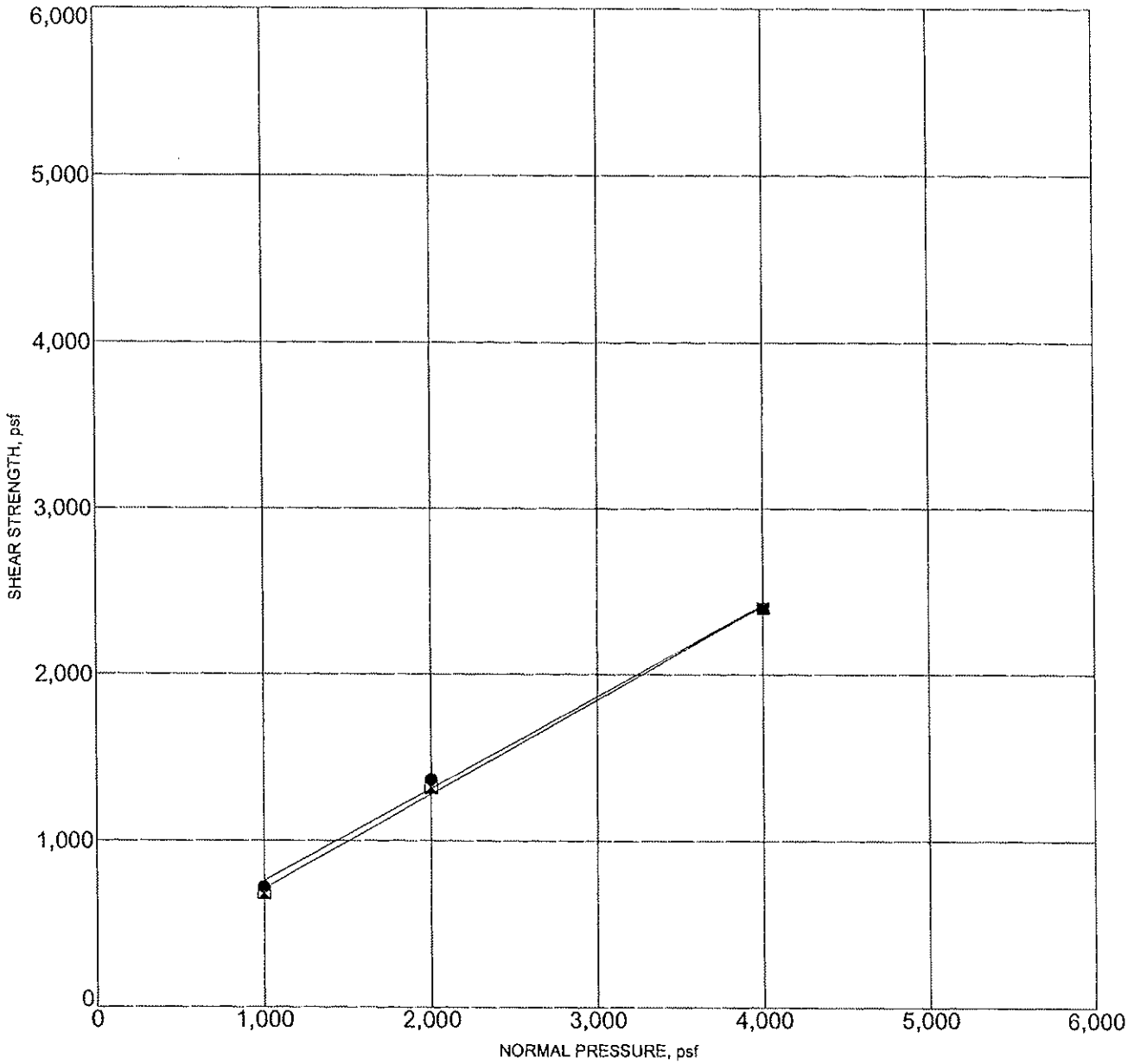
Sample Location		Classification	DD,pcf	MC,%
B-205	7.0	SANDY SILT (ML)	102	9.0

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.: 2175.1I

GPI

DIRECT SHEAR TEST RESULTS

FIGURE C-3



● **PEAK STRENGTH**
Friction Angle= 29 degrees
Cohesion= 204 psf

⊠ **ULTIMATE STRENGTH**
Friction Angle= 30 degrees
Cohesion= 144 psf

Note: Samples remolded to 90% of maximum dry density

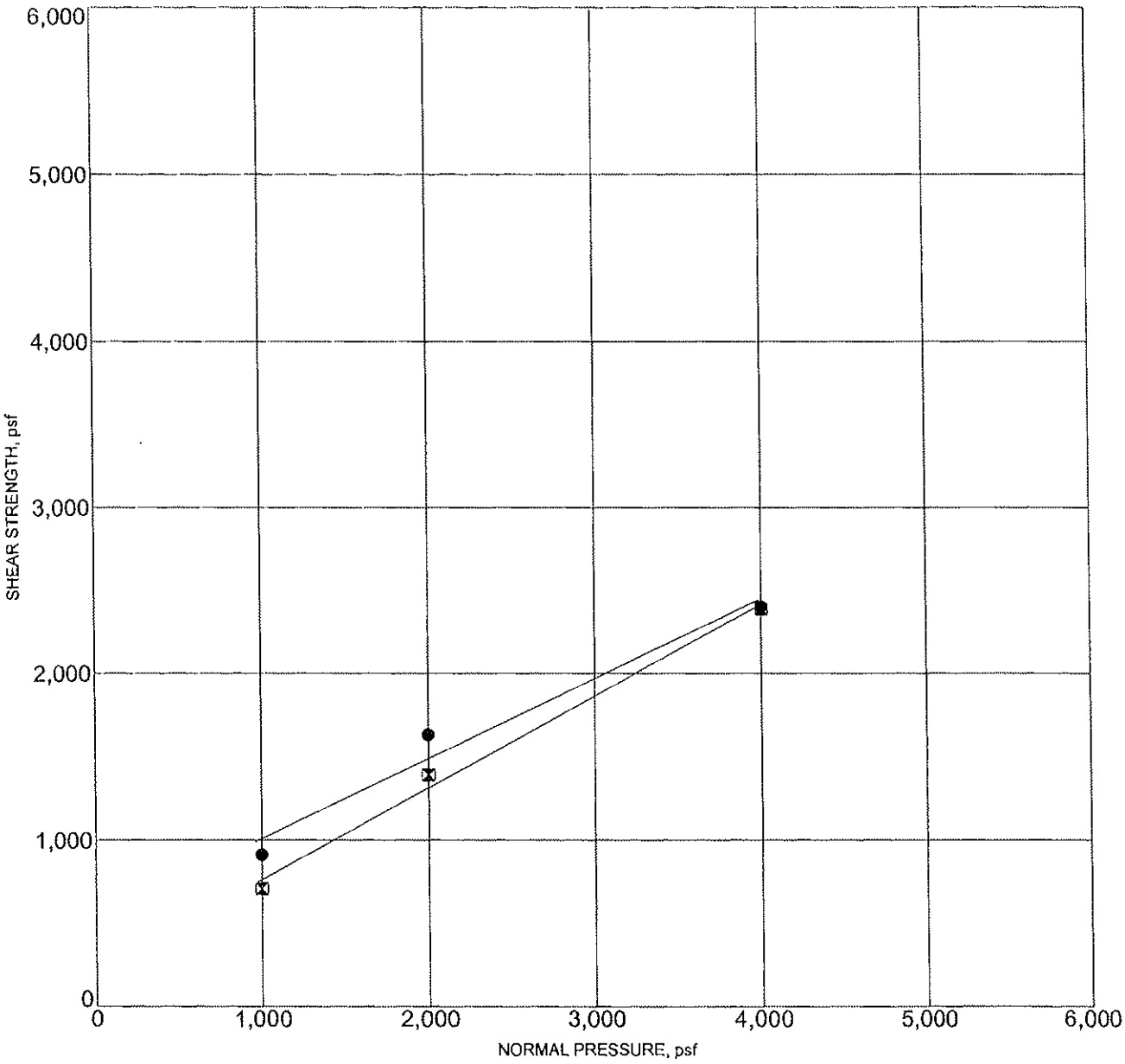
Sample Location		Classification	DD,pcf	MC,%
B-206	1-3	SANDY SILT (ML)	115	10.0

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.:2175.1I

GPI

DIRECT SHEAR TEST RESULTS

FIGURE C-4



● **PEAK STRENGTH**
Friction Angle= 26 degrees
Cohesion= 528 psf

⊠ **ULTIMATE STRENGTH**
Friction Angle= 29 degrees
Cohesion= 210 psf

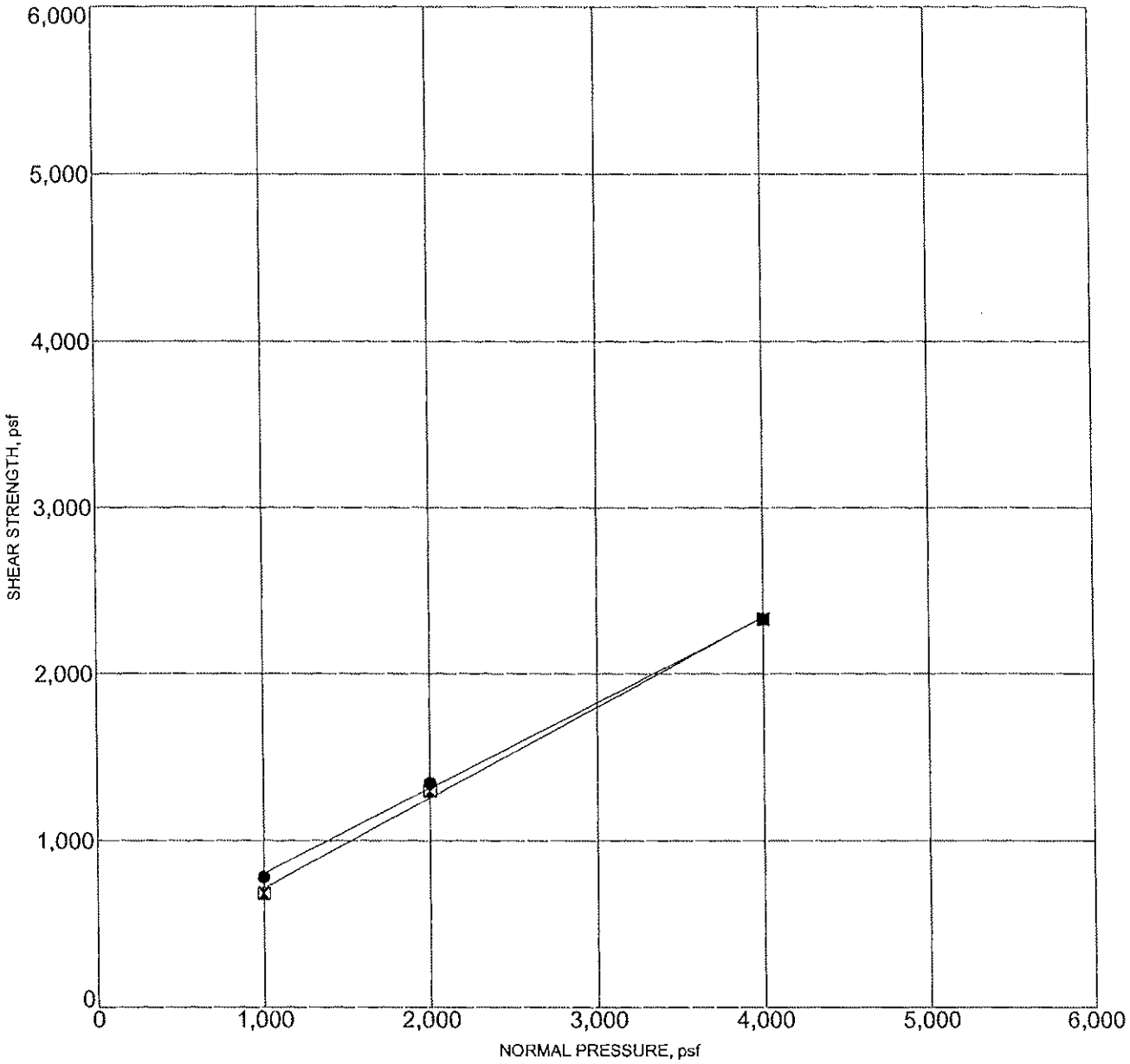
Sample Location		Classification	DD,pcf	MC,%
B-301	7.0	SANDY CLAY (CL)	111	11.7

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.:2175.1I

GPI

DIRECT SHEAR TEST RESULTS

FIGURE C-5



● **PEAK STRENGTH**
Friction Angle= 27 degrees
Cohesion= 288 psf

⊠ **ULTIMATE STRENGTH**
Friction Angle= 29 degrees
Cohesion= 168 psf

Note: " Samples remolded to 90% of maximum dry density."

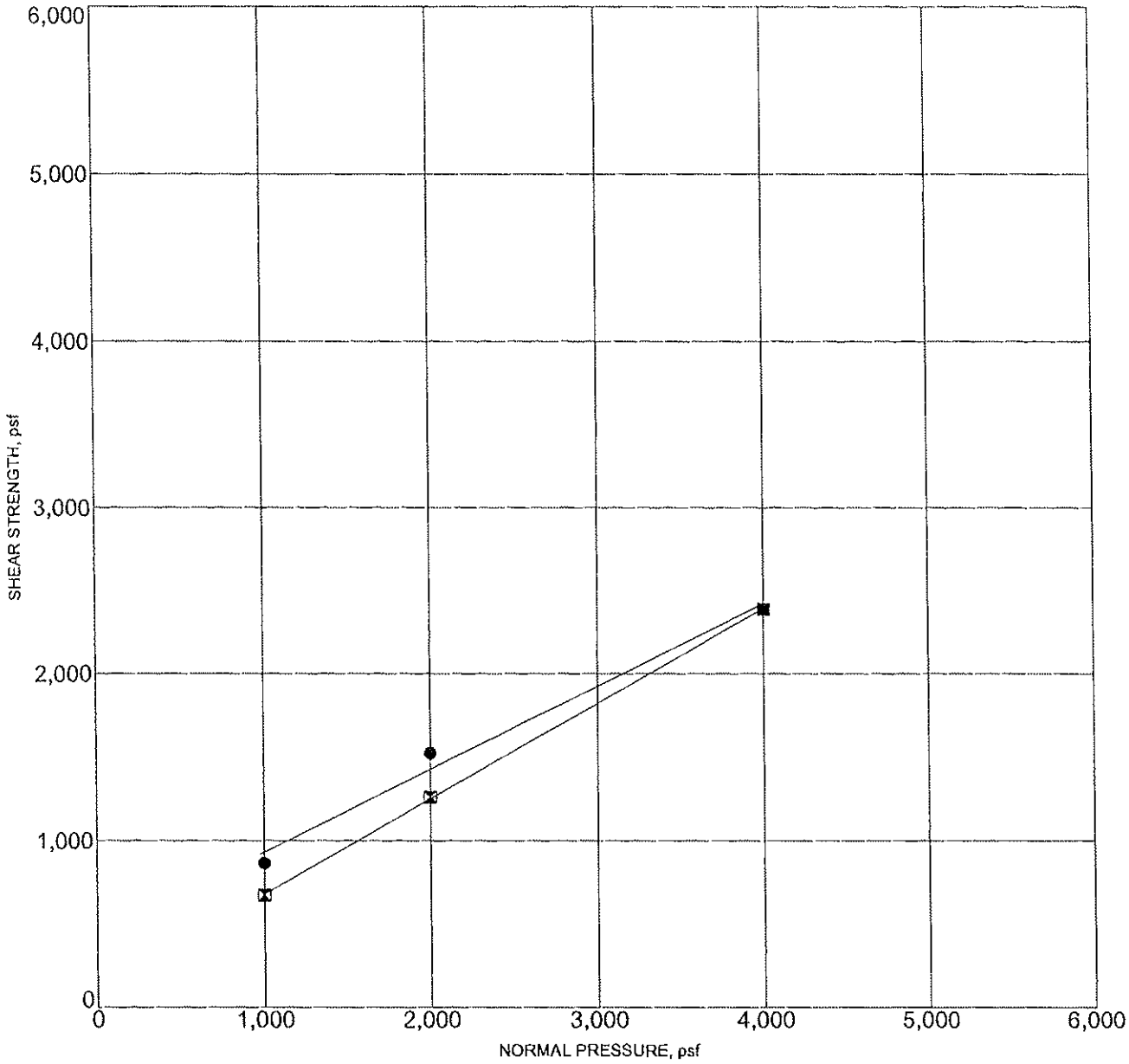
Sample Location		Classification	DD,pcf	MC,%
B-304	1-3	SILTY CLAY (CL-ML)	132	9.0

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.:2175.1I

GPI

DIRECT SHEAR TEST RESULTS

FIGURE C-6



● **PEAK STRENGTH**
Friction Angle= 26 degrees
Cohesion= 432 psf

⊠ **ULTIMATE STRENGTH**
Friction Angle= 30 degrees
Cohesion= 108 psf

Note: Samples remolded to 90% of maximum dry density

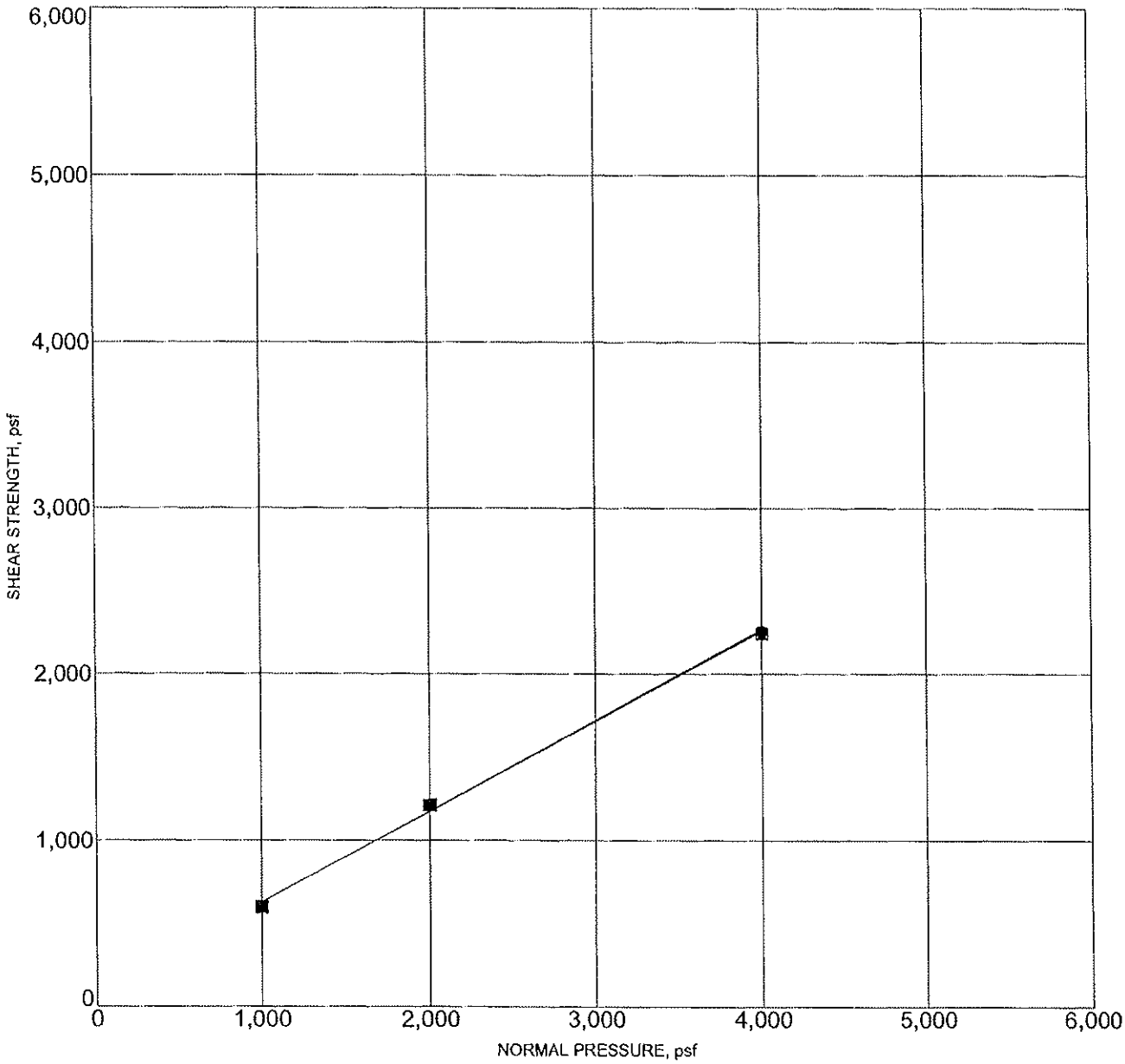
Sample Location		Classification	DD,pcf	MC,%
B-405	1-3	SILTY CLAY (CL-ML)	113	11.5

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.:2175.1I

GPI

DIRECT SHEAR TEST RESULTS

FIGURE C-7



● **PEAK STRENGTH**
Friction Angle= 29 degrees
Cohesion= 78 psf

⧓ **ULTIMATE STRENGTH**
Friction Angle= 29 degrees
Cohesion= 84 psf

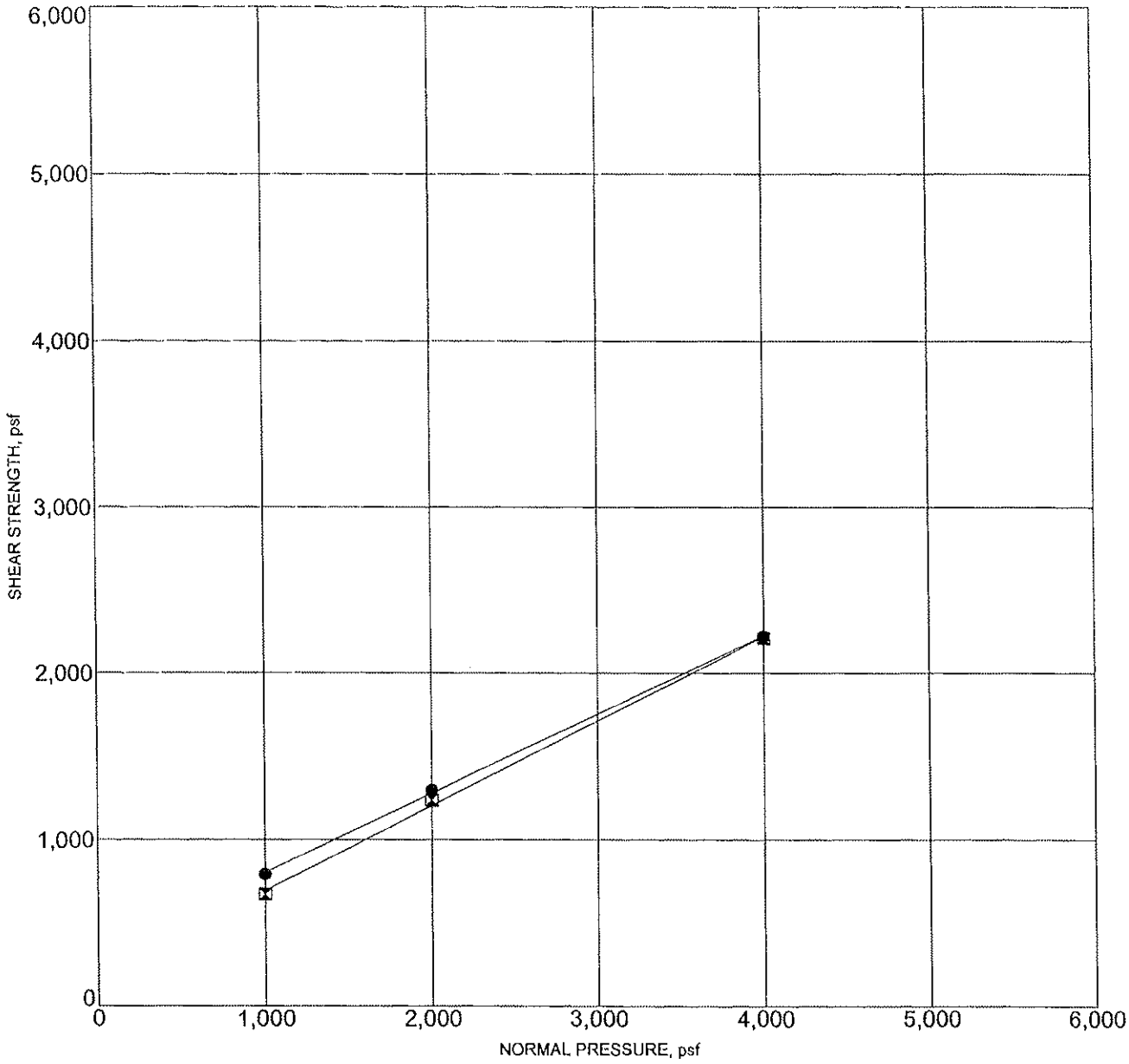
Sample Location		Classification	DD,pcf	MC,%
B-502	7.0	CLAYEY SILT (ML-CL)	91	10.4

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.:2175.1I

GPI

DIRECT SHEAR TEST RESULTS

FIGURE C-8



● **PEAK STRENGTH**
Friction Angle= 25 degrees
Cohesion= 330 psf

⊠ **ULTIMATE STRENGTH**
Friction Angle= 27 degrees
Cohesion= 186 psf

Note: " Samples remolded to 90% of maximum dry density."

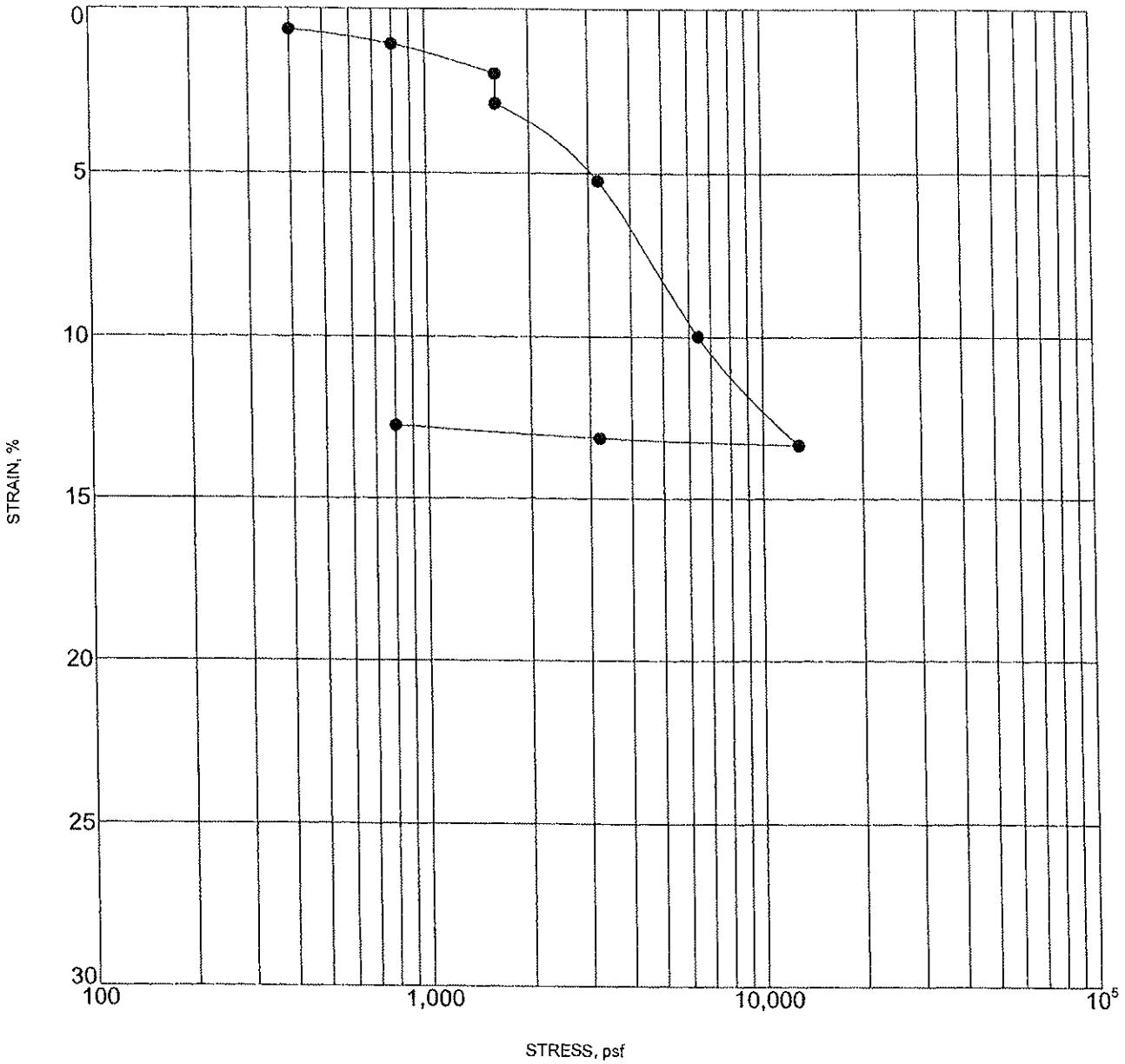
Sample Location		Classification	DD,pcf	MC,%
B-504	1-3	SILTY CLAY (CL-ML)	128	11.0

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.:2175.1I

GPI

DIRECT SHEAR TEST RESULTS

FIGURE C-9



Sample inundated at 1.6 psf

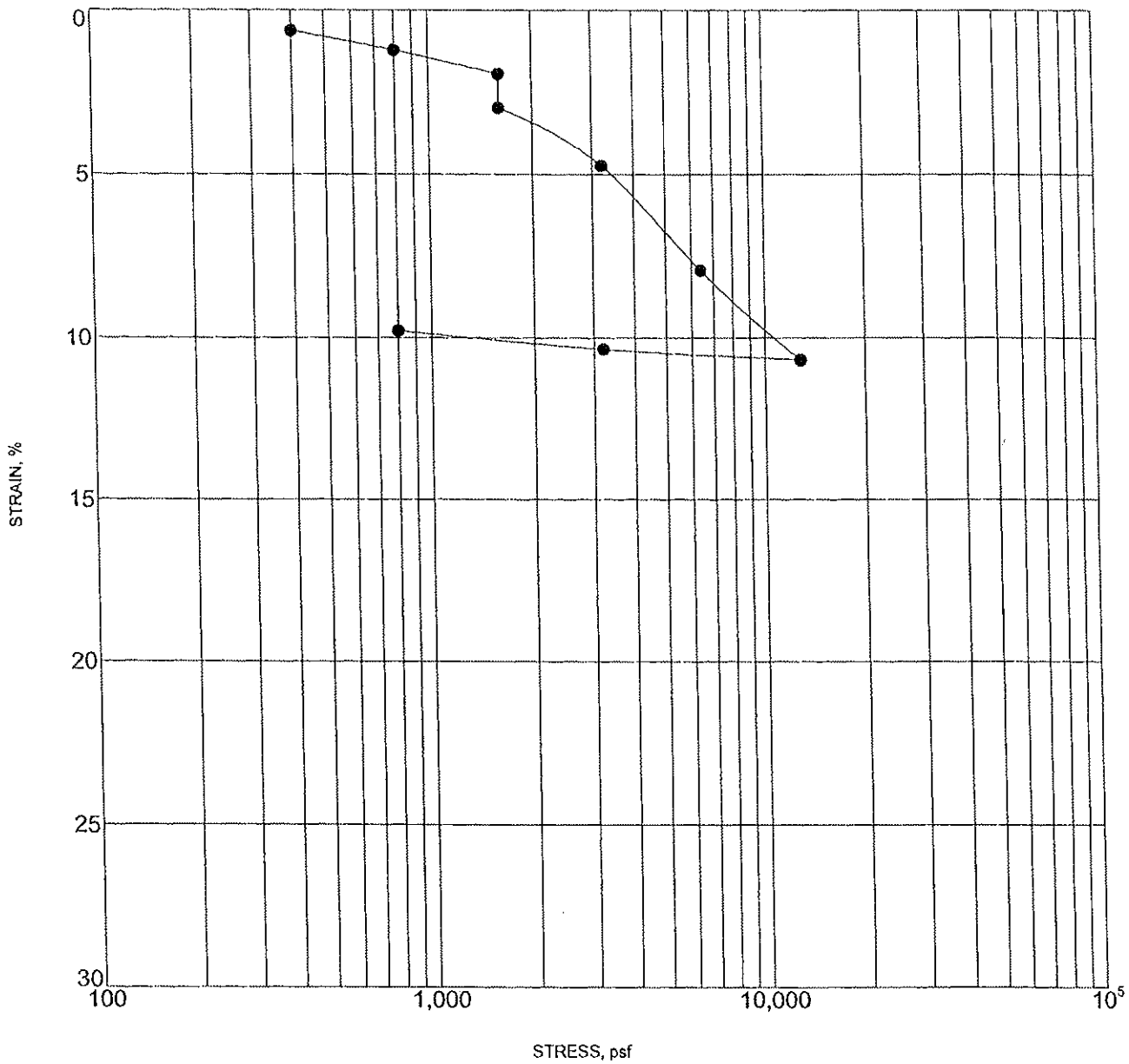
	Sample Location		Classification	DD,pcf	MC,%
●	B-102	7.0	SILTY CLAY (CL-ML)	99	14.8

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.: 2175.11

GPI

CONSOLIDATION TEST

FIGURE C-10



Sample inundated at 1.6 psf

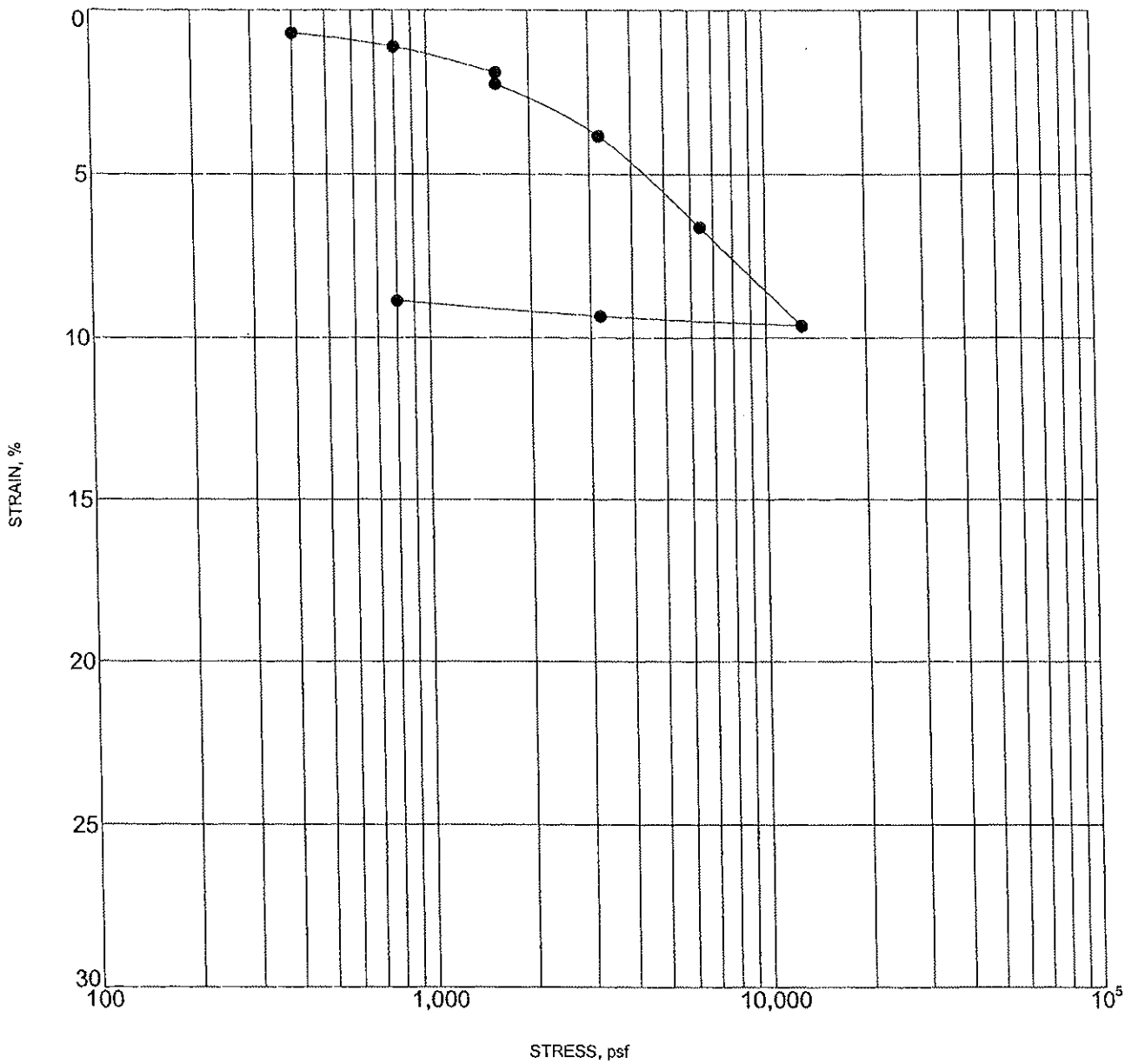
	Sample Location		Classification	DD,pcf	MC,%
●	B-209	7.0	CLAYEY SAND (SC)	93	13.9

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.: 2175.1I

GPI

CONSOLIDATION TEST

FIGURE C-11



Sample inundated at 1.6 psf

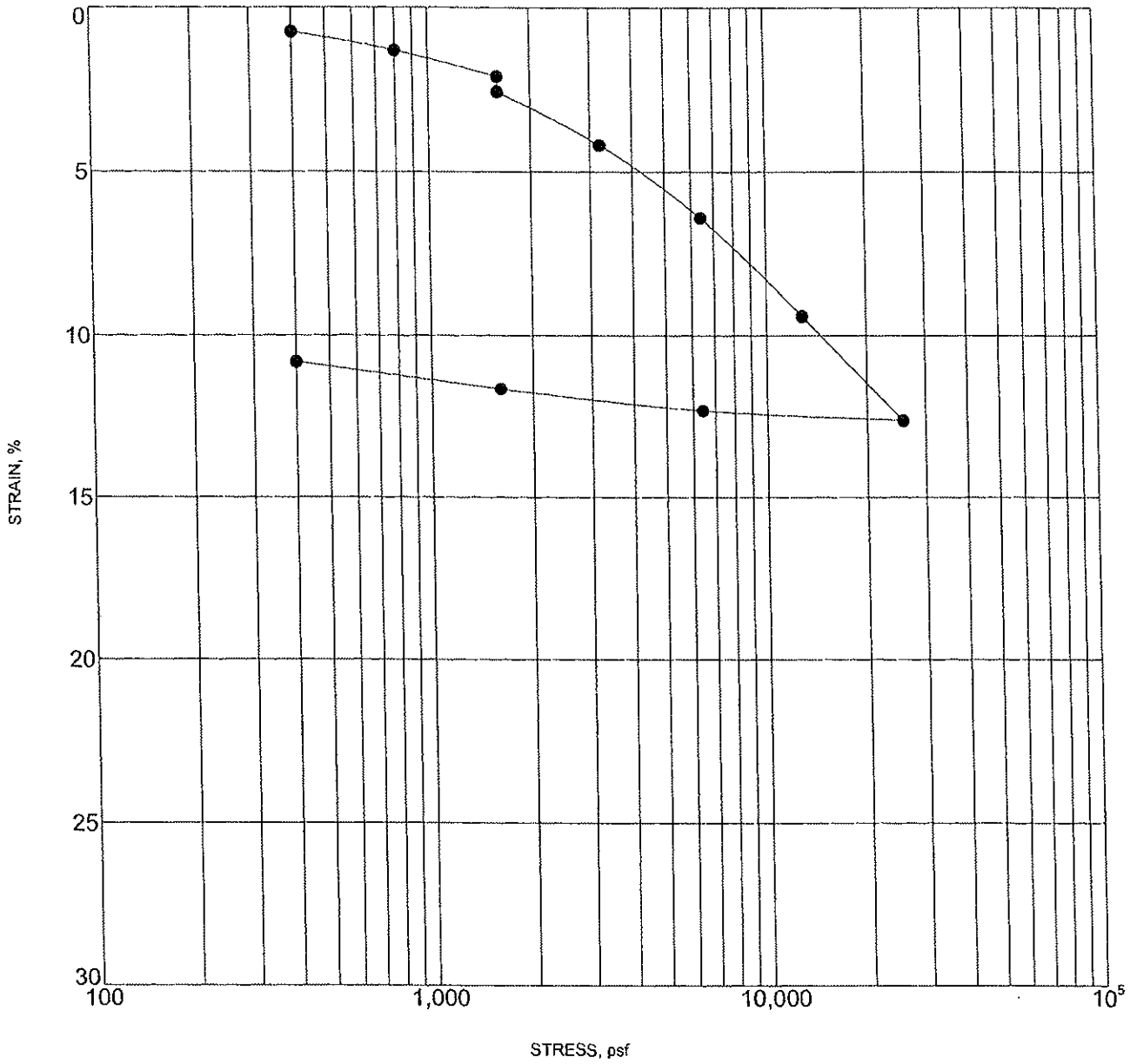
	Sample Location		Classification	DD,pcf	MC,%
●	B-306	7.0	SANDY CLAY (CL)	104	11.2

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.: 2175.1I

GPI

CONSOLIDATION TEST

FIGURE C-12



Sample inundated at 1.6 psf

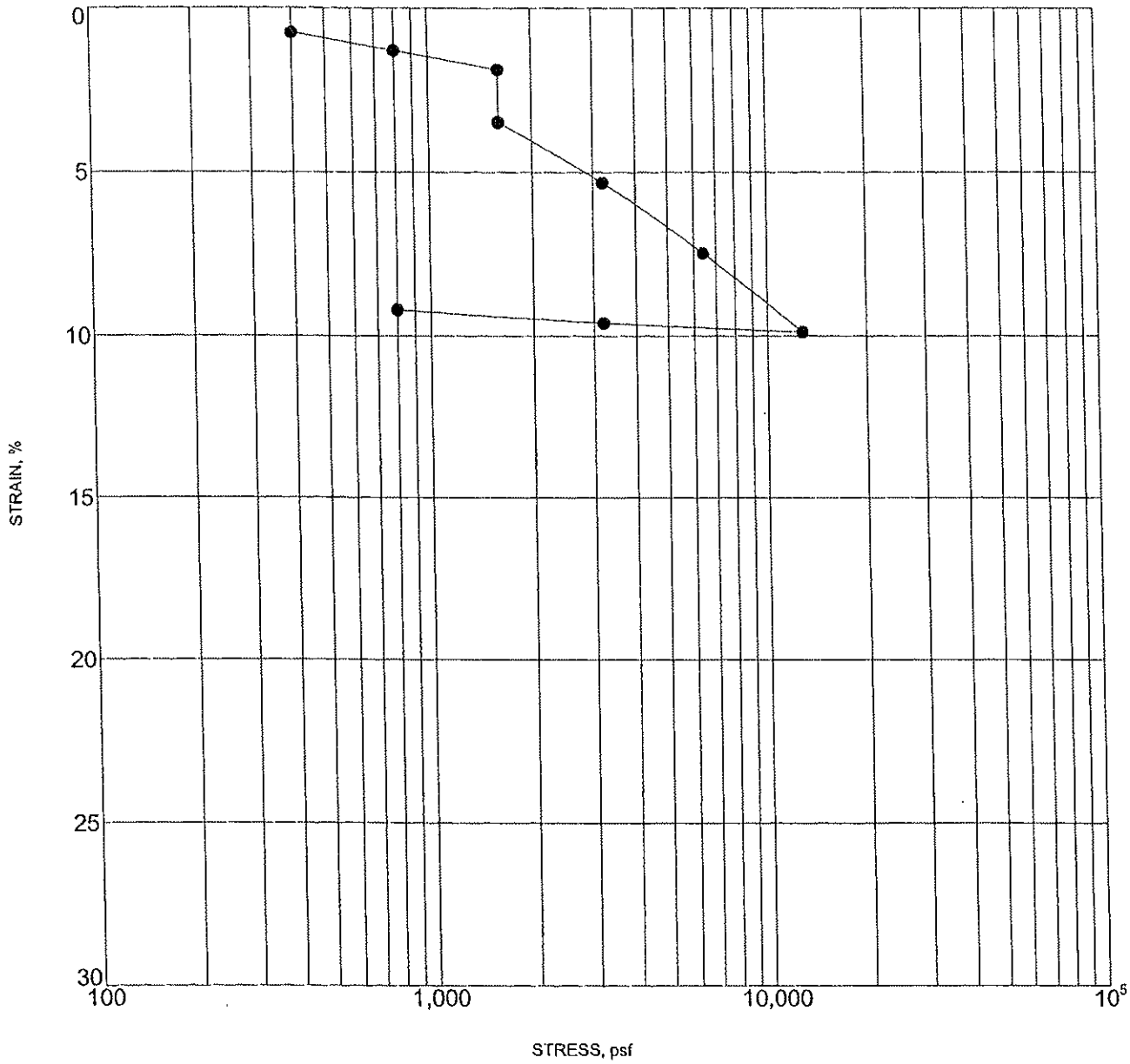
	Sample Location		Classification	DD,pcf	MC,%
●	B-307	7.0	SILTY CLAY (CL-ML)	113	10.4

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.: 2175.1I

GPI

CONSOLIDATION TEST

FIGURE C-13



Sample inundated at 1.6 psf

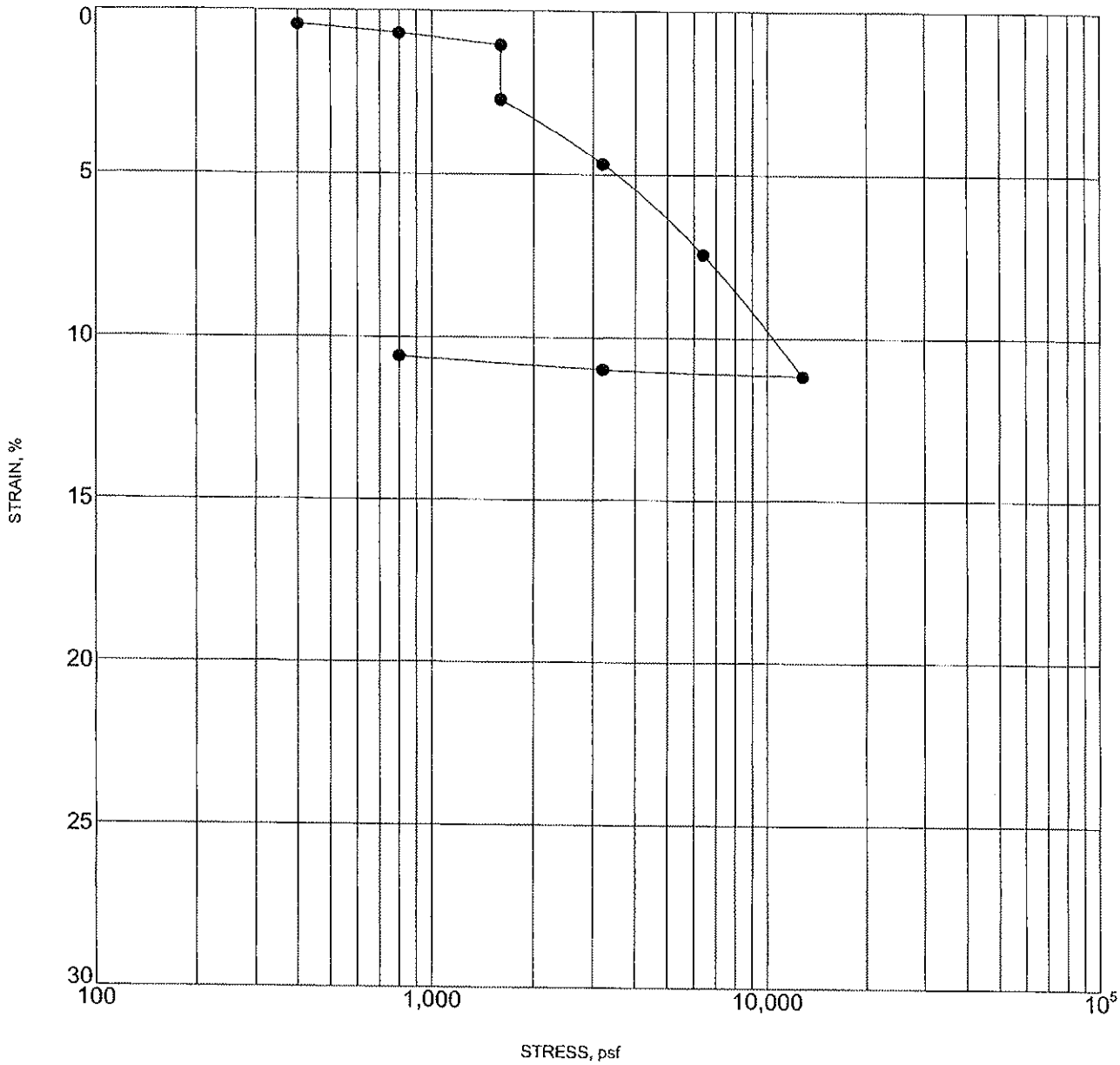
	Sample Location		Classification	DD,pcf	MC,%
●	B-403	7.0	SANDY SILT (ML)	101	6.2

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.: 2175.1I

GPI

CONSOLIDATION TEST

FIGURE C-14



Sample inundated at 1.6 psf

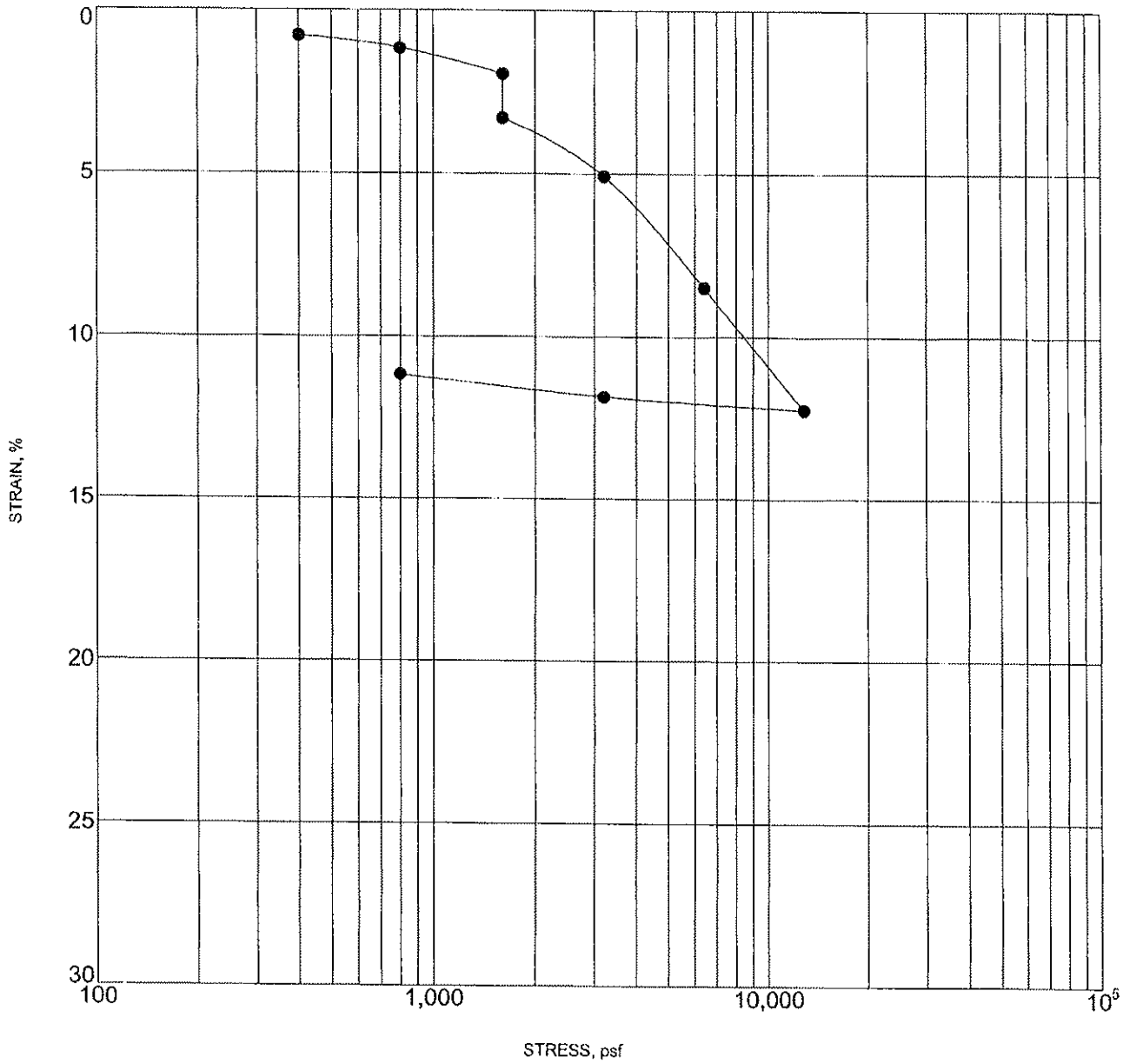
	Sample Location		Classification	DD,pcf	MC,%
●	B-501	20.0	SANDY CLAY (CL)	98	6.1

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.: 2175.1I

GPI

CONSOLIDATION TEST

FIGURE C-15



Sample inundated at 1.6 psf

	Sample Location		Classification	DD,pcf	MC,%
●	B-507	10.0	SANDY CLAY (CL)	99	7.2

PROJECT: PROLOGIS MORENO VALLEY PROJECT NO.: 2175.1I

GPI

CONSOLIDATION TEST

FIGURE C-16

Table 1 - Laboratory Tests on Soil Samples

GPI
Prologis Moreno Valley
Your #2175.II, SA #07-1380LAB
16-Oct-07

Sample ID			B-101 @ 1-4' Sandy Silt (ML)	B-206 @ 1-4' Sandy Silt (ML)	B-404 @ 1-4' Sandy Silt (ML)	B-504 @ 1-4' Sandy Silt (ML)
Resistivity		**Units**				
as-received		ohm-cm	26,800	600,000	37,600	16,800
saturated		ohm-cm	1,520	3,800	1,760	1,600
pH			7.8	7.6	7.5	7.5
Electrical Conductivity		mS/cm	0.31	0.32	0.28	0.29
Chemical Analyses						
Cations						
calcium	Ca^{2+}	mg/kg	84	258	165	201
magnesium	Mg^{2+}	mg/kg	13	36	20	15
sodium	Na^{1+}	mg/kg	266	44	44	91
potassium	K^{1+}	mg/kg	11	29	67	19
Anions						
carbonate	CO_3^{2-}	mg/kg	ND	ND	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	442	509	372	418
flouride	F^{1-}	mg/kg	1.0	2.0	1.0	5.0
chloride	Cl^{1-}	mg/kg	91	5.0	26	21
sulfate	SO_4^{2-}	mg/kg	92	93	81	72
phosphate	PO_4^{3-}	mg/kg	6.0	10	17	2.0
Other Tests						
ammonium	NH_4^{1+}	mg/kg	ND	7.1	1.3	1.3
nitrate	NO_3^{1-}	mg/kg	7.8	19.8	19.0	19.9
sulfide	S^{2-}	qual	na	na	na	na
Redox		mV	na	na	na	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

APPENDIX D

Percolation Test

GEOTECHNICAL
PROFESSIONALS INC.

July 11, 2007

ProLogis Development Services, Inc.
4041 MacArthur Boulevard, Suite 400
Newport Beach, California 92660

Attention: Mr. James Jachetta

Subject: Percolation Testing
Proposed 130-Acre Warehouse/Distribution Facility
Future Extension of Eucalyptus Drive, East of Moreno Beach Drive
Moreno Valley, California
GPI Project No. 2175.I

Dear Mr. Jachetta:

This letter report presents the results of percolation tests performed by Geotechnical Professionals Inc. (GPI) for the proposed 130-Acre Warehouse/Distribution Facility along the future extension of Eucalyptus Drive, east of Moreno Beach Drive, in Moreno Valley, California. The site location is shown on the Site Location Map, Figure 1.

We understand that conditions for the development of the project site require infiltration of some amount of the site storm water runoff prior to discharging into the public storm drain system. The results of the percolation tests will be used to assist in designing the storm water infiltration system. We understand that detention basins will be constructed at three locations.

The testing was performed in accordance with our proposal dated May 18, 2007.

SCOPE OF WORK

Our scope of work for this investigation consisted of review and use of an existing geotechnical report by others (Reference 1), installation of percolation test wells, field percolation testing, and the preparation of this report.

The percolation test wells were installed at the three locations of the detention basins as provided by Mr. Brian Thienes, the project Civil Engineer. Test PT-1 was performed in the approximate location of the detention basin planned to be located adjacent to Building 1. Tests PT-2 and PT-3 were performed in the approximate location of the detention basin planned to be located adjacent to Building 2. Tests PT-4 and PT-5 were performed in the approximate location of the detention basin planned to be located adjacent to Building 5. The approximate locations of the percolation tests and the proposed buildings and detention basins are shown on the Site Plan, Figure 2.

5736 Corporate Avenue • Cypress, CA 90630 • (714) 220-2211, FAX (714) 220-2122

The depths of the slotted portion of the wells were selected to assess the drainage characteristics of the typical soils to depths of up to 15 feet underneath the retention facilities. The depth of the wells varied from 8 feet to 28 feet below the existing ground surface. The details and a schematic of the well configuration are shown in Figure 3.

The test wells were installed using truck-mounted hollow-stem auger drilling equipment. Prior to installing the test wells, we performed a boring to depth of 50 feet at a distance of 5 to 10 feet of each test well location to characterize the site subsurface conditions. The wells consisted of 2-inch diameter solid PVC casing installed in 8-inch diameter boreholes. The lower 3 feet of casing in each well was slotted. Packing material around the slotted section of the well casing and 1-foot above the slotted section consisted of ⅜-inch pea gravel. This created a zone of percolation with a length of approximately 4 feet and a wetted soil area of approximately 8.7 square feet. Above the slotted section, a 1-foot zone of hydrated bentonite pellets was used as a seal to minimize water flow up the borehole. Backfill materials in the remaining upper portion of the wells consisted of the previously excavated on-site soils.

Details of the drilling, well installation, and Logs of Borings are presented in Appendix A.

Laboratory tests were performed on the soils to determine the fines content of the soils as well as in-situ dry density and moisture content. Details of the laboratory testing are presented in Appendix B.

Prior to performing the percolation tests, water was first introduced into the well for a period of 6 to 8 hours to pre-saturate the subsurface soils. A water wagon filled from off-site fire hydrants were used as the water supply. Once pre-saturation was complete, falling head tests were performed at each location. To perform the test, an electronic water sounder was lowered into the casing to a known depth, above the slotted zone. The casing was then filled with water. After filling, the water supply was shut off, and the time required for the water to drop below the sounder was recorded. The procedure was repeated multiple times over several days until consistent results were achieved. The data presented in this report consists of the final test runs with the relatively consistent data. A discussion of the results is provided in the following section.

CONCLUSIONS AND RECOMMENDATIONS

Water flows through soils in the interconnected voids between the soil particles. The percolation rate of the soil depends on the soil type, particle size distribution, void ratio, homogeneity of the soil mass, and anisotropic characteristics of soil.

In general, the results of the percolation tests performed in the upper 23 feet (Tests PT-1 to PT-4) showed relatively unfavorable conditions in regards to subsurface water infiltration. The results of the percolation test performed from depth 24 to 28 feet (Test PT-5) showed more favorable conditions in regards to subsurface water infiltration. The average flow rates measured in Tests PT-1 to PT-4 were between 0.1 and 0.6 gallons per minutes. The average flow rates measured in Test PT-5 was 1.6 gallons per minute. The percolation

zone in each test had a wetted soil area of approximately 8.7 square feet. The results of the tests are summarized in Table 1.

We recommend the civil engineer review the flow rates of water measured during percolation tests and determine a design infiltration rate to be used for the design of the storm water dissipation system.

Testing at Test PT-1 included 1 day of pre-saturation and two days of measurement of a falling head while water was being introduced into the well. The flow into the well was measured between 0.08 and 0.11 gallons per minute during approximately 18 separate tests performed during the first two days. When tests were performed on the third day of testing, the results changed dramatically with flows measured between 0.52 and 0.68 gallons per minute. A possible reason for this increase in flow rates would be the migration of fines caused by repeated flooding of the soils directly below the test depth into coarser granular material. This may have created a direct drainage path to a deeper granular soil layer. We recommend cone penetration tests be performed during the geotechnical investigation to determine the presence of thin granular materials that may not have been detected with the hollow-stem auger drilling. We reported the results of the percolation tests for five trials prior to this change in the flow rate.

The soils encountered during excavation of the percolation test holes consisted of silty sands, sandy silts, clayey silts, sandy clays, and clays. It should be noted that occasional clean sand layers of limited thickness were encountered that will likely be much more permeable than the surrounding soils. While the percolation test well depths were selected that captured the effects of these layers, percolation through the overlying materials may be less favorable than the materials tested.

LIMITATIONS

This letter report, percolation test results, and other materials resulting from GPI's efforts were prepared exclusively for use by ProLogis Development Services and their consultants in designing the proposed development. The report is not to be used for any other portions of the site or any project other than the currently proposed development. If this report or portions of this report are provided to contractors or included in specifications, it should be understood that they are provided for information only. This report cannot be utilized by another entity without the express written permission of GPI. This report is an instrument of our services and remains the property of GPI.

Soil deposits may vary in type, strength, and many other important properties between points of exploration due to non-uniformity of the geologic formations or to man-made cut and fill operations. While we cannot evaluate the consistency of the properties of materials in areas not explored, the conclusions drawn in this report are based on the assumption that the data obtained in the field and laboratory are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Furthermore, our recommendations were developed with the assumption that a proper level of field observation and construction review will be provided during grading, excavation, and foundation construction by GPI. If field conditions during construction appear to be different than is indicated in this report, we should be notified immediately so that we may assess the impact of such conditions on our recommendations. If construction phase services are performed by others they must accept full responsibility (as Project Geotechnical Engineer) for all geotechnical aspects of the project including this report.

Our investigation and evaluations were performed using generally accepted engineering approaches and principles available at this time and the degree of care and skill ordinarily exercised under similar circumstances by reputable Geotechnical Engineers practicing in this area. No other representation, either expressed or implied, is included or intended in our report.

Respectfully submitted,
Geotechnical Professionals Inc.

Donald A. Cords, G.E.
Associate

REGISTERED PROFESSIONAL ENGINEER
DONALD A. CORDS
No. GE 2529
Exp. 6-30-09
GEOTECHNICAL
STATE OF CALIFORNIA

James E. Harris, G.E.
Principal

REGISTERED PROFESSIONAL ENGINEER
JAMES E. HARRIS, IV
No. GE 2100
Exp. 12/31/07
GEOTECHNICAL
STATE OF CALIFORNIA

DAC/JEH:sph

JUL 1 1 2007

Enclosures: Reference
Table 1 - Percolation Test Result Summary
Figure 1 - Site Location Map
Figure 2 - Site Plan
Figure 3 - Percolation Test Well Configuration

cc: (6) Addressee

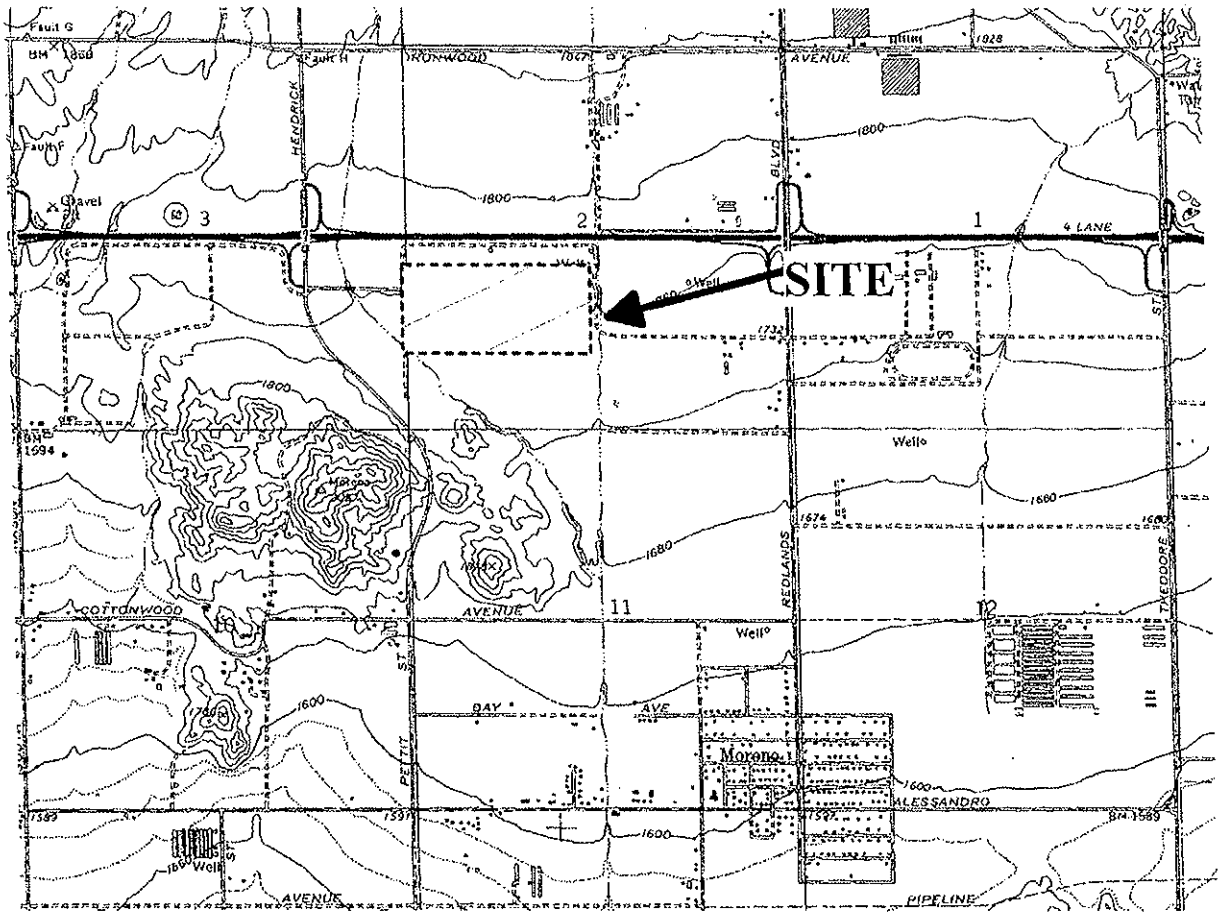
REFERENCE

1. R.M. Environmental, Inc., *"Preliminary Geotechnical Investigation, Proposed 347 Lot Single-Family Residential Development, 120± Acres, Assessors Parcel Numbers (APN) 477-120-(001, 006, 007, 008, 014, 015), Near the Intersection of Pettit Street and Highway 60, City of Moreno Valley,, California,"* Project No. 03-406, January 19, 2004.

TABLE 1

PERCOLATION TEST RESULT SUMMARY

PERCOLATION TEST LOCATION	DEPTH OF PERCOLATION TEST (ft)	SOIL TYPE LOGGED IN TEST INTERVAL	NUMBER OF MEASUREMENTS	FLOW RATE, Q (gallons per minute)	
				Range	*Average*
PT-1	19-23	CLAY (CL) Fines – 62%	5	0.08 - 0.11	**0.10**
PT-2	4-8	Sandy SILT (ML) Fines = 54%	3	0.08 – 0.09	**0.08**
PT-3	14-18	Silty SAND (SM)	13	0.56 – 0.65	**0.60**
PT-4	9-13	Sandy SILT (ML) Fines = 56%	4	0.44 – 0.46	**0.45**
PT-5	24-28	Sandy CLAY (CL) and SAND (SP)	11	1.46 – 1.84	**1.64**



N

SITE LOCATION MAP REPRODUCED USGS SUNNYMEAD QUADRANGLE

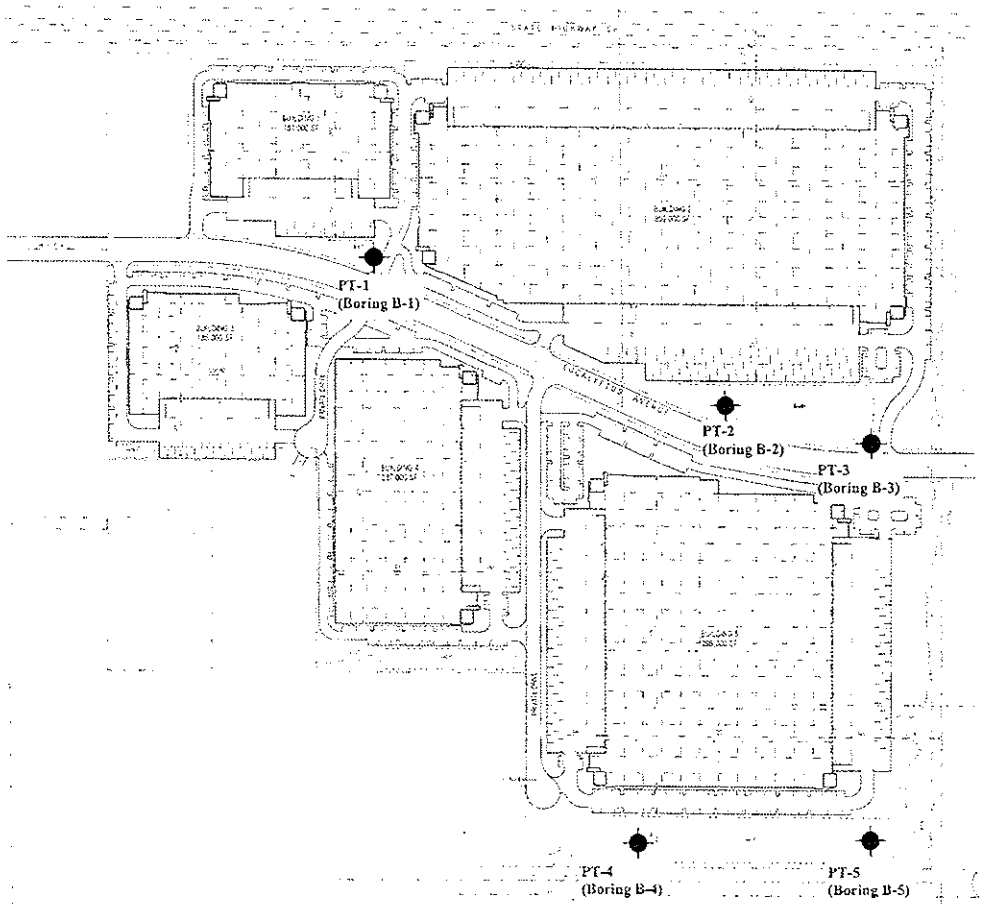
GPI GEOTECHNICAL PROFESSIONALS, INC.

PROLOGIS MORENO VALLEY

GPI PROJECT NO. 2175.I | 1" = 1 mile

SITE LOCATION MAP

FIGURE 1



EXPLANATION

APPROXIMATE LOCATION OF PERCOLATION TEST WELL/EXPLORATIORY BORING

GEOTECHNICAL PROFESSIONALS, INC.

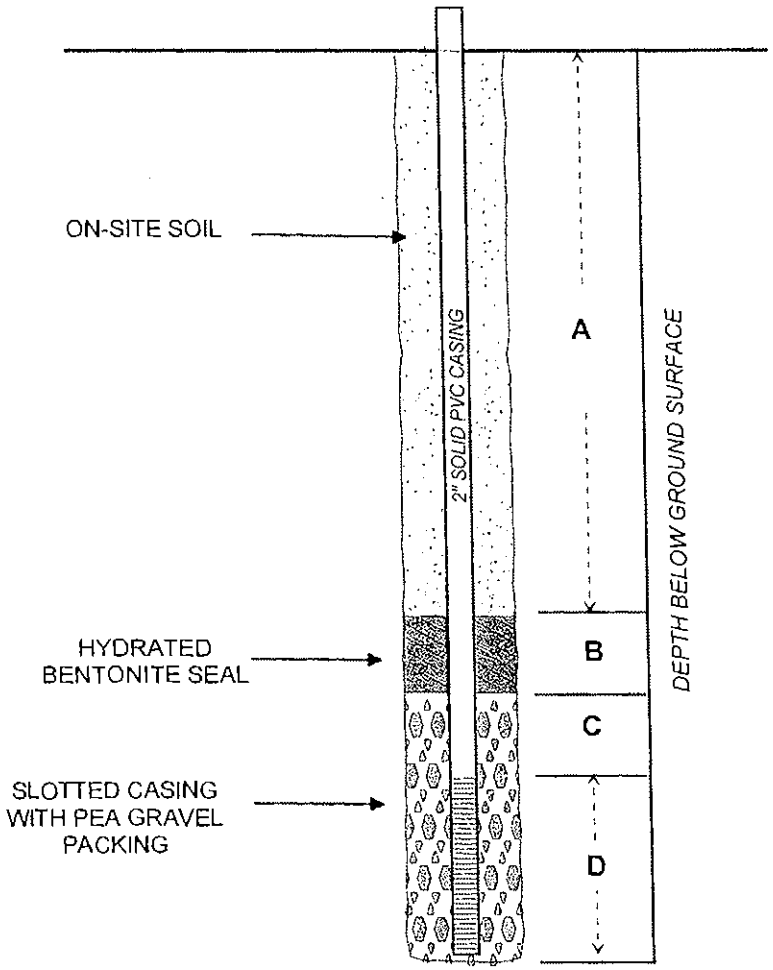
PROLOGIS MORENO VALLEY

GPI PROJECT NO.: 2175.11 | SCALE: 1"= 400 FT

SITE PLAN

FIGURE 2

PERCOLATION WELL



PERCOLATION TEST WELLS INSTALLED IN 8" DIAMETER HOLLOW-STEM AUGER BOREHOLES

A+B+C+D = DEPTH OF WELL

B = THICKNESS OF BENTONITE SEAL

C = THICKNESS OF PEA GRAVEL ABOVE SLOTTED PIPE

D = LENGTH OF SLOTTED PORTION OF PIPE

WELL	DEPTH OF WELL	B	C	D
PT-1	23 FT	1 FT	1 FT	3 FT
PT-2	8 FT	1 FT	1 FT	3 FT
PT-3	18 FT	1 FT	1 FT	3 FT
PT-4	13 FT	1 FT	1 FT	3 FT
PT-5	28 FT	1 FT	1 FT	3 FT

GEOTECHNICAL PROFESSIONALS, INC.

PROLOGIS MORENO VALLEY

GPI PROJECT NO.: 2175.1 | NO SCALE

PERCOLATION TEST WELL CONFIGURATION

FIGURE 3

APPENDIX A

APPENDIX A

EXPLORATORY BORINGS

The subsurface conditions at the site were investigated by drilling and sampling five exploratory borings and installing percolation wells. These borings were advanced to depths of 50 feet below the existing ground surface. The exploration locations are shown on the Site Plan, Figure 2.

Well casing to perform field permeability test were installed in the borings. The wells consisted of 2-inch PVC pipe placed in the 8-inch drilled hole. A screened interval of well casing extended, in general, from the bottom of the boring upward a distance of approximately 3 feet. The slot size in the screen portion is 0.020 inches. Solid PVC casing extends above the slotted portion to the ground surface. A filter pack of pea gravel was placed around the well casing to a distance of approximately 1-foot above the screened well portion. A sealing layer of bentonite chips with a thickness of approximately 1-foot was placed on the filter pack. This created a zone of percolation with a length of approximately 4 feet. Soil cuttings from the borings were used to backfill around the well casing above the bentonite to the ground surface. Details of the well construction and backfill of the wells are shown on Figure 3.

The borings were drilled using truck-mounted hollow-stem auger equipment. Relatively undisturbed samples were obtained using a brass-ring lined sampler (ASTM D 3550). The brass-rings have an inside diameter of 2.42 inches. The ring samples were driven into the soil by a 140-pound hammer dropping 30 inches. The number of blows needed to drive the sampler into the soil was recorded as the penetration resistance.

The field explorations for the investigation were performed under the continuous technical supervision of GPI's representative, who visually inspected the site, maintained detailed logs of the borings, classified the soils encountered, and obtained relatively undisturbed samples for examination and laboratory testing. The soils encountered in the borings were classified in the field and through further examination in the laboratory in accordance with the Unified Soils Classification System. Detailed logs of the borings are presented in Figures A-1 to A-5 in this appendix.

The boring locations were laid out in the field by measuring from existing site features. Upon completion, the borings were backfilled with the excavated soil cuttings. Ground surface elevations at the exploration locations were estimated from the site plan provided by ProLogis Development and should be considered approximate.

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					SANDY SILT (ML) light brown, slightly moist to dry, soft to firm, surface disturbed from recent tilling	1765
1.3	106	10	D	5		1760
9.1		5	S	10	**SILTY SAND (SM)** brown, slightly moist, loose	1755
14.6	97	14	D	15	**SANDY SILT (ML)** brown, slightly moist to moist, stiff, trace porosity	1750
15.5		13	S	20	**CLAY (CL)** brown, slightly moist, stiff	1745
				25		1740
8.1	101	27	D	30	**CLAYEY SAND (SC)/CLAYEY SILT (ML)** light brown, slightly moist, medium dense to very stiff, trace caliche, trace porosity	1735
				35		1730

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.I
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-1

FIGURE A-1

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
2.3		15	S	40	**SANDY SILT (ML)** light brown, slightly moist, stiff, trace gravel	1725
				45		1720
18.8	103	27	D	50	**CLAY (CL)** brown, slightly moist, very stiff	
					Total Depth 50 feet	
					Percolation Well P-1 Installed Adjacent to Boring.	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.I
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-1

FIGURE A-1

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					SANDY SILT (ML) light brown, dry, firm, trace caliche, trace sand, surface disturbed from recent tilling	1755
6.1	102	10	D	5		
						1750
9.5		4	S	10		
						1745
6.9	97	7	D	15	**SILTY SAND (SM)** brown, slightly moist, loose, trace caliche	
					SANDY CLAY (CL) brown, slightly moist, firm	1740
19.8		11	S	20		
						1735
				25		
						1730
9.7	105	12	D	30	**SANDY SILT (ML)** light brown, slightly moist, firm to stiff	
					SILTY CLAY (CL) brown, slightly moist, firm	1725
				35		
						1720

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.I
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-2

FIGURE A-2

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
17.3		8	S	40		1715
17.3	96	15	D	45		1710
				50	**CLAY (CL)** brown, slightly moist, stiff, trace porosity	
					Total Depth 50 feet	
					Percolation Well P-2 Installed Adjacent to Boring.	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-2

FIGURE A-2

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					SANDY SILT (ML) light brown, dry, trace organics, surface disturbed from recent tilling	1755
6.6	87	6	D	5		
					SANDY CLAY (CL) light brown, dry, firm, trace caliche, trace porosity	1750
6.7		2	S	10	@ 10 feet, very soft	1745
9.0	94	9	D	15	**SILTY SAND (SM)** light brown, slightly moist to moist, loose	1740
12.8		4	S	20	**SAND (SP)** light brown, slightly moist, loose	1735
					SANDY CLAY (CL) brown, moist, soft	
				25		1730
		15	D	30	**SAND (SP)** light brown, slightly moist, medium dense, trace gravel	1725
				35	**SANDY SILT (ML)** light brown, moist, very stiff	1720

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07
EQUIPMENT USED: 8" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-3

FIGURE A-3

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
13.4		30	S	40		1715
				45		1710
				50	@ 49 feet, very dense	
					Total Depth 50 feet	
					Percolation Well P-3 Installed Adjacent to Boring.	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GDI

PROJECT NO.: 2175.1

PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-3

FIGURE A-3

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					SANDY SILT (ML) light brown, dry, trace clay, surface disturbed from recent tilling	1725
9.9	99	8	D	5	**SANDY CLAY (CL)** light brown, dry to slightly moist, firm, trace caliche, trace porosity	1720
6.1		5	S	10	**SANDY SILT (ML)** light brown, slightly moist to moist, firm	1715
4.2	101	21	D	15	**CLAYEY SAND (SC)** light brown, dry, stiff, with porosity, with caliche	1710
3.4		34	S	20	**SILTY SAND (SM)** light brown, slightly moist, medium dense, trace gravel	1705
				25		1700
12.1	98	22	D	30	**SANDY CLAY (CL)** brown, slightly moist, stiff to very stiff, trace caliche, trace porosity	1695
				35		1690

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07
EQUIPMENT USED: 8" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-4

FIGURE A-4

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
7.3		26	S	40	@ 40 feet, dry	1685
				45		
8.1	100	32	D	50	@ 49 feet, with porosity	1680
					Total Depth 50 feet Percolation Well P-4 Installed Adjacent to Boring.	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-4

FIGURE A-4

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
				0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
					CLAYEY SAND (SC) light brown, dry, stiff, with porosity, with caliche, surface disturbed from recent tilling	1720
13.2	89	5	D	5	**CLAYEY SAND (SC)** light brown, dry, stiff, with porosity, with caliche	1715
7.3		3	S	10	**SILTY SAND (SMP)** brown, moist, very loose	1710
3.4	109	21	D	15	**SAND (SP)** brown, moist, medium dense, trace of gravel	1705
5.0		14	S	20	**SILTY SAND (SM)** brown, slightly moist, loose	
					SANDY CLAY (CL) brown, slightly moist, stiff	1700
				25	**SAND (SP)** brown, moist, medium dense	1695
15.9	101	23	D	30	**SANDY CLAY (CL)** brown, slightly moist, very stiff, with caliche, trace porosity	1690
				35		
		43	D			1685

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07
EQUIPMENT USED: 8" Hollow Stem Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.1
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-5

FIGURE A-5

	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
						This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
	16.4		23	S	40		
					45		1680
	9.6	119			50	@ 49 feet, dry, trace sand	1675
						Total Depth 50 feet	
						Percolation Well P-5 Installed Adjacent to Boring.	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 6-4-07

EQUIPMENT USED: 8" Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2175.I
PROLOGIS - MORENO VALLEY

LOG OF BORING NO. B-5

FIGURE A-5

APPENDIX B

APPENDIX B

LABORATORY TESTS

INTRODUCTION

Representative undisturbed soil samples and bulk samples were carefully packaged in the field and sealed to prevent moisture loss. The samples were then transported to our Cypress office for examination and testing assignments. Laboratory tests were performed on selected representative samples as an aid in classifying the soils and to evaluate the physical properties of the soils affecting foundation design and construction procedures. Detailed descriptions of the laboratory tests are presented below under the appropriate test headings. Test results are presented in the figures that follow.

MOISTURE CONTENT AND DRY DENSITY

Moisture content and dry density were determined from a number of the ring samples from the borings. The samples were first trimmed to obtain volume and wet weight and then were dried in accordance with ASTM D 2216. After drying, the weight of each sample was measured, and moisture content and dry density were calculated. Moisture content and dry density values are presented on the boring logs in Appendix A.

ATTERBERG LIMITS

Liquid and plastic limits were determined for selected samples in accordance with ASTM D4318. Results of the Atterberg Limits test are presented in the table below:

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)
B-1	10	Sandy Silt (ML)	NP	NP	NP

PERCENTAGE PASSING NO. 200 SIEVE

A representative soil sample was dried, weighed, soaked in water until individual soil particles were separated, and then washed on the No. 200 sieve in accordance with ASTM D 422. That portion of the material retained on the No. 200 sieve was oven-dried and weighed to determine the percentage of the material passing the No. 200 sieve. The results are as follows.

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	PERCENT PASSING No. 200 SIEVE
B-1	10	Sandy Silt (ML)	60
B-1	15	Sandy Silt (ML)	62
B-1	20	Clay (CL)	69
B-1	30	Silty Sand (SM)	45
B-1	50	Clay (CL)	83
B-2	5	Sandy Silt (ML)	54
B-2	10	Sandy Silt (ML)	54
B-2	20	Silty Clay (CL)	75
B-3	5	Sandy Silt (ML)	71
B-3	40	Sandy Silt (ML)	63
B-4	10	Sandy Silt (ML)	56
B-4	15	Silty Sand (SM)	38
B-4	20	Silty Sand (SM)	37
B-4	30	Sandy Clay (CL)	65
B-5	10	Silty Sand (SM)	43
B-5	30	Sandy Clay (SM)	73

Appendix F

Treatment Control BMP Sizing Calculations and Design Details

Worksheet 1

Design Procedure for BMP Design Volume

85th percentile runoff event

Designer: S. McMasters
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 1 and 2 / Basin #1

1. Create Unit Storage Volume Graph		
a. Site location (Township, Range, and Section).	T &R / Section	(1)
b. Slope value from the Design Volume Curve in **Appendix A.**	Slope = 0.80	(2)
c. Plot this value on the Unit Storage Volume Graph shown on **Figure 2.**		
d. Draw a straight line form this point to the origin, to create the graph	Is this graph attached? Yes ☑ No ☐	
2. Determine Runoff Coefficient		
a. Determine total impervious area	$A_{impervious}$ = 41.04 acres	(5)
b. Determine total tributary area	A_{total} = 45.6 acres	(6)
c. Determine Impervious fraction i = *(5)* / *(6)*	i = 0.9	(7)
d. Use *(7)* in **Figure 1** to find Runoff OR $C = .858i^3 - .78i^2 + .774i + .04$	C = 0.73	(8)
3. Determine 85% Unit Storage Volume		
a. Use *(8)* in **Figure 2** Draw a Vertical line from *(8)* to the graph, then a Horizontal line to the desired V_u value.	V_u = 0.63 in-acre / acre	(9)
4. Determine Design Storage Volume		
a. V_{BMP} = *(9)* x *(6)* [in- acres]	V_{BMP} = 28.7 in-acre	(10)
b. V_{BMP} = *(10)* / 12 [ft- acres]	V_{BMP} = 2.39 ft-acre	(11)
c. V_{BMP} = *(11)* x 43560 [ft^3]	V_{BMP} = 104,108.4 ft^3	(12)

Notes:

Worksheet 1

Design Procedure for BMP Design Volume

85th percentile runoff event

Designer: S. McMasters
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 3, 4, 5 and 6 / Basin #2

1. Create Unit Storage Volume Graph		
a. Site location (Township, Range, and Section).	T &R Section	*(1)*
b. Slope value from the Design Volume Curve in **Appendix A.**	Slope = 0.86	*(2)*
c. Plot this value on the Unit Storage Volume Graph shown on **Figure 2.**		
d. Draw a straight line form this point to the origin, to create the graph	Is this graph attached? Yes ☑ No ☐	
2. Determine Runoff Coefficient		
a. Determine total impervious area	$A_{impervious}$ = 51.3 acres	*(5)*
b. Determine total tributary area	A_{total} = 57.0 acres	*(6)*
c. Determine Impervious fraction i = *(5)* / *(6)*	i = 0.9	*(7)*
d. Use *(7)* in Figure 1 to find Runoff OR C = $.858i^3 - .78i^2 + .774i + .04$	C = 0.73	*(8)*
3. Determine 85% Unit Storage Volume		
a. Use *(8)* in **Figure 2** Draw a Vertical line from *(8)* to the graph, then a Horizontal line to the desired V_u value.	V_u = 0.63 in-acre / acre	*(9)*
4. Determine Design Storage Volume		
a. V_{BMP} = *(9)* x *(6)* [in- acres]	V_{BMP} = 35.91 in-acre	*(10)*
b. V_{BMP} = *(10)* / 12 [ft- acres]	V_{BMP} = 2.99 ft-acre	*(11)*
c. V_{BMP} = *(11)* x 43560 [ft^3]	V_{BMP} = 130,244.4 ft^3	*(12)*

Notes:

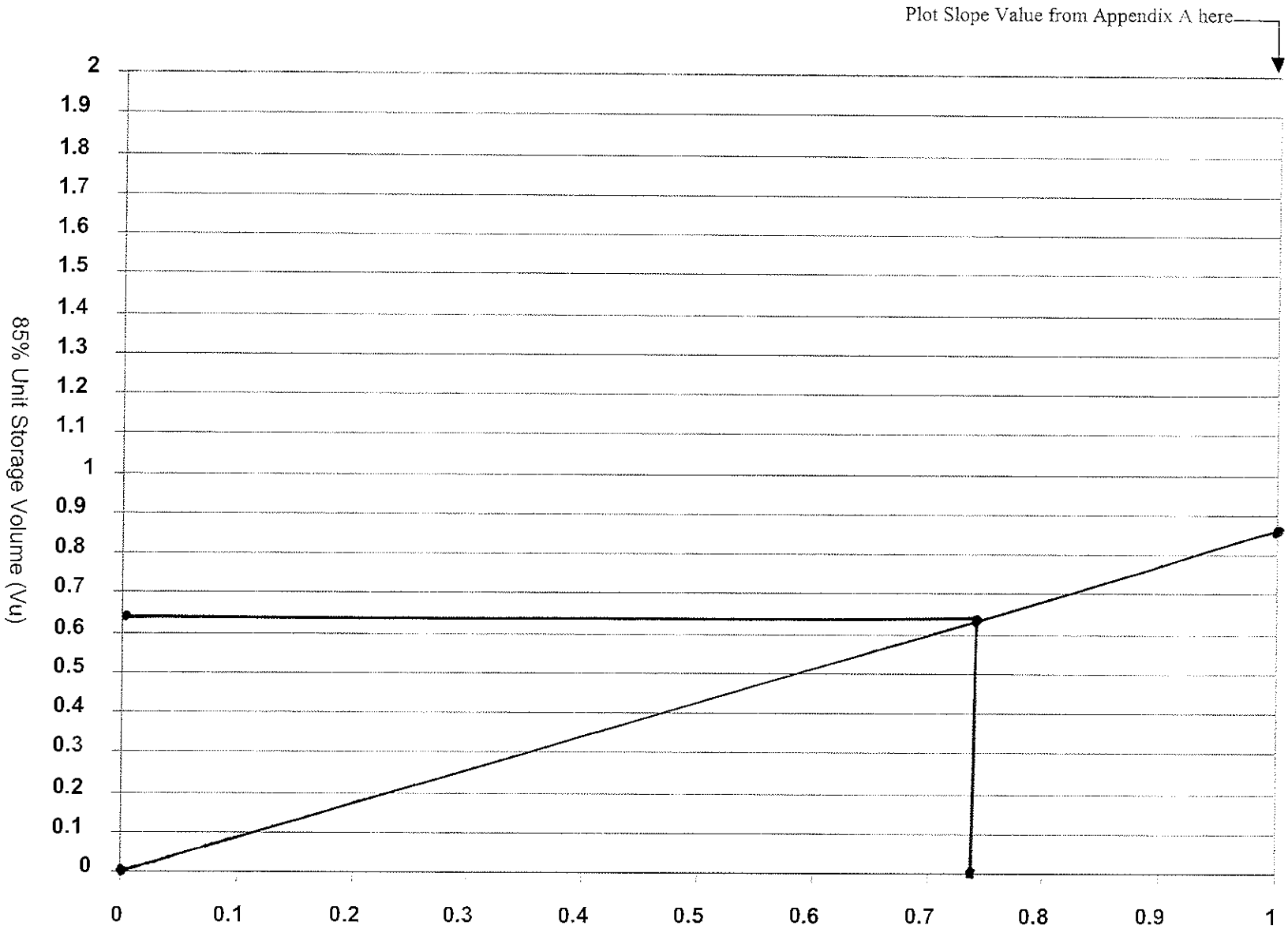


Figure 2 Unit Storage Volume Graph

Worksheet 2

Design Procedure Form for Design Flow

Uniform Intensity Design Flow

Designer: S. McMasters
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 1

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = 6.4 acres	*(1)*
b. Determine Impervious %	i = 90 %	*(2)*
2. Determine Runoff Coefficient Values Use Table 4 and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a =	*(3)*
b. B Soil Runoff Coefficient	C_b = .73	*(4)*
c. C Soil Runoff Coefficient	C_c =	*(5)*
d. D Soil Runoff Coefficient	C_d =	*(6)*
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / *(1)* =	A_a =	*(7)*
b. Aree of B Soil / *(1)* =	A_b = 1	*(8)*
c. Area of C Soil / *(1)* =	A_c =	*(9)*
d. Area of D Soil / *(1)* =	A_d =	*(10)*
4. Determine Runoff Coefficient		
a. C = *(3)*x*(7)* + *(4)*x*(8)* + *(5)*x*(9)* + *(6)*x*(10)* =	C = .73	*(11)*
5. Determine BMP Design flow		
a. Q_{BMP} = C x I x A = *(11)* x 0.2 x *(1)*	Q_{BMP} = 0.93 $\frac{ft^3}{s}$	*(12)*

Worksheet 2

Design Procedure Form for Design Flow

Uniform Intensity Design Flow

Designer: S. McMasters
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 3

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = 14.6 acres	*(1)*
b. Determine Impervious %	i = 90 %	*(2)*
2. Determine Runoff Coefficient Values Use Table 4 and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a =	*(3)*
b. B Soil Runoff Coefficient	C_b = .73	*(4)*
c. C Soil Runoff Coefficient	C_c =	*(5)*
d. D Soil Runoff Coefficient	C_d =	*(6)*
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / *(1)* =	A_a =	*(7)*
b. Area of B Soil / *(1)* =	A_b = 1	*(8)*
c. Area of C Soil / *(1)* =	A_c =	*(9)*
d. Area of D Soil / *(1)* =	A_d =	*(10)*
4. Determine Runoff Coefficient		
a. C = *(3)*x*(7)* + *(4)*x*(8)* + *(5)*x*(9)* + *(6)*x*(10)* =	C = .73	*(11)*
5. Determine BMP Design flow		
a. Q_{BMP} = C x I x A = *(11)* x 0.2 x *(1)*	Q_{BMP} = 2.13 $\frac{ft^3}{s}$	*(12)*

Worksheet 2

Design Procedure Form for Design Flow

Uniform Intensity Design Flow

Designer: S. McMasters
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 4

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = 2.7 acres	(1)
b. Determine Impervious %	i = 90 %	(2)
2. Determine Runoff Coefficient Values Use Table 4 and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a =	(3)
b. B Soil Runoff Coefficient	C_b = .73	(4)
c. C Soil Runoff Coefficient	C_c =	(5)
d. D Soil Runoff Coefficient	C_d =	(6)
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / *(1)* =	A_a =	(7)
b. Area of B Soil / *(1)* =	A_b = 1	(8)
c. Area of C Soil / *(1)* =	A_c =	(9)
d. Area of D Soil / *(1)* =	A_d =	(10)
4. Determine Runoff Coefficient		
a. C = *(3)x(7) + (4)x(8) + (5)x(9) + (6)x(10)* =	C = .73	(11)
5. Determine BMP Design flow		
a. Q_{BMP} = C x I x A = *(11)* x 0.2 x *(1)*	Q_{BMP} = 0.39 ft^3/s	(12)

Worksheet 2

Design Procedure Form for Design Flow

Uniform Intensity Design Flow

Designer: S. McMasters
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 5

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = 6.5 acres	*(1)*
b. Determine Impervious %	i = 90 %	*(2)*
2. Determine Runoff Coefficient Values Use **Table 4** and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a =	*(3)*
b. B Soil Runoff Coefficient	C_b = .73	*(4)*
c. C Soil Runoff Coefficient	C_c =	*(5)*
d. D Soil Runoff Coefficient	C_d =	*(6)*
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / *(1)* =	A_a =	*(7)*
b. Area of B Soil / *(1)* =	A_b = 1	*(8)*
c. Area of C Soil / *(1)* =	A_c =	*(9)*
d. Area of D Soil / *(1)* =	A_d =	*(10)*
4. Determine Runoff Coefficient		
a. C = *(3)*x*(7)* + *(4)*x*(8)* + *(5)*x*(9)* + *(6)*x*(10)* =	C = .73	*(11)*
5. Determine BMP Design flow		
a. Q_{BMP} = C x I x A = *(11)* x 0.2 x *(1)*	Q_{BMP} = 0.95 $\frac{ft^3}{s}$	*(12)*

Worksheet 3

Design Procedure Form for Extended Detention Basin

Designer: B. Weil
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area land2 / Basin #1

1. Determine Design Volume (Use Worksheet 1) a. Total Tributary Area (minimum 5 ac.) b. Design Volume, V_{BMP}	A_{total} = 45.6 acres V_{BMP} = 104,108.4 ft^3	
2. Basin Length to Width Ratio (2:1 min.)	Ratio = 2 L:W	
3. Two-Stage Design a. Overall Design 1) Depth (3.5' min.) 2) Width (30' min.) 3) Length (60' min.) 4) Volume (must be ≥ V_{BMP}) b. Upper Stage 1) Depth (2' min.) 2) Bottom Slope (2% to low flow channel recommended) c. Bottom Stage 1) Depth (1.5' to 3') 2) Length 3) Volume (10 to 25% of V_{BMP})	Depth = 7 ft Width = VARIES ft Length = VARIES ft Volume = 490,000 ft^3 Depth = _____ ft Slope = _____ % Depth = _____ ft Length = _____ ft Volume = _____ ft^3	
4. Forebay Design a. Forebay Volume (5 to 10% of V_{BMP}) b. Outlet pipe drainage time (≅ 45 min)	Volume = _____ ft^3 Drain time = _____ minutes	
5. Low-flow Channel a. Depth (9" minimum) b. Flow Capacity (2 * Forebay Q_{OUT})	Depth = _____ ft $Q_{Low\ Flow}$ = _____ cfs	
6. Trash Rack or Gravel Pack (check one)	Trash Rack X Gravel Pack _____	

w/ FINAL DESIGN

7. Basin Outlet a. Outlet type (check one) b. Orifice Area c. Orifice Type d. Maximum Depth of water above bottom orifice e. Length of time for 50% V_{BMP} drainage (24 hour minimum) f. Length of time for 100% V_{BMP} drainage (between 48 and 72 hours) g. Attached Documents (all required) 1) Stage vs. Discharge 2) Stage vs. Volume 3) Inflow Hydrograph 4) Basin Routing	Single orifice _____ Multi-orifice plate _____ Perforated Pipe _____ Other C.M.P RISER Area = _____ ft^2 Type _____ Depth = _____ ft Time 50% = _____ hrs Time 100% = _____ hrs Attached Documents (check) 1) _____ 2) _____ 3) _____ 4) _____
8. Increased Runoff (optional) Is this basin also mitigating increased runoff? Attached Documents (all required) for 2, 5, & 10-year storms: 1) Stage vs. Discharge 2) Stage vs. Volume 3) Inflow Hydrograph 4) Basin Routing	Yes X No _____ (if No, skip to #9) Attached Documents (check) 1) _____ 2) _____ 3) _____ 4) _____
9. Vegetation (check type)	X Native Grasses _____ Irrigated Turf _____ Other _____
10. Embankment a. Interior slope (4:1 max.) b. Exterior slope (3:1 max.)	Interior Slope = _____ % Exterior Slope = _____ %
11. Access a. Slope (10% max.) b. Width (16 feet min.)	Slope = 10 % Width = 16 ft

W/ FINAL DESIGN

W/ FINAL DESIGN

Worksheet 3

Design Procedure Form for Extended Detention Basin

Designer: B. Weil
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 3, 4, 5 and 16 / Basin #2

1. Determine Design Volume (Use Worksheet 1) a. Total Tributary Area (minimum 5 ac.) b. Design Volume, V_{BMP}	A_{total} = 57.0 acres V_{BMP} = 130,244.4 ft^3
2. Basin Length to Width Ratio (2:1 min.)	Ratio = 9:1 L:W
3. Two-Stage Design a. Overall Design 1) Depth (3.5' min.) 2) Width (30' min.) 3) Length (60' min.) 4) Volume (must be ≥ V_{BMP}) b. Upper Stage 1) Depth (2' min.) 2) Bottom Slope (2% to low flow channel recommended) c. Bottom Stage 1) Depth (1.5' to 3') 2) Length 3) Volume (10 to 25% of V_{BMP})	Depth = 5 ft Width = 100 ft Length = 900 ft Volume = 450,000 ft^3 Depth = _____ ft Slope = _____ % Depth = _____ ft Length = _____ ft Volume = _____ ft^3
4. Forebay Design a. Forebay Volume (5 to 10% of V_{BMP}) b. Outlet pipe drainage time (≅ 45 min)	Volume = _____ ft^3 Drain time = _____ minutes
5. Low-flow Channel a. Depth (9" minimum) b. Flow Capacity (2 * Forebay Q_{OUT})	Depth = _____ ft $Q_{Low\ Flow}$ = _____ cfs
6. Trash Rack or Gravel Pack (check one)	Trash Rack X Gravel Pack _____

W/ FINAL DESIGN

7. Basin Outlet a. Outlet type (check one)	Single orifice _____ Multi-orifice plate _____ Perforated Pipe _____ Other CMP RISER
b. Orifice Area c. Orifice Type d. Maximum Depth of water above bottom orifice e. Length of time for 50% V_{BMP} drainage (24 hour minimum) f. Length of time for 100% V_{BMP} drainage (between 48 and 72 hours) g. Attached Documents (all required) 1) Stage vs. Discharge 2) Stage vs. Volume 3) Inflow Hydrograph 4) Basin Routing	Area = _____ ft^2 Type _____ Depth = _____ ft Time 50% = _____ hrs Time 100% = _____ hrs Attached Documents (check) 1) _____ 2) _____ 3) _____ 4) _____
8. Increased Runoff (optional) Is this basin also mitigating increased runoff? Attached Documents (all required) for 2, 5, & 10-year storms: 1) Stage vs. Discharge 2) Stage vs. Volume 3) Inflow Hydrograph 4) Basin Routing	Yes X No _____ (if No, skip to #9) Attached Documents (check) 1) _____ 2) _____ 3) _____ 4) _____
9. Vegetation (check type)	X Native Grasses ____ Irrigated Turf ____ Other _____
10. Embankment a. Interior slope (4:1 max.) b. Exterior slope (3:1 max.)	Interior Slope = _____ % Exterior Slope = _____ %
11. Access a. Slope (10% max.) b. Width (16 feet min.)	Slope = 10 % Width = 16 ft

W/ FINAL DESIGN

W/ FINAL DESIGN

Worksheet 7

Design Procedure Form for Austin Sand Filter

Designer: B. Weil
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 1 and 2 / Basin #1

1. Determine Design Storage Volume (Use Worksheet 1) a. Total Tributary Area (maximum 100) b. Design Storage Volume, V_{BMP}	A_{total} = 45.16 acres V_{BMP} = 104,108.4 ft^3
2. Maximum Water Height in Sedimentation Basin* a. Invert elevation at connection to storm drain system. b. Sand Filter invert elevation (consider min. grade (1%) from storm drain). Point A, Figure 9. c. Estimate filter depth or use min. (3'). d. Top elevation of filter bed. Point B, Figure 9. e. Surface elevation at BMP inlet. Point C, Figure 9. f. Determine max. allowable height (2h) of water in the sedimentation basin using the elevation difference between points C and B. (min. 2', max. 10') 2h = [(C-B) – 1' Freeboard]	Elev. Storm Drain = _____ ft Elev. Pt A = _____ ft Filter Depth = _____ ft Elev. Pt B = _____ ft Elev. Pt C = _____ ft 2h = 3 ft
3. Size Sedimentation Basin a. Find Sedimentation Basin Area, A_s $A_s = V_{BMP} / (2h)$ b. Determine basin length and width, using a length to width ratio ≥ 2:1 $A_s = 2 \times W^2$ length = 2 x width	A_s = 34703 ft^2 width = 600 ft length = 159 ft
4. Size Filter Basin a. Determine Filter Basin Area, A_f $A_f = V_{BMP} / 18$ b. Determine Filter Basin Volume	A_f = 5784 ft^2

$V_f = A_f$ x filter depth (part 2c)	V_f = 17352 ft^3
c. Determine Required Volume, V_r $V_r = 0.2 \times V_{BMP}$ d. Check if $V_r \geq V_f$? If no, redesign with an increased filter depth or increase filter area.	V_r = 20822 ft^3 Check $V_r \geq V_f$ YES

Notes: SAND SURFACE AREA = 6000 ft^2 (60 x 100)

* Based on these elevations, is there a sufficient elevation drop to allow gravity flow from the outlet of the control measure to the storm drain system? If no, investigate alternative on-site locations for treatment control, consider another treatment control measure more suitable for site conditions, or contact the District to discuss on-site pumping requirements.

Worksheet 7

Design Procedure Form for Austin Sand Filter

Designer: B. Weil
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 3, 4, 5 and 6 / Basin #2

1. Determine Design Storage Volume (Use Worksheet 1) a. Total Tributary Area (maximum 100) b. Design Storage Volume, V_{BMP}	A_{total} = 57.0 acres V_{BMP} = 130,744 ft^3
2. Maximum Water Height in Sedimentation Basin* a. Invert elevation at connection to storm drain system. b. Sand Filter invert elevation (consider min. grade (1%) from storm drain). Point A, Figure 9. c. Estimate filter depth or use min. (3'). d. Top elevation of filter bed. Point B, Figure 9. e. Surface elevation at BMP inlet. Point C, Figure 9. f. Determine max. allowable height (2h) of water in the sedimentation basin using the elevation difference between points C and B. (min. 2', max. 10') 2h = [(C-B) – 1' Freeboard]	Elev. Storm Drain = _____ ft Elev. Pt A = _____ ft Filter Depth = _____ ft Elev. Pt B = _____ ft Elev. Pt C = _____ ft 2h = 3 ft
3. Size Sedimentation Basin a. Find Sedimentation Basin Area, A_s $A_s = V_{BMP} / (2h)$ b. Determine basin length and width, using a length to width ratio ≥ 2:1 $A_s = 2 \times W^2$ length = 2 x width	A_s = 43415 ft^2 width = 900 ft length = 103 ft
4. Size Filter Basin a. Determine Filter Basin Area, A_f $A_f = V_{BMP} / 18$ b. Determine Filter Basin Volume	A_f = 7236 ft^2

$V_f = A_f$ x filter depth (part 2c)	V_f = 21708 ft^3
c. Determine Required Volume, V_r $V_r = 0.2 \times V_{BMP}$ d. Check if $V_r \geq V_f$? If no, redesign with an increased filter depth or increase filter area.	V_r = 26049 ft^3 Check $V_r \geq V_f$ YES

Notes: SAND SURFACE AREA = 7800 (120 x 65)

* Based on these elevations, is there a sufficient elevation drop to allow gravity flow from the outlet of the control measure to the storm drain system? If no, investigate alternative on-site locations for treatment control, consider another treatment control measure more suitable for site conditions, or contact the District to discuss on-site pumping requirements.

Worksheet 9

Design Procedure Form for Grassed Swale

Designer: B. Weil
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 1

1. Determine Design Flow (Use Worksheet 2)	Q_{BMP} = 0.93 cfs
2. Swale Geometry a. Swale bottom width (b) b. Side slope (z) c. Flow direction slope (s)	b = 15 ft z = 3 s = 1 %
3. Design flow velocity (Manning n = 0.2)	v = 0.27 ft/s
4. Depth of flow (D)	D = .22 ft
5. Design Length (L) L = (7 min) x (flow velocity, ft/sec) x 60	L = 113 ft
6. Vegetation (describe)	
8. Outflow Collection (check type used or describe "other")	___ Grated Inlet' ___ Infiltration Trench ___ Underdrain X Other CMP RISER

Notes: AVAILABLE LENGTH = 130'

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                        Analysis prepared by:

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                        16800 VALLEY VIEW AVENUE
                           LA MIRADA CA 90638
                    PH: (714) 521-4811 FAX: (714) 521-4173

-----------------------------------------------------------------------------
  TIME/DATE OF STUDY:  4:44   4/10/2008
=============================================================================


 ************************** DESCRIPTION OF STUDY **************************
* DEPTH OF FLOW AND VELOCITY IN SWALE                                       *
* ASSOCIATED WITH AREA 1                                                    *
*                                                                           *
 *****************************************************************************

*****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
-----------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =     3.00
            Z2(HORIZONTAL/VERTICAL) =     3.00
    BASEWIDTH(FEET) =     15.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.010000
    UNIFORM FLOW(CFS) =         0.93
    MANNINGS FRICTION FACTOR = 0.2000
=============================================================================
    NORMAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =    0.22
    FLOW TOP-WIDTH(FEET) =         16.34
    FLOW AREA(SQUARE FEET) =             3.50
    HYDRAULIC DEPTH(FEET) =      0.21
    FLOW AVERAGE VELOCITY(FEET/SEC.) =      0.27
    UNIFORM FROUDE NUMBER =     0.101
    PRESSURE + MOMENTUM(POUNDS) =            24.48
    AVERAGED VELOCITY HEAD(FEET) =       0.001
    SPECIFIC ENERGY(FEET) =       0.224
=============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =         15.29
    CRITICAL FLOW AREA(SQUARE FEET) =            0.74
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.05
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      1.26
    CRITICAL DEPTH(FEET) =      0.05
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =             3.39
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =       0.025
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =       0.073
=============================================================================

1
```

Worksheet 9

Design Procedure Form for Grassed Swale

Designer: B. Weil
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 3

1. Determine Design Flow (Use Worksheet 2)	Q_{BMP} = 2.13 cfs
2. Swale Geometry a. Swale bottom width (b) b. Side slope (z) c. Flow direction slope (s)	b = 25 ft z = 3 s = 1 %
3. Design flow velocity (Manning n = 0.2)	v = .30 ft/s
4. Depth of flow (D)	D = .27 ft
5. Design Length (L) L = (7 min) x (flow velocity, ft/sec) x 60	L = 126 ft
6. Vegetation (describe)	
8. Outflow Collection (check type used or describe "other")	___ Grated Inlet' ___ Infiltration Trench ___ Underdrain X Other C.M.P Riser

Notes: Available Length = 350'

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                             LA MIRADA CA 90638
                      PH: (714) 521-4811 FAX: (714) 521-4173

----------------------------------------------------------------------------
  TIME/DATE OF STUDY:  4:49   4/10/2008
============================================================================


 ************************** DESCRIPTION OF STUDY **************************
* DEPTH OF FLOW AND VELOCITY FOR SWALE                                      *
* ASSOCIATED WITH AREA 3                                                    *
*                                                                           *
 ***************************************************************************

*****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
----------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =     3.00
            Z2(HORIZONTAL/VERTICAL) =     3.00
    BASEWIDTH(FEET) =     25.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.010000
    UNIFORM FLOW(CFS) =         2.13
    MANNINGS FRICTION FACTOR = 0.2000
============================================================================
    NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =    0.27
    FLOW TOP-WIDTH(FEET) =         26.64
    FLOW AREA(SQUARE FEET) =             7.04
    HYDRAULIC DEPTH(FEET) =      0.26
    FLOW AVERAGE VELOCITY(FEET/SEC.) =      0.30
    UNIFORM FROUDE NUMBER =     0.104
    PRESSURE + MOMENTUM(POUNDS) =            60.54
    AVERAGED VELOCITY HEAD(FEET) =       0.001
    SPECIFIC ENERGY(FEET) =       0.274
============================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =         25.36
    CRITICAL FLOW AREA(SQUARE FEET) =            1.53
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.06
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      1.39
    CRITICAL DEPTH(FEET) =      0.06
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =             8.64
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =       0.030
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =       0.091
============================================================================
```

Worksheet 9

Design Procedure Form for Grassed Swale

Designer: B. Weil
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 4

1. Determine Design Flow (Use Worksheet 2)	Q_{BMP} = 0.39 cfs
2. Swale Geometry a. Swale bottom width (b) b. Side slope (z) c. Flow direction slope (s)	b = 25 ft z = 3 s = 1 %
3. Design flow velocity (Manning n = 0.2)	v = .16 ft/s
4. Depth of flow (D)	D = .10 ft
5. Design Length (L) L = (7 min) x (flow velocity, ft/sec) x 60	L = 42 ft
6. Vegetation (describe)	
8. Outflow Collection (check type used or describe "other")	___ Grated Inlet' ___ Infiltration Trench ___ Underdrain X Other CMP Riser

Notes: AVAILABLE LENGTH = 200'

```
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                            LA MIRADA CA 90638
                       PH: (714) 521-4811 FAX: (714) 521-4173

---------------------------------------------------------------------------
  TIME/DATE OF STUDY:  4:53   4/10/2008
===========================================================================


 ************************** DESCRIPTION OF STUDY **************************
* DEPTH OF FLOW AND VELOCITY IN SWALE                                      *
* ASSOCIATED WITH AREA 4                                                   *
*                                                                          *
 ****************************************************************************

*****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
---------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =     3.00
            Z2(HORIZONTAL/VERTICAL) =     3.00
    BASEWIDTH(FEET) =     25.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.010000
    UNIFORM FLOW(CFS) =         0.39
    MANNINGS FRICTION FACTOR = 0.2000
===========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
---------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =    0.10
    FLOW TOP-WIDTH(FEET) =         25.58
    FLOW AREA(SQUARE FEET) =            2.46
    HYDRAULIC DEPTH(FEET) =      0.10
    FLOW AVERAGE VELOCITY(FEET/SEC.) =      0.16
    UNIFORM FROUDE NUMBER =     0.090
    PRESSURE + MOMENTUM(POUNDS) =             7.56
    AVERAGED VELOCITY HEAD(FEET) =       0.000
    SPECIFIC ENERGY(FEET) =       0.098
===========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
---------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =         25.12
    CRITICAL FLOW AREA(SQUARE FEET) =            0.51
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.02
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      0.77
    CRITICAL DEPTH(FEET) =      0.02
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =             0.90
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =       0.009
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =       0.029
===========================================================================
```

Worksheet 9

Design Procedure Form for Grassed Swale

Designer: B. Weil
Company: Thienes Eng.
Date: 4-9-08
Project: Moreno Valley - Eucalyptus
Location: Area 5

1. Determine Design Flow (Use Worksheet 2)	Q_{BMP} = 0.95 cfs
2. Swale Geometry a. Swale bottom width (b) b. Side slope (z) c. Flow direction slope (s)	b = 2.5 ft z = 3 s = 1 %
3. Design flow velocity (Manning n = 0.2)	v = 0.22 ft/s
4. Depth of flow (D)	D = .17 ft
5. Design Length (L) L = (7 min) x (flow velocity, ft/sec) x 60	L = 92 ft
6. Vegetation (describe)	
8. Outflow Collection (check type used or describe "other")	___ Grated Inlet' ___ Infiltration Trench ___ Underdrain X Other CMP RISER

Notes: AVAILABLE LENGTH = 95'

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                          LA MIRADA CA 90638
                    PH: (714) 521-4811 FAX: (714) 521-4173

---------------------------------------------------------------------------
  TIME/DATE OF STUDY:  4:56   4/10/2008
===========================================================================


 ************************** DESCRIPTION OF STUDY **************************
* DEPTH OF FLOW AND VELOCITY IN SWALE                                      *
* ASSOCIATED WITH AREA 5                                                   *
*                                                                          *
 ****************************************************************************

*****************************************************************************
>>>>CHANNEL INPUT INFORMATION<<<<
---------------------------------------------------------------------------
    CHANNEL Z1(HORIZONTAL/VERTICAL) =     3.00
            Z2(HORIZONTAL/VERTICAL) =     3.00
    BASEWIDTH(FEET) =     25.00
    CONSTANT CHANNEL SLOPE(FEET/FEET) = 0.010000
    UNIFORM FLOW(CFS) =         0.95
    MANNINGS FRICTION FACTOR = 0.2000
===========================================================================
    NORMAL-DEPTH FLOW INFORMATION:
---------------------------------------------------------------------------
    >>>>> NORMAL DEPTH(FEET) =    0.17
    FLOW TOP-WIDTH(FEET) =         26.00
    FLOW AREA(SQUARE FEET) =            4.23
    HYDRAULIC DEPTH(FEET) =      0.16
    FLOW AVERAGE VELOCITY(FEET/SEC.) =      0.22
    UNIFORM FROUDE NUMBER =     0.098
    PRESSURE + MOMENTUM(POUNDS) =            22.18
    AVERAGED VELOCITY HEAD(FEET) =       0.001
    SPECIFIC ENERGY(FEET) =       0.167
===========================================================================
    CRITICAL-DEPTH FLOW INFORMATION:
---------------------------------------------------------------------------
    CRITICAL FLOW TOP-WIDTH(FEET) =        25.21
    CRITICAL FLOW AREA(SQUARE FEET) =            0.87
    CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.03
    CRITICAL FLOW AVERAGE VELOCITY(FEET/SEC.) =      1.09
    CRITICAL DEPTH(FEET) =      0.03
    CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =            2.95
    AVERAGED CRITICAL FLOW VELOCITY HEAD(FEET) =       0.019
    CRITICAL FLOW SPECIFIC ENERGY(FEET) =       0.053
===========================================================================
```

Appendix G

AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

"WILL BE ADDRESSED IN THE FINAL WQMP"

Appendix H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTION

"WILL BE ADDRESSED IN THE FINAL WQMP"

AEI CASC CONSULTING

October 8, 2009 **Delivered Via Email and Federal Express**

Phuong Hunter, CPSWQ
Associate Environmental Engineer
City of Moreno Valley
Public Works Department – Land Development
14177 Frederick Street
Moreno Valley, CA 92552

Subject: PA07-0084 – Moreno Valley Eucalyptus
Project Specific Preliminary Water Quality Management Plan
Acceptance Recommendation for Entitlement Processing – Subject to Conditions

Dear Ms. Hunter,

The AEI-CASC Consulting (AEI-CASC), as a consultant to the City of Moreno Valley, has reviewed the subject Project Specific Revised Preliminary Water Quality Management Plan (P-WQMP) and recommends it be accepted by the City for entitlement processing only, subject to the following conditions:

Special Project Conditions

1. In accordance with the City of Moreno Valley standards, the Double Ring Infiltrometer field testing method shall be utilized to perform in-situ percolation testing in the location of the proposed infiltration area treatment control BMPs and the results included in the first submittal of the Final-WQMP. Based on the results of these tests, the Applicant acknowledges that substantially more area than currently shown on the plans may be required to treat site runoff as required by the WQMP guidance. **NOTE:** If the in-situ percolation test results do not support use of the infiltration BMPs, a more robust treatment BMP will be required.

Conditions Related to Post-Construction Water Pollution Control

2. The Applicant shall prepare and submit for approval a final, project-specific water quality management plan (F-WQMP) for PA07-0084 – Moreno Valley Eucalyptus. The F-WQMP shall be consistent with the approved P-WQMP and in full conformance with the document; "Riverside County Water Quality Management Plan for Urban Runoff" dated July 24, 2006. The F-WQMP shall be submitted and approved prior to application for and issuance of grading permits or building permits. At a minimum, the F-WQMP shall include the following: Site design BMPs; Source control BMPs; Treatment control BMPs; Operation and Maintenance requirements for BMPs; and sources of funding for BMP implementation.
3. The Applicant shall select and implement treatment control BMPs that are medium to highly effective for treating Pollutants of Concern (POC) for the project. POC include project pollutants associated with a 303(d) listing or a TMDL for receiving waters.
   A. Project receiving waters and 303(d) or TMDL status, if applicable, include:
      i. San Jacinto River Reach 3,
      ii. Canyon Lake (aka San Jacinto River Reach 2) (303(d) listed, and TMDL),
      iii. San Jacinto River Reach 1,
      iv. Lake Elsinore (303(d) listed, and TMDL),
      v. Temescal Creek 6,

vi. Temescal Creek 5,
vii. Temescal Creek 4,
viii. Temescal Creek 3 (aka Lee Lake),
ix. Temescal Creek 2,
x. Temescal Creek 1,
xi. Santa Ana River Reach 3 (303(d) listed),
xii. The Prado Basin Management Zone,
xiii. Santa Ana River Reach 2,
xiv. Santa Ana River Reach 1,
xv. Tidal Prism of Santa Ana River (to within 1000' of Victoria Street) and Newport Slough, and
xvi. Pacific Ocean.

B. Project POC include:
i. Nutrients,
ii. Oxygen Demanding Substances, and
iii. Pathogens (Bacteria and Viruses).

C. Exhibit C of the document, "Riverside County Water Quality Management Plan for Urban Runoff" dated July 24, 2006 shall be consulted for determining the effectiveness of proposed treatment BMPs.

4. Overall, the proposed treatment control concept is accepted as the conceptual treatment control BMP for the proposed site.

5. The Applicant **has proposed to incorporate the use of filtration and detention systems.** Final design details of these systems must be provided in the first submittal of the F-WQMP. The size of the treatment control BMP is to be determined using the procedures set forth in Exhibit C of the Riverside County Guidance Document. The Applicant acknowledges that more area than currently shown on the plans may be required to treat site runoff as required by the WQMP guidance.

6. The Applicant shall substantiate the applicable Hydrologic Condition of Concern (HCOC) (WQMP Section IV) in the F-WQMP. The HCOC designates that the project will comply with Condition A; therefore, the condition must be addressed in the F-WQMP.

7. The Applicant shall record with the County-Clerk Recorder a "Covenant and Agreement" that informs future property owners of the requirements to implement the approved F-WQMP and the associated Master F-WQMP. The "Covenant and Agreement" shall be in a form acceptable to the City of Moreno Valley. The Applicant may propose, subject to approval by the City of Moreno Valley, the recording of alternative documents to inform future owners of the requirements to implement the approved F-WQMP. Documents shall be approved by the City of Moreno Valley and recorded with the County-Clerk Recorder prior to issuance of building or grading permits.

8. Applicant shall submit the F-WQMP to the City of Moreno Valley, Public Works Department, Land Development Division. The F-WQMP submittal shall include payment of fee as set by the City for review of the F-WQMP.

Conditions Related to Construction Site Water Pollution Control

9. Prior to the issuance of any grading or building permits for projects that will result in soil disturbance of one or more acres of land, the applicant shall demonstrate that coverage has been obtained under California's General Permit for Stormwater Discharges Associated with Construction Activity by providing a copy of the Notice of Intent (NOI) submitted to the State

Board and a copy of the subsequent notification of the issuance of a Waste Discharge Identification (WDID) number or other proof of filing.

10. Projects that must comply with the statewide General Permit for Storm Water Discharges Associated with Construction Activity shall prepare and implement a stormwater pollution prevention plan (SWPPP). A copy of the current SWPPP shall be kept at the project site and be available for review upon request.

11. The following notes shall be included in grading plans:
    - A. Erosion control BMPs shall be implemented and maintained to minimize and/or prevent the entrainment of soil in runoff from disturbed soil areas on construction sites.
    - B. Sediment control BMPs shall be implemented and maintained to prevent and/or minimize the transport of soil from the construction site.
    - C. Stockpiles of soil shall be properly contained to eliminate or reduce sediment transport from the site to streets, drainage facilities, or adjacent properties via runoff, vehicle tracking, or wind.
    - D. Appropriate BMPs for construction-related materials, wastes, spills or residues shall be implemented to eliminate or reduce transport from the site to streets, drainage facilities, or adjoining properties by wind or runoff.
    - E. Runoff from equipment and vehicle washing shall be contained at construction sites and must not be discharged to receiving waters or the local storm drain system.
    - F. All construction contractor and subcontractor personnel are to be made aware of the required best management practices and good housekeeping measures for the project site and any associated construction staging areas.
    - G. At the end of each day of construction activity all construction debris and waste materials shall be collected and properly disposed in trash or recycle bins.
    - H. Construction sites shall be maintained in such a condition that a storm does not carry wastes or pollutants off the site. Discharges other than stormwater (non-stormwater discharges) are prohibited, except as authorized by an individual NPDES permit or the statewide General Permit for Construction Activity. Potential pollutants include but are not limited to: solid or liquid chemical spills; wastes from paints, stains, sealants, solvents, detergents, glues, lime, pesticides, herbicides, fertilizers, wood preservatives, and asbestos fibers, paint flakes or stucco fragments; fuels, oils, lubricants, and hydraulic, radiator or battery fluids; concrete and related cutting or curing residues; floatable wastes; wastes from engine/equipment steam cleaning or chemical degreasing; wastes from street cleaning; and super-chlorinated potable water from line flushing and testing. During construction, disposal of such materials should occur in a specified and controlled temporary area on-site physically separated from potential stormwater runoff, with ultimate disposal in accordance with local, state, and federal requirements.
    - I. Discharging contaminated groundwater produced by dewatering groundwater that has infiltrated into the construction site is prohibited. Discharging of contaminated soils via surface erosion is also prohibited. Discharging non-contaminated groundwater produced by dewatering activities may require a National Pollutant Discharge Elimination System (NPDES) permit issued by the Regional Board.
    - J. Construction sites shall be managed to minimize the exposure time of disturbed soil areas through phasing and scheduling of grading to the extent feasible and the use of temporary and permanent soil stabilization.
    - K. BMPs shall be maintained at all times. In addition, BMPs shall be inspected prior to predicted storm events and following storm events.

12. Post-construction treatment control BMPs, once placed into operation for post-construction water quality control, shall not be used to treat runoff from construction sites or unstabilized areas of the site.

Conditions Related to Project Closeout and Occupancy

13. The Applicant shall, prior to building or grading permit closeout or the issuance of a certificate of occupancy, demonstrate:
    A. That all structural BMPs have been constructed and installed in conformance with the approved plans and specifications;
    B. That all structural BMPs described in the F-WQMP have been implemented in accordance with approved plans and specifications;
    C. That the applicant is prepared to implement all non-structural BMPs included in the F-WQMP, conditions of approval, and building/grading permit conditions; and
    D. That an adequate number of copies of the approved F-WQMP are available for the future owners/occupants of the project.

General Conditions

AEI-CASC Consulting has reviewed the Preliminary Water Quality Management Plan (P-WQMP) prepared by Albert A. Webb Associates (Preparer) for PA07-0084 – Moreno Valley Eucalyptus (Project) and submitted by Prologis Dev. Serv., Inc. (Applicant). Based on information presented in the P-WQMP, AEI-CASC Consulting has found that the P-WQMP is in general conformance with the document, "Riverside County Water Quality Management Plan for Urban Runoff" dated July 24, 2006 and approved by the Santa Ana Regional Water Quality Control Board (Guidance Document). While conducting the review of the P-WQMP, AEI-CASC Consulting relied on information, calculations, findings, conclusions, representations, and other information contained in the P-WQMP, a document signed and sealed by the Preparer and certified by the Applicant. AEI-CASC's review and recommendations are limited to determination of general conformance with the Guidance Document. The Applicant and Preparer remain responsible for all civil design elements and assertions in the P-WQMP, and the Applicant remains responsible for implementation, maintenance, and funding of all elements of the WQMP and for any and all liability and damages (environmental or otherwise) arising out of the implementation or failure to implement any portion of the WQMP.

Best regards,

AEI-CASC Consulting

Melanie E. Sotelo
Design Engineer

Enclosure: Preliminary WQMP (Signed by Applicant, Signed and Sealed by Engineer)
Preliminary WQMP Acceptance Recommendation Letter

Copies:
Acceptance Recommendation Only Shelly McMasters – Thienes Engineering (via fax: 714.521.4173)
Jim Jachetta – Prologis Dev. Serv., Inc. (via fax: 949.251.0766)

MORENO VALLEY 60 HIGHWAY

PETTIT STREET

EUCALYPTUS AVENUE

QUINCY WASH

QUINCY STREET

BUILDING 1
168,342 SF.

BUILDING 2
861,112 SF.

BUILDING 3
160,602 SF.

BUILDING 4
339,223 SF.

BUILDING 5
390,102 SF.

BUILDING 6
325,038 SF.

SIDEWALK DRAINS TO LANDSCAPING

ROOF DRAINS DIRECTLY CONNECT TO ONSITE STORM DRAIN SYSTEM

FLOW AREA 1 0.4 AC. DRAINS TO VEGETATED SWALE AND THEN TO BASIN #1 AND TO SAND FILTER

AREA 2 39.2 AC. VOLUME AREA 1 AND 2 45.6 AC. DRAINS TO BASIN #1 AND SAND FILTER

FLOW AREA 3 1.6 AC. DRAINS TO VEGETATED SWALE AND THEN TO BASIN #2 AND TO SAND FILTER

FLOW AREA 4 2.7 AC. DRAINS TO VEGETATED SWALE AND THEN TO BASIN #2 AND TO SAND FILTER

FLOW AREA 5 6.5 AC. DRAINS TO VEGETATED SWALE AND THEN TO BASIN #2 AND TO SAND FILTER

AREA 6 53.2 AC. VOLUME AREA 3, 4, 5 AND 6 57.0 AC. DRAINS TO BASIN #2 AND SAND FILTER

DETENTION BASIN #1

DETENTION BASIN #2

DETENTION BASIN FOR INITIAL RUNOFF

SAND FILTER

OUTLET STRUCTURE

INITIAL RUNOFF TO STORAGE AND FILTRATION

2:1 HIGH FLOWS BYPASS TO STORM DRAIN SYSTEM

BURIED PROPOSED CONCRETE EXTENDED 3' BELOW RIVER BED

GRAVEL TRAIL

DISCHARGES TO QUINCY WASH VIA STORM DRAIN

LEGEND

1. SC-30: OUTDOOR LOADING/UNLOADING
2. SC-43: PARKING AREA MAINTENANCE
3. SC-44: DRAINAGE SYSTEM MAINTENANCE
4. SC-73: LANDSCAPE MAINTENANCE
5. SD-12: EFFICIENT IRRIGATION
6. SD-13: STORM DRAIN SYSTEM SIGNS
7. SD-32: TRASH ENCLOSURE
8. TC-30: VEGETATED SWALE (SEE SHEET 2 FOR DETAILS)
9. MP-52: DRAIN INSERT (SEE SHEET 1 FOR DETAILS)
10. TC-22: EXTENDED DETENTION/SEDIMENTATION BASIN (SEE SHEETS 2 AND 3 FOR DETAILS)
11. TC-40: MEDIA FILTER (SAND FILTER) (SEE SHEET 3 FOR DETAILS)

PAVED AREAS (CONCRETE/ASPHALT)

SIDEWALK/PATIO

NOTE: SC-11: SPILL PREVENTION, CONTROL AND CLEANUP
SC-41: BUILDING AND GROUNDS MAINTENANCE
SC-60: HOUSEKEEPING PRACTICES
SD-10: SITE DESIGN AND LANDSCAPE PLANNING

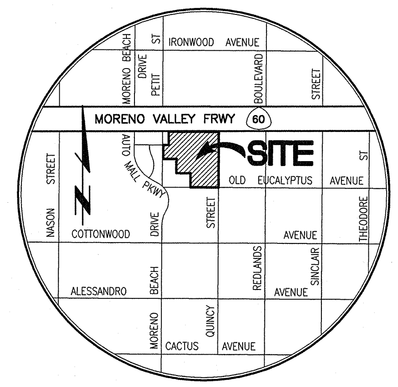
ONGOING OVER THE ENTIRE SITE

PROJECT BOUNDARY

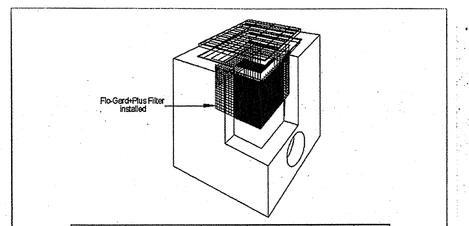
DRAINAGE AREAS

FLOW LINE

NOTE: ALL ROOF DRAINS DIRECTLY CONNECT TO ONSITE STORM DRAIN SYSTEM. ROOF RUNOFF DOES NOT WASH THE PAVEMENT.



VICINITY MAP
N.T.S.

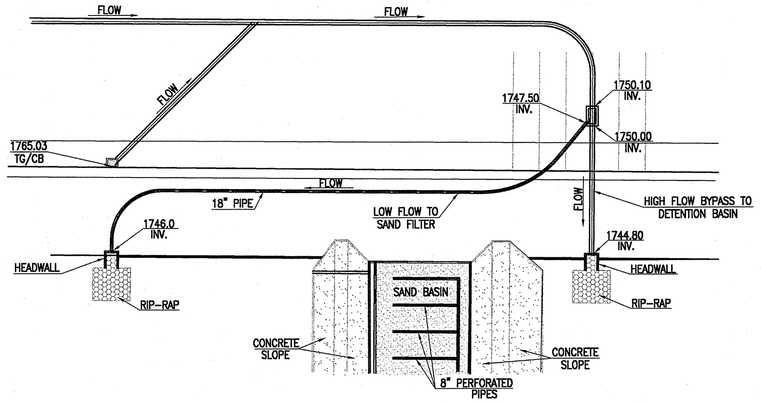


Model No.	Inlet ID (in x in)	Grate OD (in x in)	Solids Storage Cap. (cu.ft)	Filtered Flow (cfs)	Initial Bypass Cap. (cfs)	Secondary Bypass Cap. (cfs)	Total System Cap. (cfs)
FGP-1212F	12 x 12	14 x 14	0.3*	0.4	0.7	0.1	2.8
FGP-1530SF	15 x 30	19 x 26	2.3	1.5	4.6	0.4	6.5
FGP-16F	16 x 16	18 x 18	0.8	0.7	4.4	0.3	4.7
FGP-18F	18 x 18	20 x 20	0.9	0.9	4.4	0.3	4.7
FGP-1830SF	20 x 24	19 x 23	2.1	1.4	6.6	0.3	8.8
FGP-1830F	18 x 22	20 x 24	1.5	1.2	4.5	0.2	6.8
FGP-1836SF	18 x 36	19 x 40	3.3	1.8	6.6	0.4	8.8
FGP-2030SF	20 x 24	23 x 26	1.2	1.5	6.6	0.3	6.6
FGP-24F	22 x 22	24 x 24	2.2	1.5	6.6	0.3	6.1
FGP-2148SF	21 x 42	26 x 43	4.3	3.4	8.7	0.4	9.1
FGP-24F	24 x 24	26 x 26	3.2	1.8	6.6	0.3	6.1
FGP-2436SF	24 x 36	26 x 40	3.4	3.0	7.3	0.4	9.5
FGP-2445SF	24 x 45	28 x 47	4.4	3.4	8.9	0.4	9.5
FGP-3648SF	36 x 48	38 x 49	6.4	5.8	8.9	0.6	9.5
FGP-28F	28 x 28	30 x 30	3.2	1.5	6.6	0.3	6.3
FGP-36F	36 x 36	38 x 38	5.4	3.4	7.5	0.5	9.1
FGP-36F	36 x 36	38 x 40	4.8	3.4	6.6	0.5	9.1
FGP-3648F	36 x 48	40 x 48	6.4	3.4	10.8	0.6	11.6
FGP-48F (2 gr)	48 x 48	48 x 48	8.6	3.9	10.8	0.7	13.3

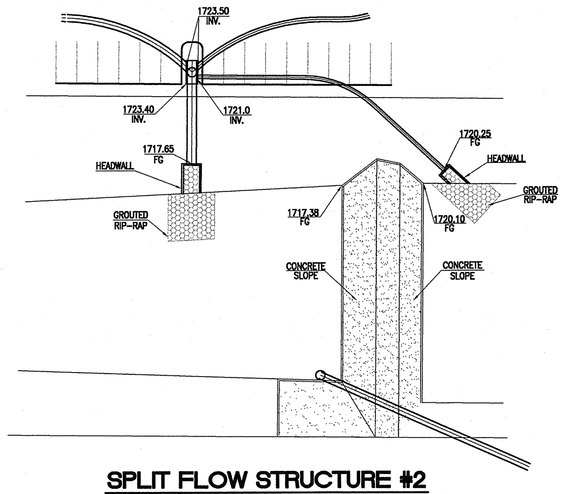
30 WATER POCKETS

NOTES:
1. Storage capacity refers to that which remains within the catchbasin prior to exceeding filtering system.
2. Filtered flow rate includes a safety factor of 2.
3. Flo-Gard+Plus Catch Basin Filter Inserts are available in the standard sizes (see above) or in custom sizes.
4. Call for details on custom size inserts.
5. Inserts in catchbasins that are structurally unsuitable or with irregular replacement openings to, refer to manufacturer's recommended maintenance guidelines.

FLO-GARD™ +PLUS
CATCH BASIN FILTER INSERT
(Frame Mount)
FLAT GRATED INLET
SHEET 1 OF 2
Hiller Enterprises, Inc., Santa Rosa, CA. (800)-676-8818



SPLIT FLOW STRUCTURE #1
N.T.S.



SPLIT FLOW STRUCTURE #2
N.T.S.

0 50 100 200 300
SCALE:1"=100'

Last Updated: 8/15/09
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CITY OF MORENO VALLEY

"WATER QUALITY SITE PLAN"

FOR

MORENO VALLEY-EUCALYPTUS

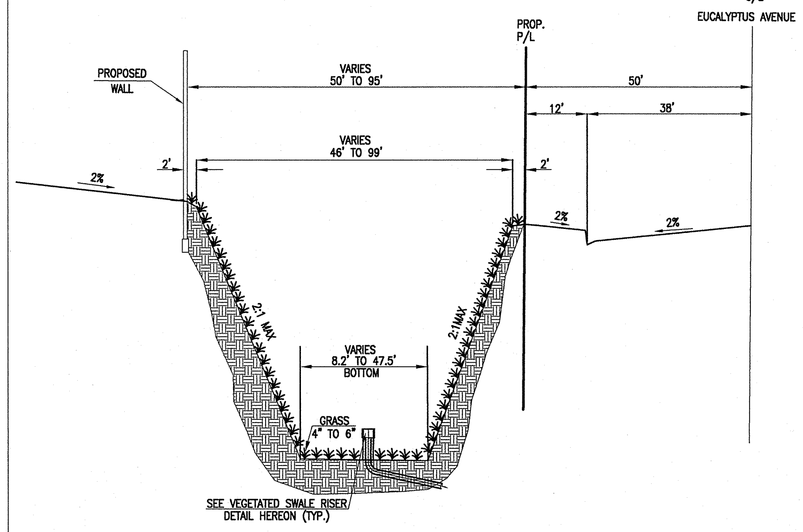
S/O 60 FREEWAY BETWEEN PETTIT ST. AND QUINCY ST.

ACCT. NO.

SHEET 1 NO. 4

CITY I. D. NO.

DETAIL SHEET

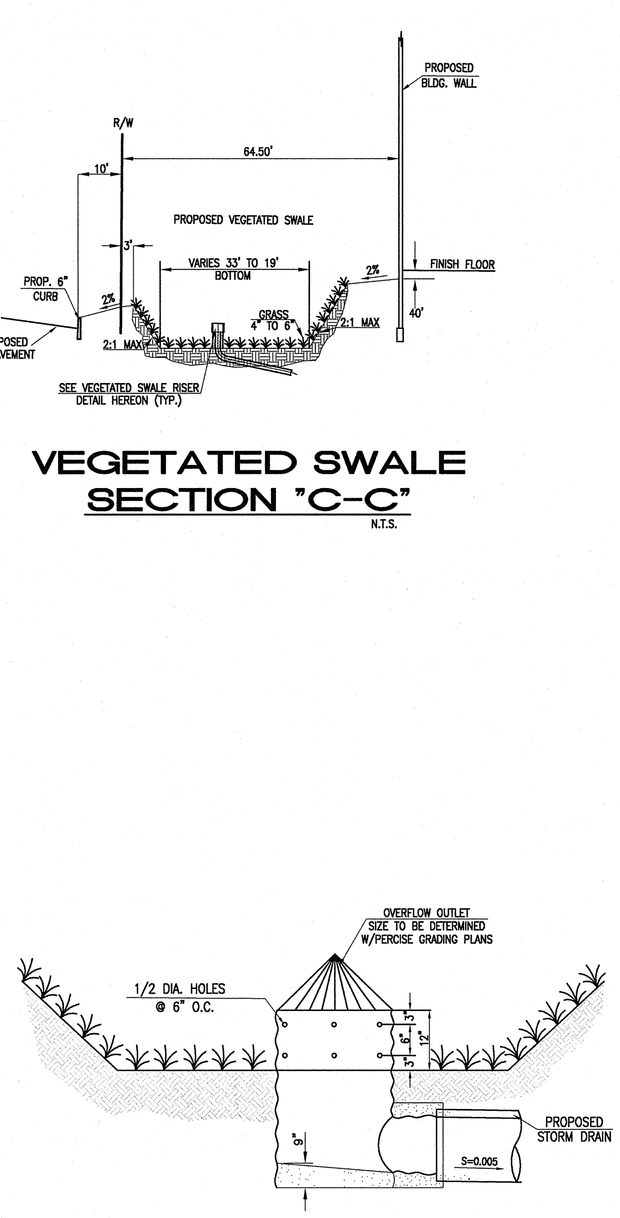


VEGETATED SWALE SECTION "A-A"

N.T.S.

VEGETATED SWALE SECTION "C-C"

N.T.S.



TYPICAL VEGETATED SWALE RISER DETAIL

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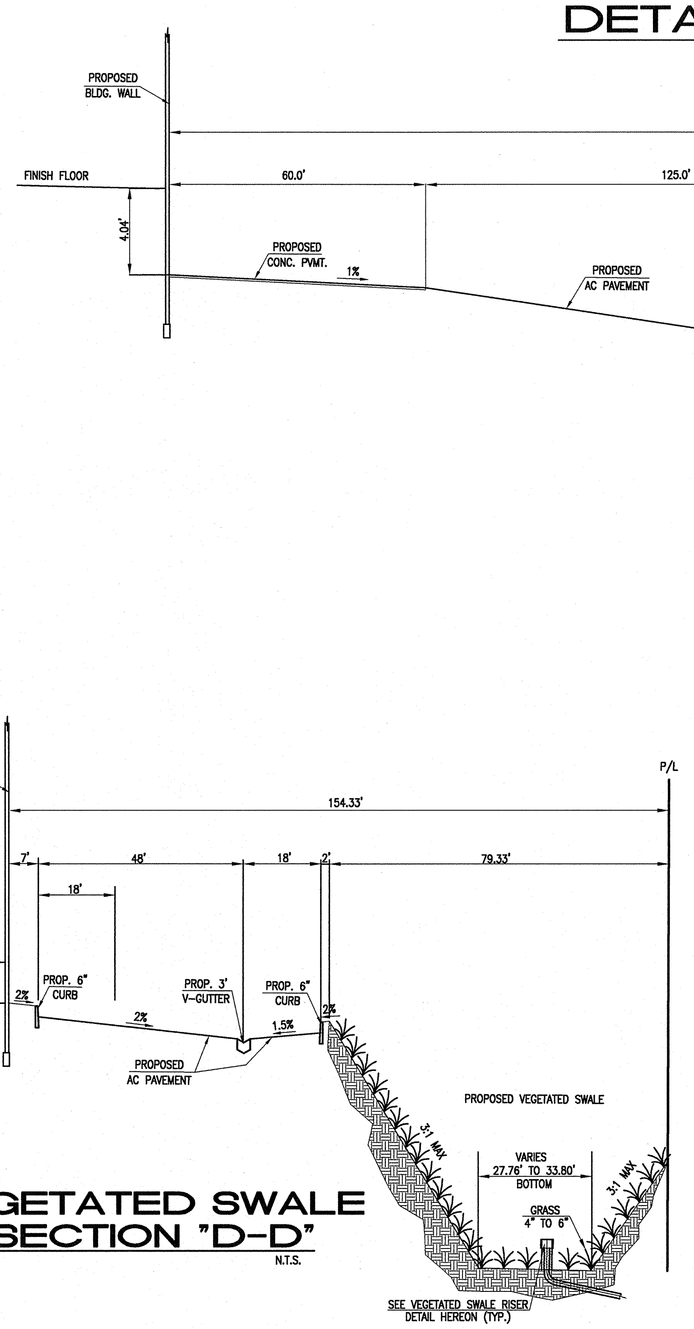

VEGETATED SWALE SECTION "D-D"

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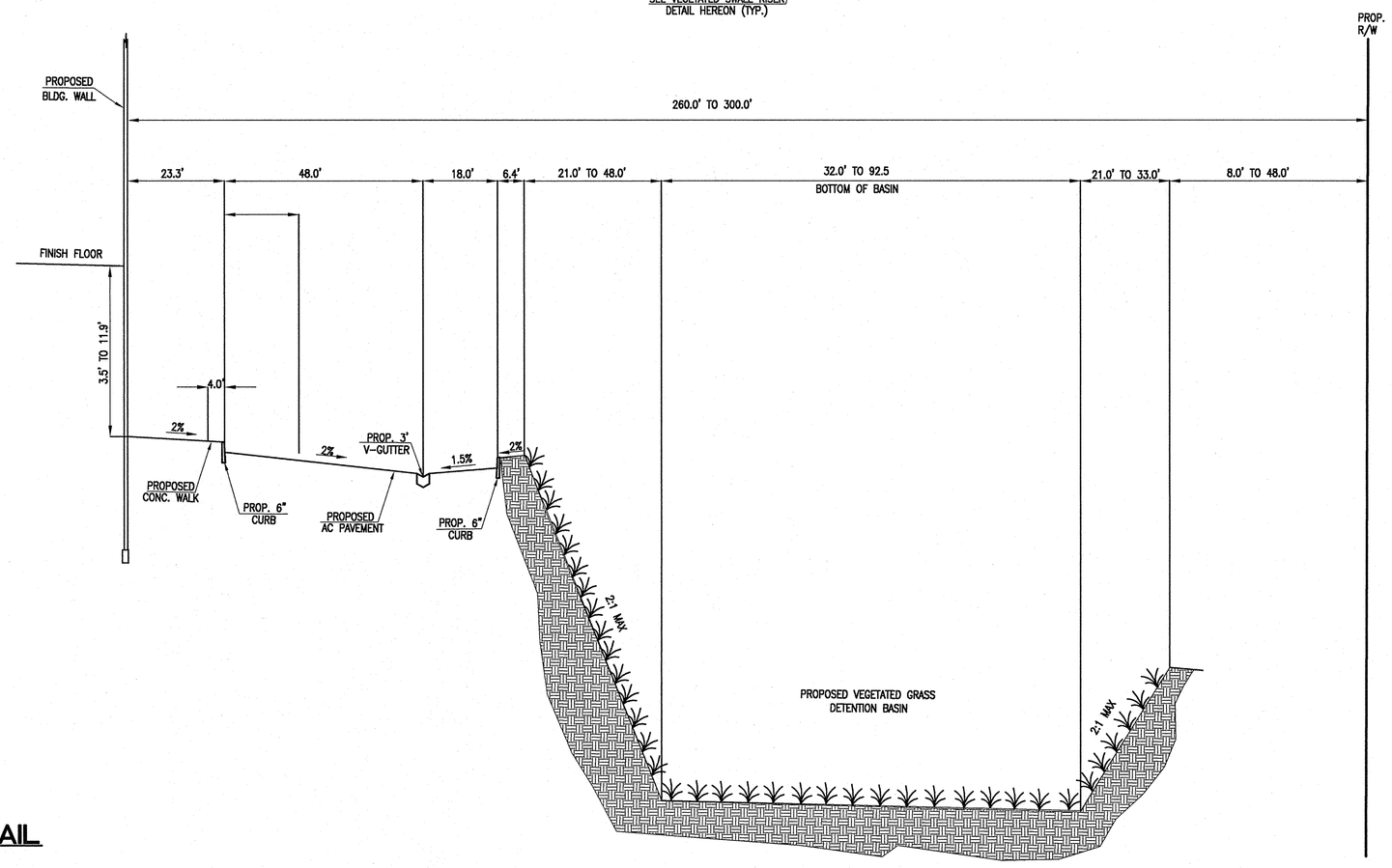

DETENTION BASIN SECTION "E-E"

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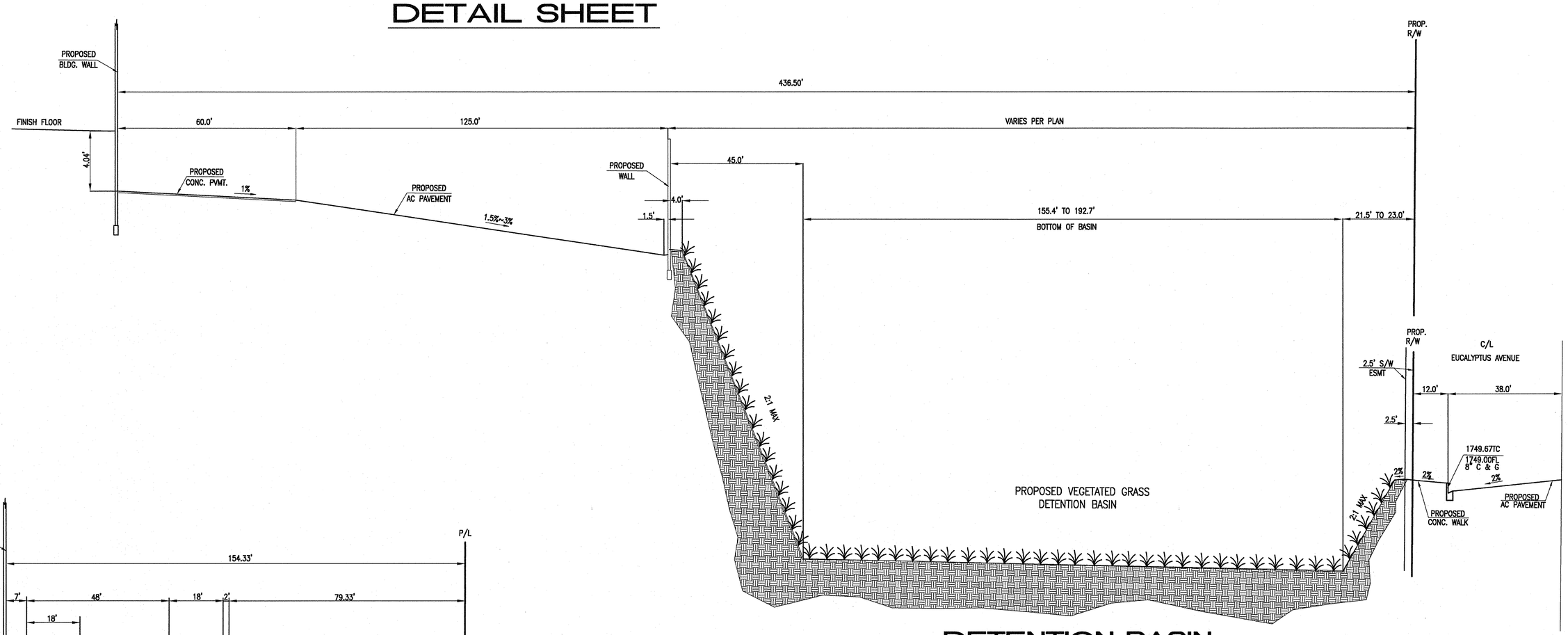

DETENTION BASIN SECTION "B-B"

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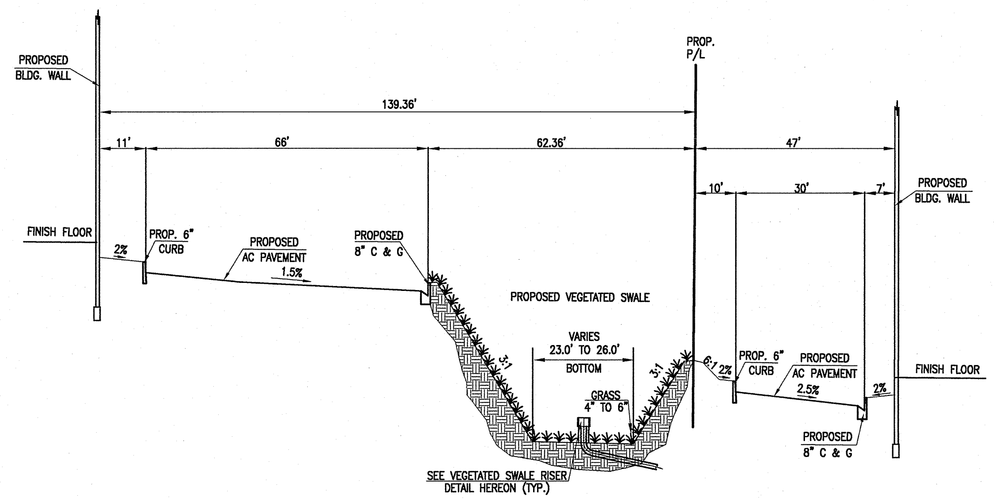

VEGETATED SWALE SECTION "F-F"

N.T.S.

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CITY OF MORENO VALLEY

"DETAIL SHEET"

FOR

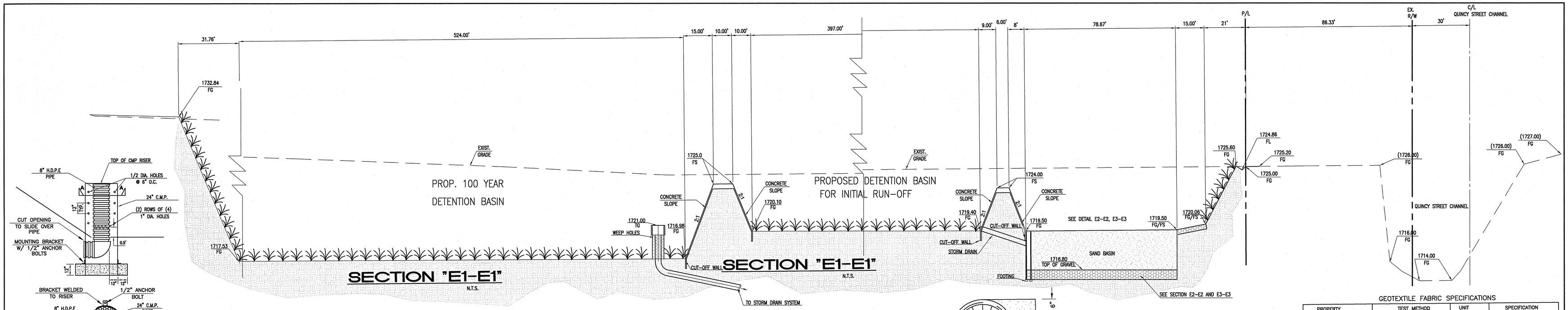
MORENO VALLEY-EUCALYPTUS

S/O 60 FREEWAY BETWEEN PETTIT ST. AND QUINCY ST.

ACCT. NO.

SHEET 2 NO. 4

CITY I. D. NO.



SECTION "E1-E1"
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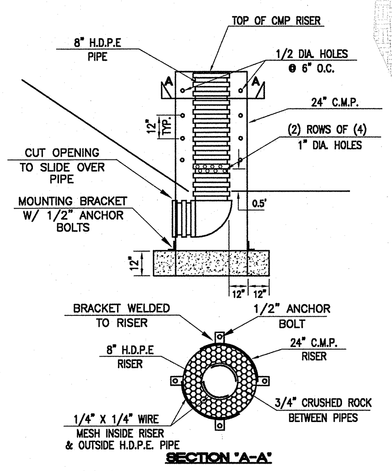
SECTION "E1-E1"
N.T.S.



BASIN RISER DETAIL (TYP)
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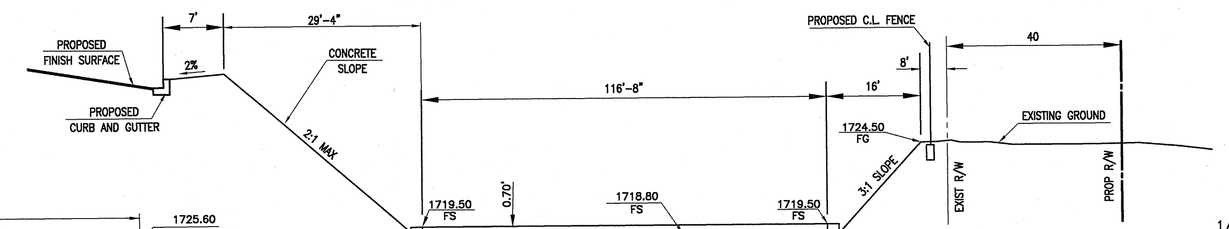

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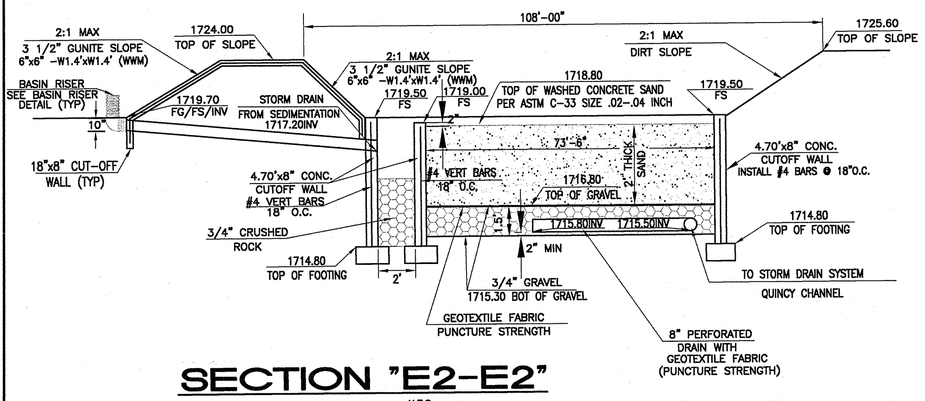

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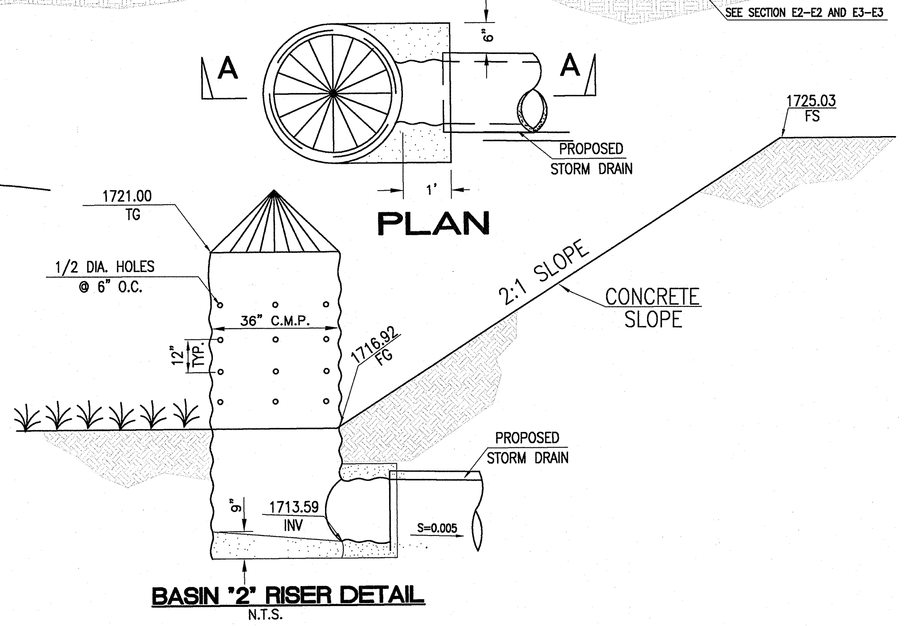


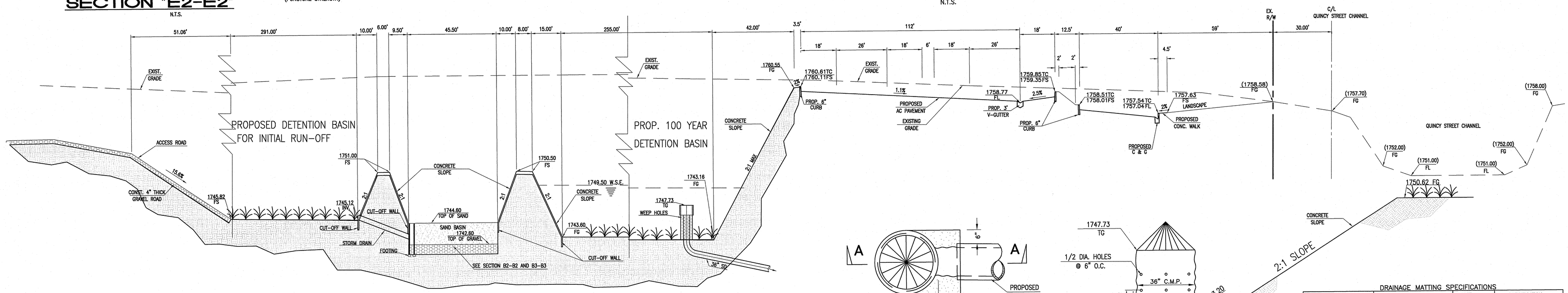
BASIN "2" RISER DETAIL
N.T.S.

GEOTEXTILE FABRIC SPECIFICATIONS

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
MATERIAL			NONWOVEN GEOTEXTILE FABRIC
UNIT WEIGHT		OZ/YD^2	8 (MINIMUM)
FILTRATION RATE		IN/SEC.	0.08 (MINIMUM)
PUNCTURE STRENGTH	ASTM D-751 (MODIFIED)	LB.	125 (MINIMUM)
MULLEN BURST STRENGTH	ASTM D-751	PSI	400 (MINIMUM)
TENSILE STRENGTH	ASTM D-1682	LB.	300 (MINIMUM)
EQUIVALENT OPENING SIZE	US STANDARD SIEVE	NO.	80 (MINIMUM)

DRAINAGE MATTING SPECIFICATIONS

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
MATERIAL			NONWOVEN GEOTEXTILE FABRIC
UNIT WEIGHT		OZ/YD^2	20
FLOW RATE (FABRIC)		GPM/FT^2	180 (MINIMUM)
PERMEABILITY	ASTM D-2434	CM/SEC.	12.4×10^{-2}
GRAB STRENGTH (FABRIC)	ASTM D-1682	LB.	DRY LG. 90 DRY WD. 70 WET LG. 95 WET WD. 70
PUNCTURE STRENGTH	COE CW-02215	LB.	42 (MINIMUM)
MULLEN BURST STRENGTH	ASTM D-1117	PSI	140 (MINIMUM)
EQUIVALENT OPENING SIZE	US STANDARD SIEVE	NO.	100 (70-120)
FLOW RATE (DRAINAGE CORE)	DREXEL UNIV. TEST METHOD	GPM/FT. WIDTH	14



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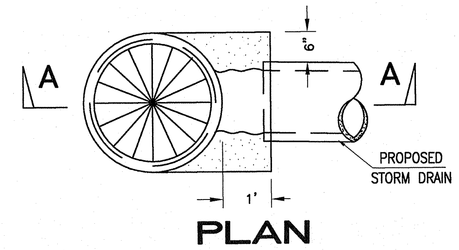


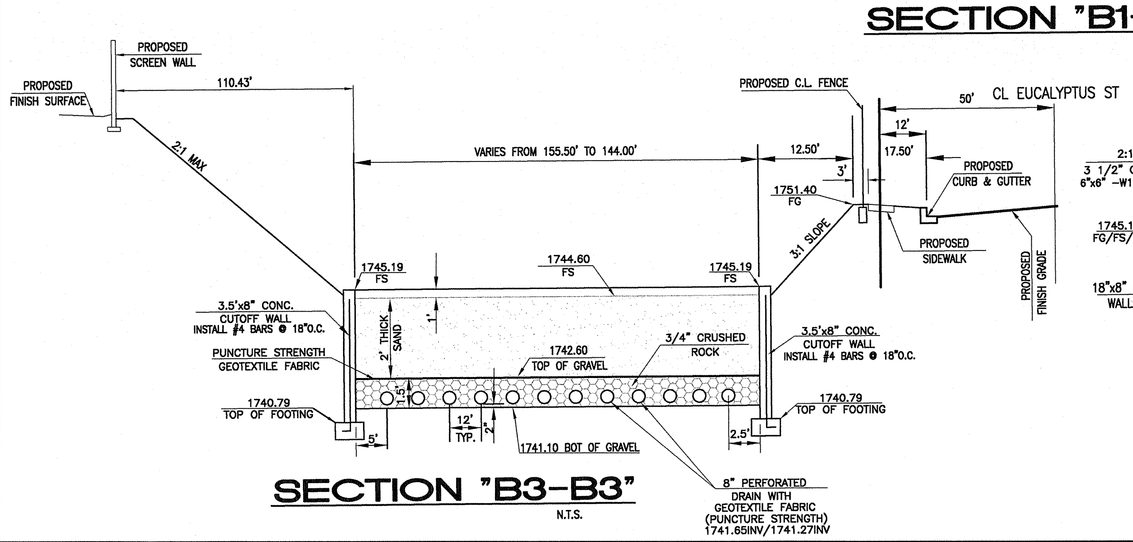
BASIN "1" RISER DETAIL
N.T.S.

GEOTEXTILE FABRIC SPECIFICATIONS

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
MATERIAL			NONWOVEN GEOTEXTILE FABRIC
UNIT WEIGHT		OZ/YD^2	8 (MINIMUM)
FILTRATION RATE		IN/SEC.	0.08 (MINIMUM)
PUNCTURE STRENGTH	ASTM D-751 (MODIFIED)	LB.	125 (MINIMUM)
MULLEN BURST STRENGTH	ASTM D-751	PSI	400 (MINIMUM)
TENSILE STRENGTH	ASTM D-1682	LB.	300 (MINIMUM)
EQUIVALENT OPENING SIZE	US STANDARD SIEVE	NO.	80 (MINIMUM)

DRAINAGE MATTING SPECIFICATIONS

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
MATERIAL			NONWOVEN GEOTEXTILE FABRIC
UNIT WEIGHT		OZ/YD^2	20
FLOW RATE (FABRIC)		GPM/FT^2	180 (MINIMUM)
PERMEABILITY	ASTM D-2434	CM/SEC.	12.4×10^{-2}
GRAB STRENGTH (FABRIC)	ASTM D-1682	LB.	DRY LG. 90 DRY WD. 70 WET LG. 95 WET WD. 70
PUNCTURE STRENGTH	COE CW-02215	LB.	42 (MINIMUM)
MULLEN BURST STRENGTH	ASTM D-1117	PSI	140 (MINIMUM)
EQUIVALENT OPENING SIZE	US STANDARD SIEVE	NO.	100 (70-120)
FLOW RATE (DRAINAGE CORE)	DREXEL UNIV. TEST METHOD	GPM/FT. WIDTH	14



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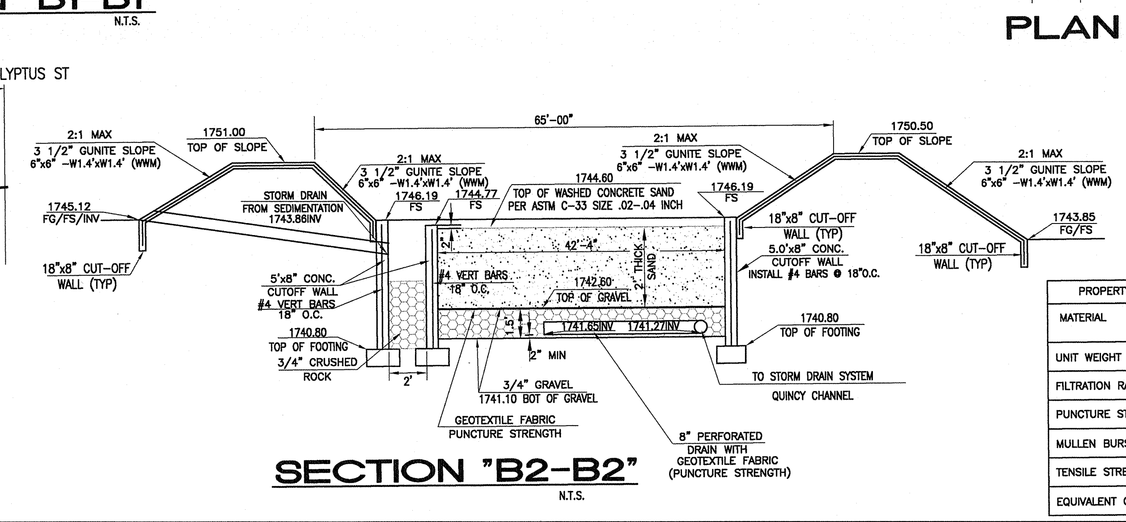

SECTION "B2-B2"
N.T.S.

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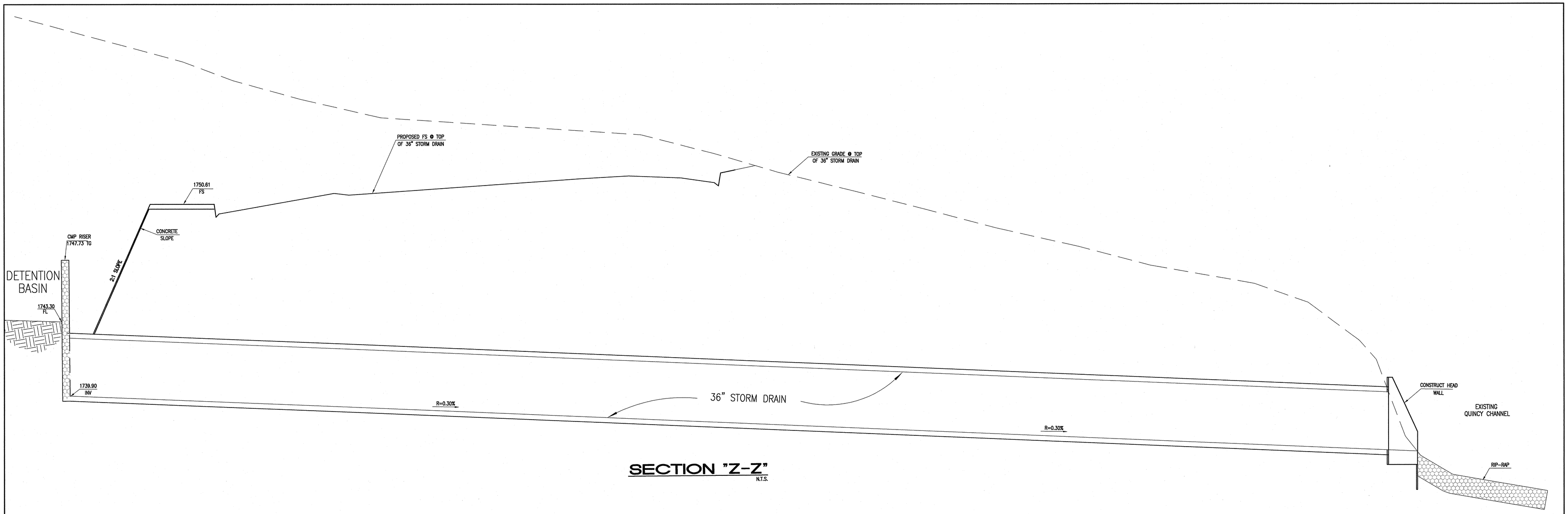
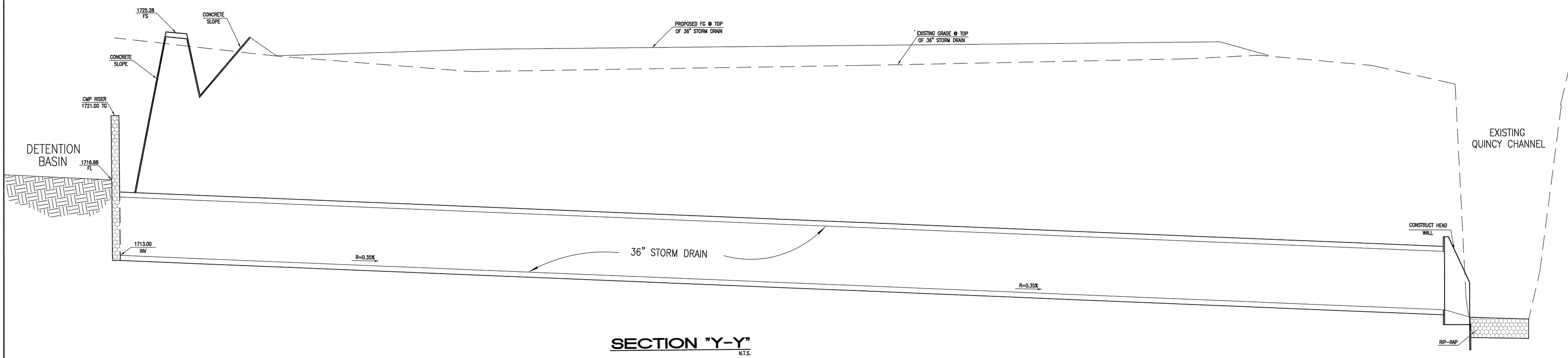
SHEET 3 NO. 4

CITY I. D. NO.



SECTION "Z-Z"
N.T.S.



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N.T.S.

Last Update: 8/15/09
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CITY OF MORENO VALLEY

"DETAIL SHEET"

FOR

MORENO VALLEY-EUCALYPTUS

S/O 60 FREEWAY BETWEEN PETTIT ST. AND QUINCY ST.

ACCT. NO.

SHEET 4 NO. 4

CITY I. D. NO.