# Appendix J

# Preliminary Drainage Study

# Sapphire

Prepared: August 28, 2019

PREPARED FOR

**Murrieta Development II, LLC**

23656 Bellwood Court
Murrieta, CA 92265


PROJECT ENGINEER

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PREPARED BY

Lundstrom
Engineering and Surveying, Inc.

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# Section 1. Project Information

## *1.1. Project Description*

### 1.1.1 Project Location

The project site is located at the northwesterly intersection of State Highway 215 and Linnel Lane, in the City of Murrieta, California. Exhibit A provides a vicinity map depicting the site location.

### 1.1.2 Project Description

The 15.8 acre project proposes a hotel, event center, common recreational area, and rough graded pads for future development, in four separate lots. Frontage street improvement are proposed along the northern half of Linnel Lane.

## *1.2. Hydrologic Setting*

This section summarizes the project's size and location in the context of the larger watershed perspective, topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, and other relevant hydrologic and environmental factors to be protected specific to the project area's watershed.

### 1.2.1 Watershed

The project site is located in the Murreita sub-watershed (HSA 902.32), which is part of the Santa Margarita watershed.

### 1.2.2 Topography

The project site topography has a moderate slope of 6% from northwest to southeast. Elevation range from north to south is approximately 1600 msl to 1550 msl, over a distance of 800-feet.

### 1.2.3 Soil and Vegetation Conditions

According to Plate C-1.52 (Murrieta) from the RCFC & WCD Hydrology Manual, the soils within the project boundaries consist of type C soils.

### 1.2.4 Existing Drainage Patterns and Facilities (Narrative)

Approximately 54 acres of steep hill side, drains through the project site in two separate drainage courses. Approximately 67.3 cfs (Q100) drains to an existing public 48" RCP storm drain headwall located along the southerly edge of the property; 78.5cfs (Q100) drains an existing 48" RCP storm drain headwall located along the southeasterly corner of the property.

### *1.3. Proposed Runoff Management Facilities*

The proposed facilities managing runoff from the site include:

- Appropriate grading of pads to direct runoff away from structures on the site.
- Proposed bypass storm drain to route upstream run-on through the site, connecting directly to the existing storm drain in Linnel Lane.
- Install new public curb inlet on Linnel Lane and stormwater infiltration trench to accommodate road widening.
- Proposed on-site storm drain to collect and convey project runoff to the proposed infiltration basin for stormwater mitigation.

# Section 2. Design Criteria and Methodology

This section summarizes the design criteria and methodology applied during drainage analysis of the project site. The design criteria and methodology follow the Riverside County Flood Control and Water Conservation District Hydrology Manual.

## *2.1. Hydrologic Design Methodology*

### 2.1.1 Rational Method: Peak Flow

Runoff calculations for this study were accomplished using the Rational Method. The Rational Method is a physically-based numerical method where runoff is assumed to be directly proportional to rainfall and area, less losses for infiltration and depression storage. Flows were computed based on the Rational formula:

$$Q = C\,i\,A$$

where ... $Q$ = Peak discharge (cfs);
$C$ = runoff coefficient, based on land use and soil type;
$i$ = rainfall intensity (in/hr);
$A$ = watershed area (acre)

The runoff coefficient represents the ratio of rainfall that runs off the watershed versus the portion that infiltrates to the soil or is held in depression storage. The runoff coefficient is dependent on the land use coverage, soil type and rain fall intensity. Plate D-1 of the Riverside County Flood Control & WCD Hydrology Manual gives step-by-step instructions for this method.

Rational Method calculations were accomplished using the Advanced Engineering Software Rational Method Analysis (Southern California County Methods) (AES-RATSCx) computer software package. Peak discharges were computed for 100-year, and 10-year hypothetical storm return frequencies. Rainfall intensity was calculated using The Standard Intensity-Duration Curves located on Plate D-4.1 (pg 4) for Murrieta. The results of this analysis are contained in **Appendix B** of this report.

# Section 3. Characterization of Project Runoff

This section characterizes the quantities and location of storm water runoff from the project site and the pollutants that might potentially be present in the runoff from the project site.

## *3.1. Hydrologic Effects of Project*

In the full buildout condition, the project will add approximately 12.64 acres of impervious area (75 percent of the project site) in the form of rooftops, streets, and access roads. **Table 3-1** summarizes the hydrologic effects of the project at the project outfall on Linnel Lane.

**Table 3-1** Summary of Onsite Hydrology Analysis

| Tributary Area Existing/Proposed (acre) / (acre) | | 100-Year Existing/Proposed (cfs)/(cfs) | |
|---|---|---|---|
| **71.0** | **71.0** | **156.6** | **136.3 (mitigate)** |

# Section 4. Summary and Conclusions

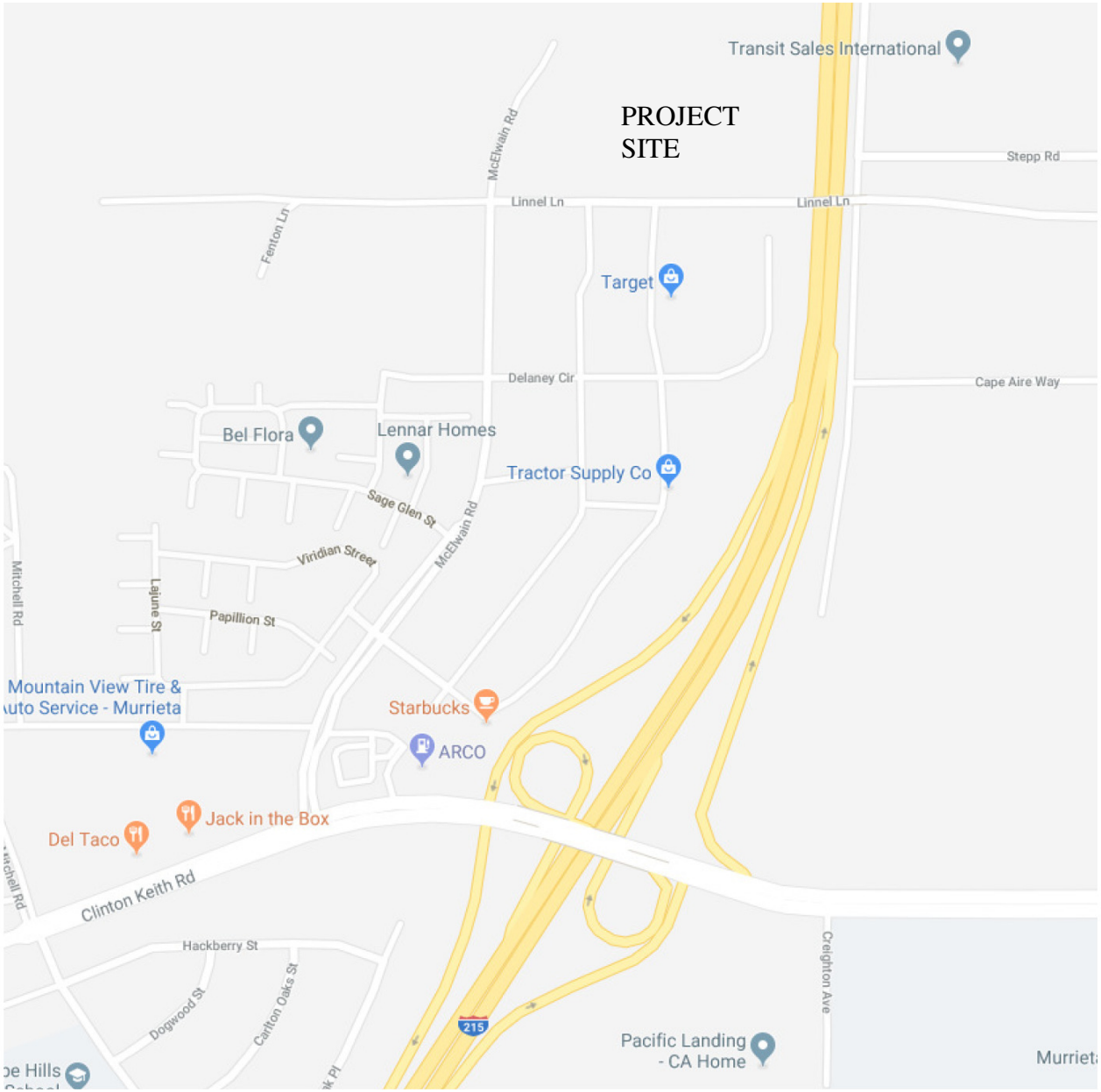
This hydrology and hydraulic study has evaluated the potential effects on runoff of the proposed project. In addition, the report has addressed the methodology used to analyze the pre- and post-construction condition, which was based on the Riverside County Flood Control and Water Conservation District Hydrology Manual. This section provides a summary discussion that evaluates the potential effects of the proposed project.

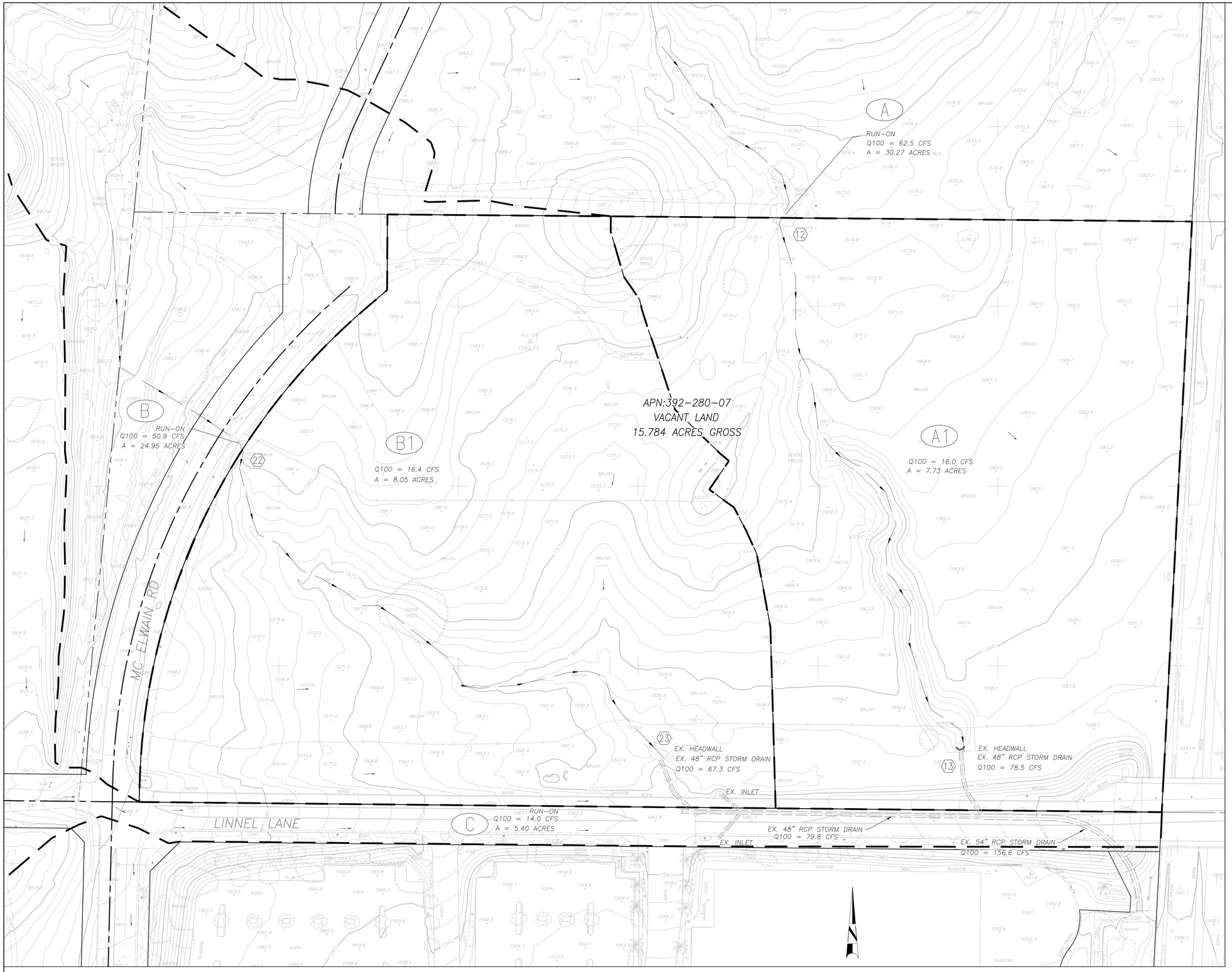
- The Rational Method results illustrate that there will be an increase in flow rate from the proposed development. The proposed infiltration basin will also be designed to function as a detention facility to mitigate the proposed flow rates.
- The project will not negatively impact downstream drainage conditions.

# Section 5. References

*Riverside County Flood Control and Water Conservation District Hydrology Manual* prepared under the direction of John W. Bryant, Chief Engineer RCFC&WCD, dated April 1978

# EXHIBITS


PROJECT
SITE
Transit Sales International
Stepp Rd
McElwain Rd
Linnel Ln
Linnel Ln
Fenton Ln
Target
Delaney Cir
Cape Aire Way
Bel Flora
Lennar Homes
Tractor Supply Co
Sage Glen St
McElwain Rd
Viridian Street
Mitchell Rd
Lajune St
Papillion St
Mountain View Tire &
uto Service - Murrieta
Starbucks
ARCO
Jack in the Box
Del Taco
Clinton Keith Rd
Hackberry St
Dogwood St
Carlton Oaks St
215
Creighton Ave
Pacific Landing
- CA Home
Murrieta



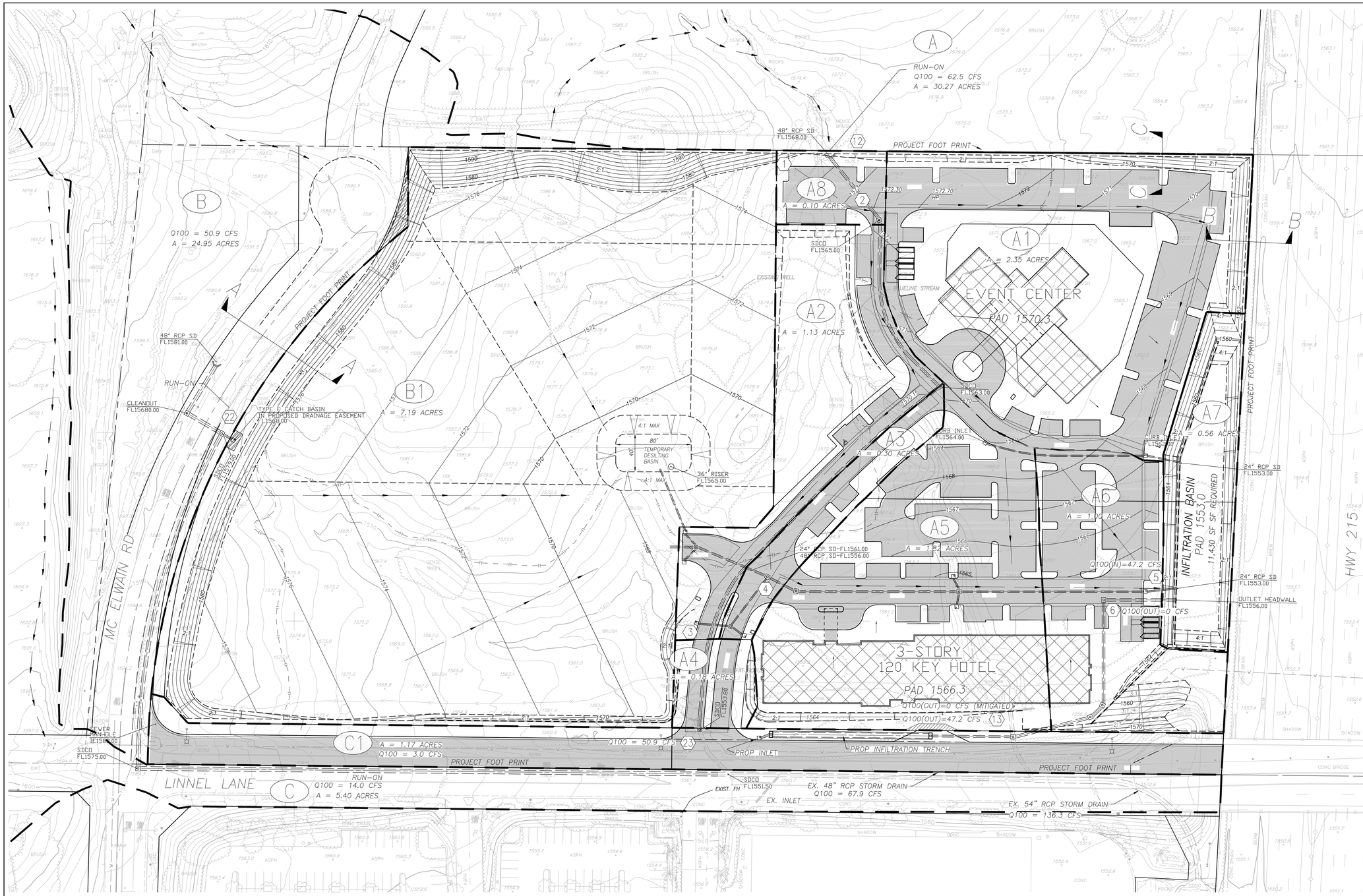

## LEGEND

- BASIN NUMBER (1)
- AES NODE NUMBER (1)
- BASIN LIMITS
- DIRECTION OF FLOW
- EXISTING STORM DRAIN

50 0 50 100 150

SCALE: 1"=50'

# EXISTING CONDITION DRAINAGE MAP




## LEGEND

- DMA NUMBER
- AES NODE NUMBER
- DMA LIMITS
- DIRECTION OF FLOW
- PROPOSED STORM DRAIN
- PROPOSED IMPERVIOUS PAVEMENT
- PROPOSED ROOF AREA
- PROPOSED LANDSCAPE AREA
- INLET WITH TRASH FILTER INSERT

## SITE DESIGN BMPS

MINIMIZE IMPERVIOUS AREA: RESIDENTIAL STREETS ARE AT THE MINIMUM REQUIRED WIDTH PER COUNTY STANDARDS.

MINIMIZE SOIL COMPACTION: RE-TILL SOILS COMPACTED BY CONSTRUCTION VEHICLES. COLLECT AND RE-USE UPPER SOIL LAYERS DEVELOPMENT SITE CONTAINING ORGANIC MATERIALS.

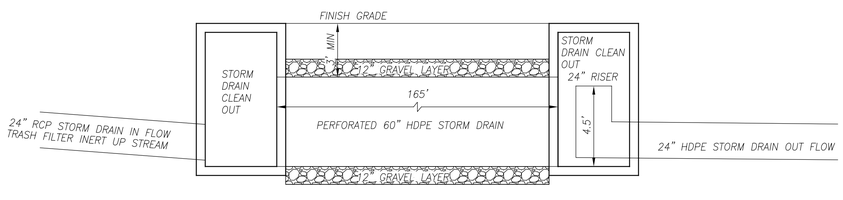
RUNOFF FROM IMPERVIOUS AREAS DRAIN TO STRUCTURAL BMPs

LANDSCAPING WITH DROUGHT TOLERANT SPECIES

RUNOFF FROM WALKS AND ROOF DRAIN DOWNSPOUTS SHALL DISCHARGE ONTO SPLASH BLOCKS AND FLOW THROUGH ADJACENT LANDSCAPE AREA BEFORE ENTERING INFILTRATION BASIN

## SOURCE CONTROL BMPs

| SOURCE CONTROL BMPS | PROJECT IMPLEMENTATION |
|---|---|
| STORM DRAIN INLETS | MARK ALL INLETS WITH THE WORDS "NO DUMPING! DRAINS TO WATERWAYS" IN ENGLISH AND "NO CONTAMINE" IN SPANISH. MAINTAIN AND PERIODICALLY REPLACE INLET MARKINGS.<br><br>SEE APPLICABLE OPERATIONAL BMPS IN CASQA FACT SHEET SC-44, "DRAINAGE SYSTEM MAINTENANCE." |
| LANDSCAPE/OUTDOOR PESTICIDE USE | LANDSCAPE HAS BEEN DESIGNED PER CITY OF SAN SAN DIEGO LANDSCAPE STANDARDS TO MINIMIZE IRRIGATION AND RUNOFF, AND TO MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES THAT CAN CONTRIBUTE TO STORMWATER POLLUTION. SEE APPLICABLE BMPS IN CASQA FACT SHEETS SC-41, "BUILDING AND GROUNDS MAINTENANCE." |
| TRASH ENCLOSURES | STORAGE AREA IS PAVED WITH CONCRETE AND DESIGN NOT TO ALLOW RUN-ON FROM ADJOINING AREAS, WALLED AND CONTAINS A ROOF. SIGNS ON DUMPSTER WITH THE WORDS "DO NOT DUMP HAZARDOUS MATERIAL HERE" OR SIMILAR APPROVED BY CITY. SEE CASQA FACT SHEET SC-34, "WASTE HANDLING AND DISPOSAL." |
| FIRE SPRINKLER TEST WATER | SEE CASQA FACT SHEET SC-41, "BUILDING AND GROUNDS MAINTENANCE." SEE BUILDING PLAN DRAWING NO. PC 1237 SHEETS PA2.2, PB2.2, PC2.2, PD2.2, PE2.2, & PF2.2, FOR FIRE SPRINKLER LOCATIONS. |
| PLAZAS, SIDEWALKS, AND PARKING LOTS | PLAZAS, SIDEWALKS, AND PARKING LOTS SHALL BE SWEPT REGULARLY AND ONCE PRIOR TO OCTOBER 1ST TO PREVENT THE ACCUMULATION OF LITTER AND DEBRIS. SEE CASQA FACT SHEET SC-41, "BUILDING AND GROUNDS MAINTENANCE." |




INFILTRATION TRENCH W/ 60" PIPE

50 0 50 100 150

SCALE: 1"=50'

# PROPOSED CONDITION DRAINAGE MAP
# WQMP SITE PLAN

# APPENDIX A
## Hydrologic Information

# APPENDIX B
## Drainage Calculations

### This Section Contains:

- Existing Hydrology Analysis
  100 yr Analysis
- Proposed Hydrology Analysis
  100 yr Analysis

# Existing Hydrology Analysis

# Linnel Lane

## Murrieta, CALIFORNIA

# Hydrology / Hydraulics Report

*Prepared For:*

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Data from the Manual
10- and 100-year Rational Output

Appendix B: Hydraulic Calculations
Catchbasin Sizing
WSPG Input/Output (HGL Calculations)

## I. INTRODUCTION

The proposed project is located in the City of Murrieta, Riverside County, California. The street is situated north of The Orchard-Stone Creek. Figure 1 shows the location of this project.

This study specifically accomplishes the following tasks:

- Determine the peak developed onsite 10-year and 100-year runoff.
- Design a storm drain system to convey the 100-year flows.

## II. HYDROLOGIC METHODOLOGY

The methodology presented in this study is in compliance with the RCFC&WCD 1978 Hydrology Manual (Reference 1, hereinafter referred to as the Manual).

**Model Descriptions** -The Integrated Rational Method Hydrology System Model Version 8.0, dated January 1, 2000, (Reference 2) within the Advanced Engineering Systems Software (AES) was used to generate the peak 10-year and 100-year onsite flows. The AES *Hydraulic Elements Program Package (HELE1)* (Reference 3) was used to size the catch basins, which were designed to intercept the entire 100-year flow. The Los Angeles County Flood Control District's *Water Surface Pressure Gradient* (WSPG) computer program (Reference 4) was used to determine the hydraulic grade lines (HGL) in the storm drains.

**Soil Type** - The Manual utilizes the Soil Conservation Service (SCS) soil classification system, which classifies soils into four (4) hydrological groups (HSG): A through D, with D being the least impervious. According to Hydrologic

Soils Group Map, this project lies within HSG "C." A copy of the HSG Map is included in Appendix A.

**Development Type**- The proposed development was based on commercial development.

**Intensity**-The10-minute / 60-minute intensity values (inches/hour) for the 10-year and 100-year storm events, obtained from Plate D-4.1 (4 of 6) of the Manual, are 2.36/0.88 and 3.48/1.30, respectively. A copy of the above-mentioned plate is included in Appendix A.

**Drainage Areas and Flow Patterns** - The drainage areas and flow patterns were determined using the Street Improvement Plans. The areas were measured using the computer capabilities of AutoCAD.

## III. HYDROLOGIC ANALYSIS - PROPOSED CONDITIONS

This study is for Linnel Lane and upstream property that will drain into proposed storm drain that goes to The Orchard – Stone Creek.

The total 100-year flows in storm drain to proposed 54" storm drain is 152.8 cfs. The hydraulic grade line, calculated for the storm drain profiles, indicate no adverse hydraulic impacts. The supporting WSPG input and output files are also included in Appendix B.

## IV. CONCLUSIONS

1. Methodology used in this report is in compliance with the Riverside County Flood Control and Water Conservation District (RCFC&WCD)

2. There are no adverse hydraulic impacts in the proposed onsite storm drain system.

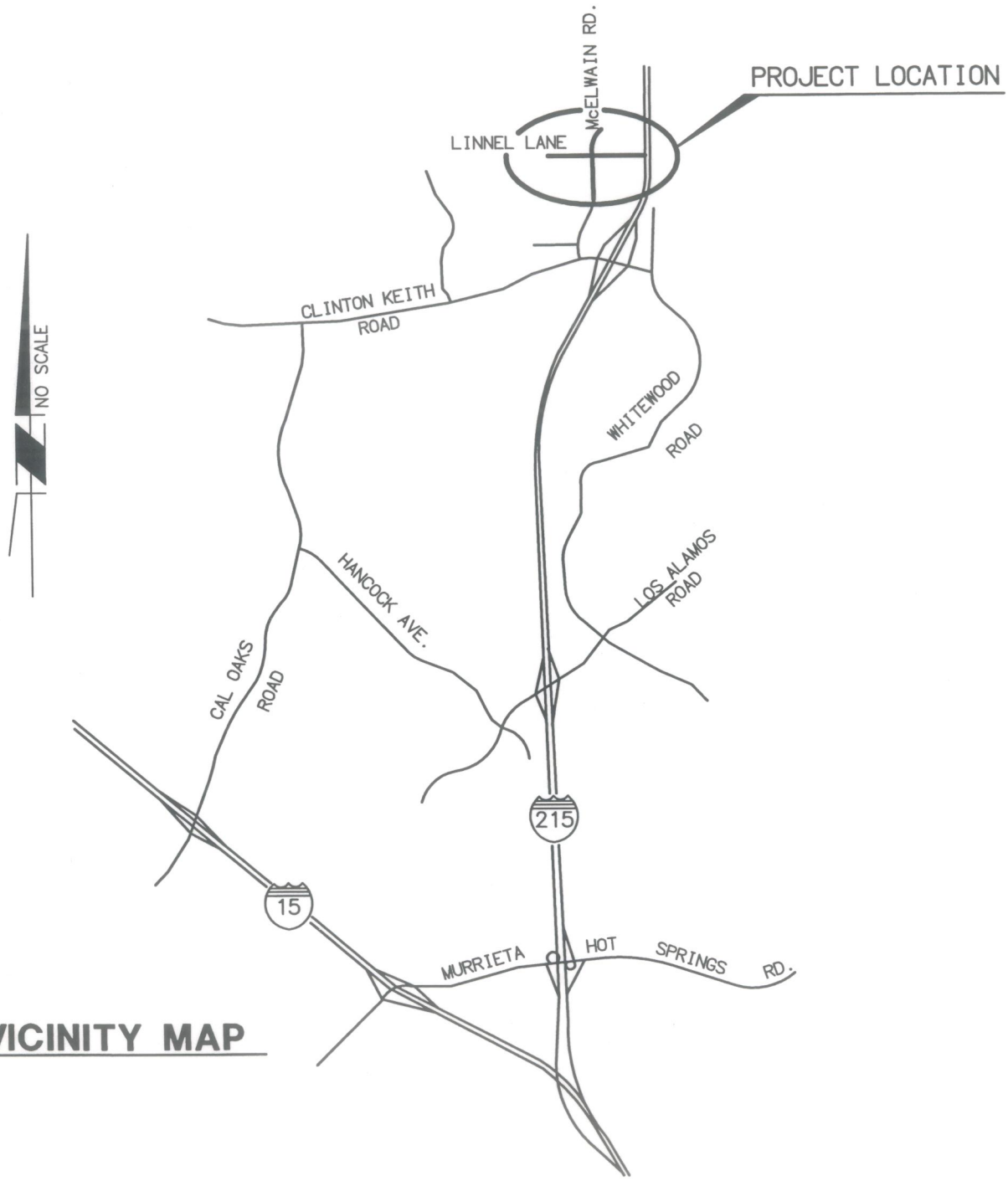
## V. REFERENCES

1. Riverside Flood Control District and Water Conservation District (RCFC&WCD) Hydrology Manual, 1978.

2. Advanced Engineering Systems Software (AES), Rational Method Hydrology System Model Version 8.0, January 1, 2000.

3. Advanced Engineering Systems Software (AES), Hydraulic Elements Program Package (HELE1) Version 8.0, January 1, 2000

4. Los Angeles County Flood Control District, Water Surface Pressure Gradient (WSPG), January 1979.




# VICINITY MAP

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**FIGURE 1**
**Orchard at Stone Creek**
**Hydrologic Soil Group Map**

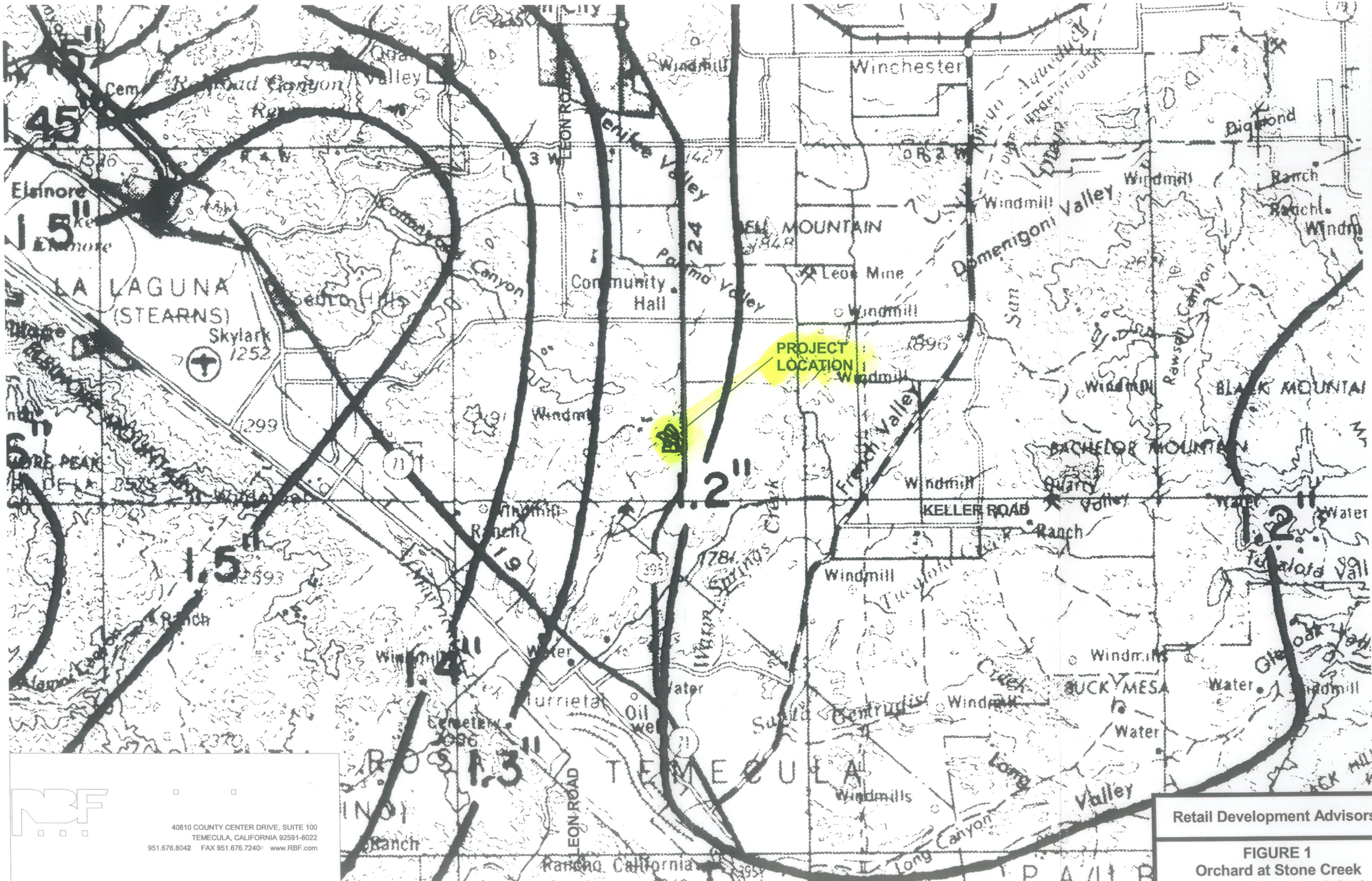


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**FIGURE 1**
**Orchard at Stone Creek**
**100-Year 1-Hour Precipitation**

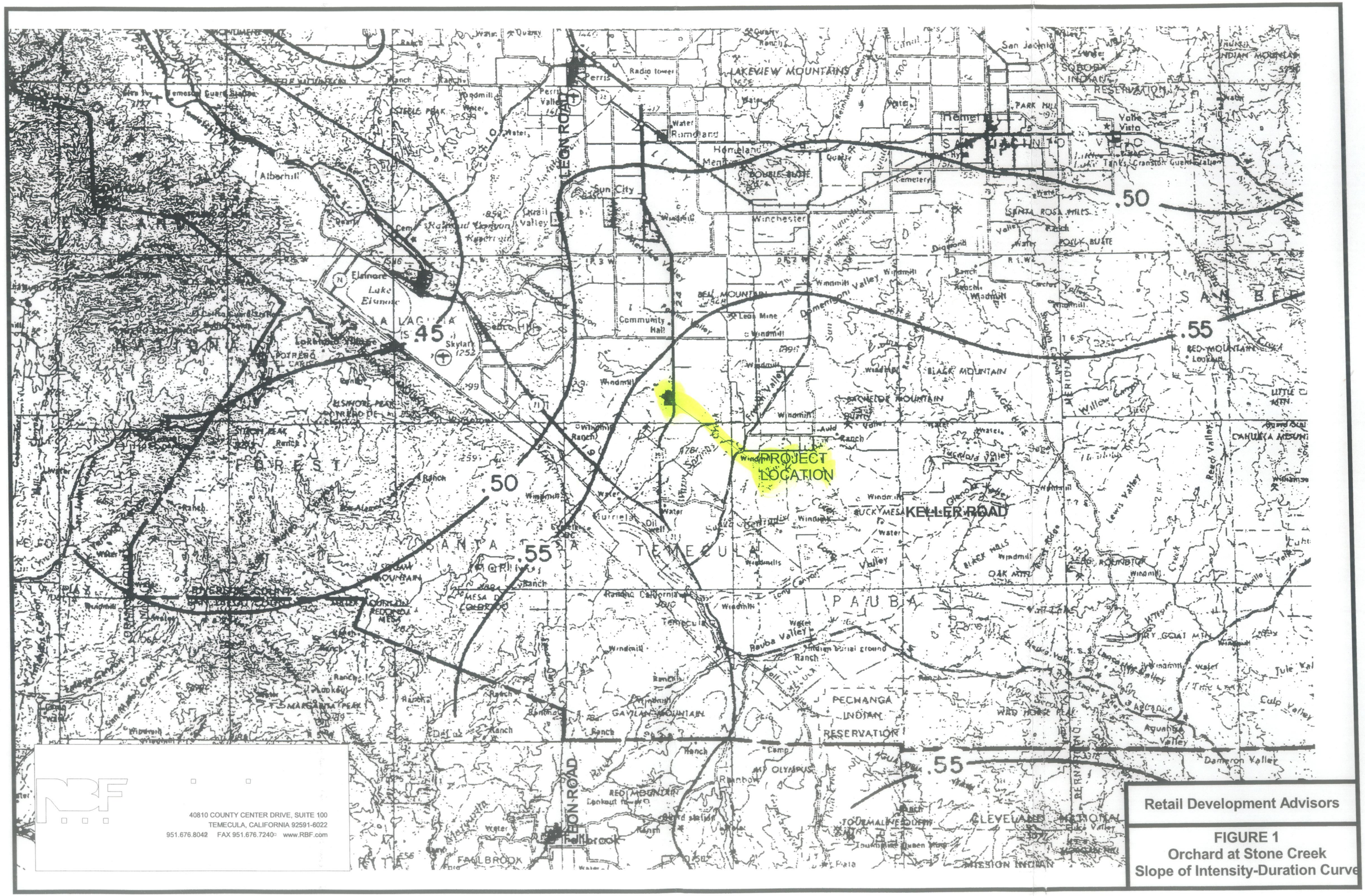


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**FIGURE 1**
**Orchard at Stone Creek**
**Slope of Intensity-Duration Curve**

# Appendix A

## Hydrologic Calculation Backup

LINNEL LANE

- Supporting Data from the RCFC & WCD's Hydrology Manual
- 10- and 100-year Rational Hydrology – Onsite Post-Developed Conditions

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**FIGURE 1**
**Orchard at Stone Creek**
**Hydrology Map**

h:\pdata\15100980\calcs\gis\0980.apr

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
       RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                  (RCFC&WCD)  1978 HYDROLOGY MANUAL
        (c) Copyright 1982-2004 Advanced Engineering Software (aes)
                  (Rational Tabling Version 6.0D)
             Release Date: 01/01/2004  License ID 1264

                      Analysis prepared by:

                         RBF Consulting
                       14725 Alton Parkway
                     Irvine, California  92618


 ************************* DESCRIPTION OF STUDY *************************
* Orchard at Stone Creek                                                 *
* 10-Year Storm                                                          *
* Developed Conditions                                                   *
 ************************************************************************

  FILE NAME: 0980.DAT
  TIME/DATE OF STUDY: 09:05 08/22/2006
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.530
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.200
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.814
  SLOPE OF INTENSITY DURATION CURVE = 0.5500
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21      A-1
----------------------------------------------------------------------------
  >>>>>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(FEET) =   897.00
  UPSTREAM ELEVATION(FEET) =   1964.00
  DOWNSTREAM ELEVATION(FEET) =   1624.00
  ELEVATION DIFFERENCE(FEET) =    340.00
  TC = 0.709*[(  897.00**3)/(   340.00)]**.2 =   13.070
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.881
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6827
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     11.30
  TOTAL AREA(ACRES) =      8.80   TOTAL RUNOFF(CFS) =     11.30

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52      A-2
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1624.00  DOWNSTREAM(FEET) =   1592.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   504.00   CHANNEL SLOPE =  0.0635
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =      11.30
  FLOW VELOCITY(FEET/SEC) =   6.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =  14.36
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =  1401.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.786
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6740
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    6.80   SUBAREA RUNOFF(CFS) =    8.19
  TOTAL AREA(ACRES) =     15.60   TOTAL RUNOFF(CFS) =   19.49
  TC(MIN.) =  14.36

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.786
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8774
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    5.60   SUBAREA RUNOFF(CFS) =    8.78
  TOTAL AREA(ACRES) =     21.20   TOTAL RUNOFF(CFS) =   28.27
  TC(MIN.) =  14.36

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  52   A-3
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1592.00  DOWNSTREAM(FEET) =   1552.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1182.00   CHANNEL SLOPE =  0.0338
  CHANNEL FLOW THRU SUBAREA(CFS) =     28.27
  FLOW VELOCITY(FEET/SEC) =   6.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.25   Tc(MIN.) =  17.61
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =  2583.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.597
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6545
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    3.60   SUBAREA RUNOFF(CFS) =    3.76
  TOTAL AREA(ACRES) =     24.80   TOTAL RUNOFF(CFS) =   32.03
  TC(MIN.) =  17.61

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.597
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8754
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =   13.20   SUBAREA RUNOFF(CFS) =   18.45
  TOTAL AREA(ACRES) =     38.00   TOTAL RUNOFF(CFS) =   50.48
  TC(MIN.) =  17.61

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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.) =  17.61
  RAINFALL INTENSITY(INCH/HR) =   1.60
  TOTAL STREAM AREA(ACRES) =    38.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     50.48

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

B-1

```
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 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(FEET) =   998.00
  UPSTREAM ELEVATION(FEET) =   1900.00
  DOWNSTREAM ELEVATION(FEET) =   1620.00
  ELEVATION DIFFERENCE(FEET) =    280.00
  TC = 0.709*[(  998.00**3)/(   280.00)]**.2 =   14.486
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.778
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6732
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     10.77
  TOTAL AREA(ACRES) =       9.00   TOTAL RUNOFF(CFS) =     10.77
**********************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  52
----------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1620.00  DOWNSTREAM(FEET) =   1584.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   501.00   CHANNEL SLOPE =  0.0719
  CHANNEL FLOW THRU SUBAREA(CFS) =     10.77
  FLOW VELOCITY(FEET/SEC) =   6.83 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =  15.71
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =  1499.00 FEET.
**********************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.700
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6655
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    3.30   SUBAREA RUNOFF(CFS) =    3.73
  TOTAL AREA(ACRES) =     12.30   TOTAL RUNOFF(CFS) =   14.51
  TC(MIN.) =  15.71
**********************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.700
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8766
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    5.70   SUBAREA RUNOFF(CFS) =    8.50
  TOTAL AREA(ACRES) =     18.00   TOTAL RUNOFF(CFS) =   23.00
  TC(MIN.) =  15.71
**********************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1584.00  DOWNSTREAM(FEET) =   1554.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   786.00   CHANNEL SLOPE =  0.0382
  CHANNEL FLOW THRU SUBAREA(CFS) =     23.00
  FLOW VELOCITY(FEET/SEC) =   6.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.15   Tc(MIN.) =  17.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =  2285.00 FEET.
**********************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.584
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8753
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =   15.00   SUBAREA RUNOFF(CFS) =   20.80
  TOTAL AREA(ACRES) =     33.00   TOTAL RUNOFF(CFS) =   43.81
  TC(MIN.) =  17.86
```

B-2

B-3

```
****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1554.00  DOWNSTREAM(FEET) =  1552.00
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.77
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     43.81
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =  18.59
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     13.00 =  2625.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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.) =  18.59
  RAINFALL INTENSITY(INCH/HR) =   1.55
  TOTAL STREAM AREA(ACRES) =    33.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.81

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       50.48    17.61        1.597        38.00
     2       43.81    18.59        1.550        33.00

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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       91.98    17.61       1.597
     2       92.81    18.59       1.550

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     91.98   Tc(MIN.) =   17.61
  TOTAL AREA(ACRES) =     71.00
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     13.00 =  2625.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     71.00  TC(MIN.) =     17.61
  PEAK FLOW RATE(CFS)    =     91.98
============================================================================
============================================================================
  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 1982-2004 Advanced Engineering Software (aes)
                  (Rational Tabling Version 6.0D)
             Release Date: 01/01/2004  License ID 1264

                     Analysis prepared by:

                         RBF Consulting
                       14725 Alton Parkway
                     Irvine, California  92618


 ************************** DESCRIPTION OF STUDY **************************
* Orchard at Stone Creek                                                   *
* 100-Year Storm                                                           *
* Developed Conditions                                                     *
 ****************************************************************************

  FILE NAME: 0980.DAT
  TIME/DATE OF STUDY: 09:04 08/22/2006
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.530
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.200
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5500
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21     A-1
----------------------------------------------------------------------------
  >>>>>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(FEET) =   897.00
  UPSTREAM ELEVATION(FEET) =   1964.00
  DOWNSTREAM ELEVATION(FEET) =   1624.00
  ELEVATION DIFFERENCE(FEET) =    340.00
  TC = 0.709*[(  897.00**3)/(   340.00)]**.2 =   13.070
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.775
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7402
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     18.07
  TOTAL AREA(ACRES) =      8.80  TOTAL RUNOFF(CFS) =     18.07

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  52     A-2
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1624.00  DOWNSTREAM(FEET) =   1592.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   504.00   CHANNEL SLOPE =  0.0635
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =      18.07
  FLOW VELOCITY(FEET/SEC) =   7.35 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.14   Tc(MIN.) =  14.21
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =  1401.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.650
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7340
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    6.80   SUBAREA RUNOFF(CFS) =   13.23
  TOTAL AREA(ACRES) =     15.60   TOTAL RUNOFF(CFS) =   31.30
  TC(MIN.) =  14.21

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.650
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8834
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    5.60   SUBAREA RUNOFF(CFS) =   13.11
  TOTAL AREA(ACRES) =     21.20   TOTAL RUNOFF(CFS) =   44.41
  TC(MIN.) =  14.21

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1592.00  DOWNSTREAM(FEET) =   1552.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1182.00   CHANNEL SLOPE =  0.0338
  CHANNEL FLOW THRU SUBAREA(CFS) =     44.41
  FLOW VELOCITY(FEET/SEC) =   6.88 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.86   Tc(MIN.) =  17.08
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =  2583.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.395
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7199
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    3.60   SUBAREA RUNOFF(CFS) =    6.21
  TOTAL AREA(ACRES) =     24.80   TOTAL RUNOFF(CFS) =   50.62
  TC(MIN.) =  17.08

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.395
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8820
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =   13.20   SUBAREA RUNOFF(CFS) =   27.89
  TOTAL AREA(ACRES) =     38.00   TOTAL RUNOFF(CFS) =   78.50
  TC(MIN.) =  17.08

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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.) =  17.08
  RAINFALL INTENSITY(INCH/HR) =   2.40
  TOTAL STREAM AREA(ACRES) =    38.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     78.50

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

6.8
+5.6
12.4 ✓

D-3

3.6
13.2
16.8 ✓

```
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 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(FEET) =   998.00
  UPSTREAM ELEVATION(FEET) =   1900.00
  DOWNSTREAM ELEVATION(FEET) =   1620.00
  ELEVATION DIFFERENCE(FEET) =    280.00
  TC = 0.709*[(  998.00**3)/(   280.00)]**.2 =   14.486
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.622
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7326
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     17.29
  TOTAL AREA(ACRES) =      9.00   TOTAL RUNOFF(CFS) =     17.29

**********************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  52
----------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1620.00  DOWNSTREAM(FEET) =   1584.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   501.00   CHANNEL SLOPE =  0.0719
  CHANNEL FLOW THRU SUBAREA(CFS) =     17.29
  FLOW VELOCITY(FEET/SEC) =   7.72 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =  15.57
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =  1499.00 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.520
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7272
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =     3.30   SUBAREA RUNOFF(CFS) =     6.05
  TOTAL AREA(ACRES) =     12.30   TOTAL RUNOFF(CFS) =    23.34
  TC(MIN.) =  15.57

**********************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.520
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8827
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =     5.70   SUBAREA RUNOFF(CFS) =    12.68
  TOTAL AREA(ACRES) =     18.00   TOTAL RUNOFF(CFS) =    36.02
  TC(MIN.) =  15.57

**********************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1584.00  DOWNSTREAM(FEET) =   1554.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   786.00   CHANNEL SLOPE =  0.0382
  CHANNEL FLOW THRU SUBAREA(CFS) =     36.02
  FLOW VELOCITY(FEET/SEC) =   6.89 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.90   Tc(MIN.) =  17.47
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =  2285.00 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.365
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8818
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    15.00   SUBAREA RUNOFF(CFS) =    31.29
  TOTAL AREA(ACRES) =     33.00   TOTAL RUNOFF(CFS) =    67.31
  TC(MIN.) =  17.47
```

B-1

B-2

3.3
+5.7
9.0 ac

B-3

```
****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1554.00  DOWNSTREAM(FEET) =  1552.00
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.63
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     67.31
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =  18.13
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     13.00 =  2625.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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.) =  18.13
  RAINFALL INTENSITY(INCH/HR) =   2.32
  TOTAL STREAM AREA(ACRES) =    33.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     67.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        78.50    17.08       2.395         38.00
     2        67.31    18.13       2.318         33.00

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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       141.91    17.08       2.395
     2       143.27    18.13       2.318

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    141.91   Tc(MIN.) =   17.08
  TOTAL AREA(ACRES) =     71.00
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     13.00 =  2625.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     71.00  TC(MIN.) =     17.08
  PEAK FLOW RATE(CFS)    =    141.91
============================================================================
============================================================================
  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 1982-2001 Advanced Engineering Software (aes)
                    (Rational Tabling Version 5.9D)
                 Release Date: 01/01/2001  License ID 1264

                         Analysis prepared by:

                            RBF Consulting
                          14725 Alton Parkway
                           Irvine, CA  92618


 ************************** DESCRIPTION OF STUDY **************************
* ORCHARD AT STONE CREEK                                                   *
* 100 YEAR STORM                                                           *
* LINNEL LANE                                                              *
 ****************************************************************************

  FILE NAME: LINNEL.DAT
  TIME/DATE OF STUDY: 17:56 10/04/2006
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.530
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.200
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5500
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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     30.00 TO NODE     31.00 IS CODE =  21    C-1
----------------------------------------------------------------------------
  >>>>>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 =   570.00
 UPSTREAM ELEVATION =   1700.00
 DOWNSTREAM ELEVATION =   1593.13
 ELEVATION DIFFERENCE =    106.87
 TC = 0.533*[(  570.00**3)/(   106.87)]**.2 =    9.422
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.322
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7625
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      6.59
 TOTAL AREA(ACRES) =      2.60   TOTAL RUNOFF(CFS) =      6.59

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  61    C-2
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1593.13  DOWNSTREAM ELEVATION(FEET) = 1560.35
 STREET LENGTH(FEET) =   725.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 44.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  30.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.080

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.52
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.44
   HALFSTREET FLOOD WIDTH(FEET) =    4.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.07
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.09
 STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =  11.13
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.031
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.88
 TOTAL AREA(ACRES) =    3.30        PEAK FLOW RATE(CFS) =       8.46

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =   5.22
 FLOW VELOCITY(FEET/SEC.) =  7.29   DEPTH*VELOCITY(FT*FT/SEC.) =   3.33
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =  1295.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =  81    C-3
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.031
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.88
 TOTAL AREA(ACRES) =     4.00   TOTAL RUNOFF(CFS) =   10.34
 TC(MIN) =  11.13
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1555.31  DOWNSTREAM(FEET) =  1551.59
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     10.34
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =  11.17
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =  1330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81      C-4
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.025
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.87
  TOTAL AREA(ACRES) =     4.70   TOTAL RUNOFF(CFS) =   12.22
  TC(MIN) =  11.17

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81      C-5
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.025
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.87
  TOTAL AREA(ACRES) =     5.40   TOTAL RUNOFF(CFS) =   14.09
  TC(MIN) =  11.17

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 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.) =  11.17
  RAINFALL INTENSITY(INCH/HR) =   3.03
  TOTAL STREAM AREA(ACRES) =    5.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.09

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   7      B-3
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  17.47   RAIN INTENSITY(INCH/HOUR) =  2.37
  TOTAL AREA(ACRES) =    33.00   TOTAL RUNOFF(CFS) =     67.31
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 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.) =  17.47
  RAINFALL INTENSITY(INCH/HR) =   2.37
  TOTAL STREAM AREA(ACRES) =   33.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     67.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1       14.09    11.17        3.025         5.40
     2       67.31    17.47        2.365        33.00

 ***********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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       57.12    11.17        3.025
     2       78.33    17.47        2.365

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     78.33   Tc(MIN.) =   17.47
  TOTAL AREA(ACRES) =     38.40
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =  1330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1550.66  DOWNSTREAM(FEET) =  1549.29
  FLOW LENGTH(FEET) =   273.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.38
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     78.33
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =  18.01
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     13.00 =  1603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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.) =  18.01
RAINFALL INTENSITY(INCH/HR) =   2.33
TOTAL STREAM AREA(ACRES) =   38.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =     78.33

****************************************************************************
FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   7   A-3
----------------------------------------------------------------------------
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) =  17.08   RAIN INTENSITY(INCH/HOUR) =  2.39
TOTAL AREA(ACRES) =    38.00   TOTAL RUNOFF(CFS) =     78.50

****************************************************************************
FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 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.) =  17.08
RAINFALL INTENSITY(INCH/HR) =   2.39
TOTAL STREAM AREA(ACRES) =   38.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =     78.50

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
   1        78.33    18.01       2.326        38.40
   2        78.50    17.08       2.395        38.00

*********************************WARNING*********************************
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****************************************************************************

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       152.77    17.08       2.395
   2       154.56    18.01       2.326

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    152.77   Tc(MIN.) =   17.08
TOTAL AREA(ACRES) =     76.40
LONGEST FLOWPATH FROM NODE     30.00 TO NODE     13.00 =  1603.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =     76.40  TC(MIN.) =     17.08
PEAK FLOW RATE(CFS)    =    152.77
============================================================================
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

# Appendix B

## Hydraulic Calculation Backup

## Linnel Lane

- Catch Basin Calculations
- WSPG Input/Output Models

```
0
T1 LINE A
T2 LINNEL LANE
T3 FILE:980A2   QFILE:980A2Q
SO    842.351548.00  9
R     879.141548.18  9      .013                                92.32
R    1000.001548.79  9      .013
R    1085.921549.22  9      .013
JX   1087.561549.34  9  8   .013    74.6        1549.49        45.0
TS   1093.981549.76  8
JX   1361.211551.10  8  4  4.013     8.1     2.91552.231552.23 45.0 45.0
R    1415.561551.37  8      .013
SH                   8
CD   1  4              1.00
CD   2  4              1.25
CD   3  4              1.50
CD   4  4              2.00
CD   5  4              2.50
CD   6  4              3.00
CD   7  4              3.50
CD   8  4              4.00
CD   9  4              4.50
CD  10  4              5.00
CD  11  4              5.50
CD  12  3              4.11    7.00
CD  13  3              6.03    7.00
CD  14  3              7.17   24.00
```

□□DATE: 10/ 5/2006
TIME: 17:13

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIERS | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL | ZR | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD | 1 | 4 | | | 1.00 | | | | | | | | | | | | | | |
| CD | 2 | 4 | | | 1.25 | | | | | | | | | | | | | | |
| CD | 3 | 4 | | | 1.50 | | | | | | | | | | | | | | |
| CD | 4 | 4 | | | 2.00 | | | | | | | | | | | | | | |
| CD | 5 | 4 | | | 2.50 | | | | | | | | | | | | | | |
| CD | 6 | 4 | | | 3.00 | | | | | | | | | | | | | | |
| CD | 7 | 4 | | | 3.50 | | | | | | | | | | | | | | |
| CD | 8 | 4 | | | 4.00 | | | | | | | | | | | | | | |
| CD | 9 | 4 | | | 4.50 | | | | | | | | | | | | | | |
| CD | 10 | 4 | | | 5.00 | | | | | | | | | | | | | | |
| CD | 11 | 4 | | | 5.50 | | | | | | | | | | | | | | |
| CD | 12 | 3 | 0 | 0.00 | 4.11 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 13 | 3 | 0 | 0.00 | 6.03 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 14 | 3 | 0 | 0.00 | 7.17 | 24.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |

□□

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

LINE A

HEADING LINE NO 2 IS -

LINNEL LANE

HEADING LINE NO 3 IS -

FILE:980A2 QFILE:980A2Q

□□

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|---|---|---|---|---|
| | 842.35 | 1548.00 | 9 | 0.00 |

ELEMENT NO 2 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 879.14 | 1548.18 | 9 | 0.013 | 0.00 | 92.32 | 0.00 | 0 |

ELEMENT NO 3 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 1000.00 | 1548.79 | 9 | 0.013 | 0.00 | 0.00 | 0.00 | 0 |

```
ELEMENT NO   4 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                             1085.92 1549.22    9              0.013                                 0.00   0.00    0.00      0

ELEMENT NO   5 IS A JUNCTION           *         *     *     *                 *                 *                 *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                             1087.56 1549.34    9     8     0  0.013    74.6      0.0  1549.49     0.00  45.00    0.00

ELEMENT NO   6 IS A TRANSITION        *         *     *
                U/S DATA   STATION    INVERT  SECT              N
                             1093.98 1549.76    8              0.014

ELEMENT NO   7 IS A JUNCTION           *         *     *     *                 *                 *                 *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                             1361.21 1551.10    8     4     4  0.013     8.1      2.9  1552.23  1552.23  45.00    5.00

ELEMENT NO   8 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                             1415.56 1551.37    8              0.013                                 0.00   0.00    0.00      0

ELEMENT NO   9 IS A SYSTEM HEADWORKS                   *                                 *
                U/S DATA   STATION    INVERT  SECT                                     W S ELEV
                             1415.56 1551.37    8                                         0.00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC □□LICENSEE: R.B.F. &
ASSOC. - SAN DIEGO                          F0515P                                                                    PAGE    1
                                                     WATER SURFACE PROFILE LISTING

                     LINE A
                     LINNEL LANE
                     FILE:980A2   QFILE:980A2Q

 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
             ELEV   OF FLOW    ELEV                          HEAD   GRD.EL.   ELEV   DEPTH            DIA    ID NO.        PIER

 L/ELEM      SO                                          SF AVE     HF                     NORM DEPTH                ZR
*****************************************************************************************************************************

   842.35  1548.00    3.625  1551.625     152.9   11.14    1.926  1553.551   0.00    3.625            4.50    0.00   0.00   0   0.00
    20.42  0.00489                                       .005971     0.12                    4.500                   0.00
   862.77  1548.10    3.822  1551.922     152.9   10.62    1.751  1553.673   0.00    3.625            4.50    0.00   0.00   0   0.00
    16.37  0.00489                                       .005645     0.09                    4.500                   0.00
   879.14  1548.18    3.874  1552.054     152.9   10.50    1.712  1553.766   0.00    3.625            4.50    0.00   0.00   0   0.00
   120.86  0.00505                                       .005471     0.66                    4.500                   0.00
  1000.00  1548.79    4.026  1552.816     152.9   10.19    1.611  1554.427   0.00    3.625            4.50    0.00   0.00   0   0.00
```

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 85.92 | 0.00500 | | | | | .005317 | 0.46 | | | 4.500 | | | 0.00 | | |
| 1085.92 | 1549.22 | 4.088 | 1553.308 | 152.9 | 10.07 | 1.576 | 1554.884 | 0.00 | 3.625 | | 4.50 | 0.00 | 0.00 | 0 | 0.00 |
| JUNCT STR | 0.07317 | | | | | .003435 | 0.01 | | | | | | 0.00 | | |
| 1087.56 | 1549.34 | 5.656 | 1554.996 | 78.3 | 4.92 | 0.376 | 1555.372 | 0.00 | 2.587 | | 4.50 | 0.00 | 0.00 | 0 | 0.00 |
| TRANS STR | 0.06542 | | | | | .002642 | 0.02 | | | | | | 0.00 | | |
| 1093.98 | 1549.76 | 5.071 | 1554.831 | 78.3 | 6.23 | 0.603 | 1555.434 | 0.00 | 2.680 | | 4.00 | 0.00 | 0.00 | 0 | 0.00 |
| JUNCT STR | 0.00501 | | | | | .002583 | 0.69 | | | | | | 0.00 | | |
| 1361.21 | 1551.10 | 4.694 | 1555.794 | 67.3 | 5.36 | 0.445 | 1556.239 | 0.00 | 2.478 | | 4.00 | 0.00 | 0.00 | 0 | 0.00 |
| 54.35 | 0.00497 | | | | | .002195 | 0.12 | | | 2.383 | | | 0.00 | | |
| 1415.56 | 1551.37 | 4.543 | 1555.913 | 67.3 | 5.36 | 0.445 | 1556.358 | 0.00 | 2.478 | | 4.00 | 0.00 | 0.00 | 0 | 0.00□□ |

```
0
T1 LATERAL A
T2 LINNEL LANE
T3 FILE:980A3   QFILE:980A3Q
SO    100.001549.49  8                          1555.00
R     120.711549.61  8      .013                          40.37
R     155.941549.80  8      .013
R     181.711549.95  8      .013
SH                   8
CD   1  4              1.00
CD   2  4              1.25
CD   3  4              1.50
CD   4  4              2.00
CD   5  4              2.50
CD   6  4              3.00
CD   7  4              3.50
CD   8  4              4.00
CD   9  4              4.50
CD  10  4              5.00
CD  11  4              5.50
CD  12  3              4.11    7.00
CD  13  3              6.03    7.00
CD  14  3              7.17   24.00
```

□□DATE: 10/ 5/2006
TIME: 17:18

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIERS | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL | ZR | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD | 1 | 4 | | | 1.00 | | | | | | | | | | | | | | |
| CD | 2 | 4 | | | 1.25 | | | | | | | | | | | | | | |
| CD | 3 | 4 | | | 1.50 | | | | | | | | | | | | | | |
| CD | 4 | 4 | | | 2.00 | | | | | | | | | | | | | | |
| CD | 5 | 4 | | | 2.50 | | | | | | | | | | | | | | |
| CD | 6 | 4 | | | 3.00 | | | | | | | | | | | | | | |
| CD | 7 | 4 | | | 3.50 | | | | | | | | | | | | | | |
| CD | 8 | 4 | | | 4.00 | | | | | | | | | | | | | | |
| CD | 9 | 4 | | | 4.50 | | | | | | | | | | | | | | |
| CD | 10 | 4 | | | 5.00 | | | | | | | | | | | | | | |
| CD | 11 | 4 | | | 5.50 | | | | | | | | | | | | | | |
| CD | 12 | 3 | 0 | 0.00 | 4.11 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 13 | 3 | 0 | 0.00 | 6.03 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 14 | 3 | 0 | 0.00 | 7.17 | 24.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |

□□

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

LATERAL A

HEADING LINE NO 2 IS -

LINNEL LANE

HEADING LINE NO 3 IS -

FILE:980A3 QFILE:980A3Q

□□

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *
U/S DATA STATION INVERT SECT W S ELEV
100.00 1549.49 8 1555.00

ELEMENT NO 2 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
120.71 1549.61 8 0.013 0.00 40.37 0.00 0

ELEMENT NO 3 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
155.94 1549.80 8 0.013 0.00 0.00 0.00 0

```
ELEMENT NO    4 IS A REACH                *          *      *
                U/S DATA    STATION    INVERT   SECT                N                                  RADIUS  ANGLE  ANG PT  MAN H
                            181.71 1549.95      8               0.013                                    0.00   0.00    0.00      0

ELEMENT NO    5 IS A SYSTEM HEADWORKS                 *                                  *
                U/S DATA    STATION    INVERT   SECT                                                W S ELEV
                            181.71 1549.95      8                                                      0.00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC □□LICENSEE: R.B.F. &
ASSOC. - SAN DIEGO                                                                                                                PAGE    1
                                F0515P
                                                WATER SURFACE PROFILE LISTING
                        LATERAL A
                        LINNEL LANE
                        FILE:980A3    QFILE:980A3Q

STATION     INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/    BASE/     ZL    NO  AVBPR
             ELEV   OF FLOW    ELEV                          HEAD   GRD.EL.   ELEV    DEPTH            DIA     ID NO.          PIER

L/ELEM       SO                                            SF AVE     HF                     NORM DEPTH                ZR
*****************************************************************************************************************************************

  100.00  1549.49    5.510  1555.000      78.5    6.25    0.606  1555.606   0.00    2.683            4.00     0.00    0.00    0   0.00
   20.71  0.00579                                        .002987     0.06                    2.508                     0.00
  120.71  1549.61    5.533  1555.143      78.5    6.25    0.606  1555.749   0.00    2.683            4.00     0.00    0.00    0   0.00
   35.23  0.00539                                        .002987     0.11                    2.570                     0.00
  155.94  1549.80    5.448  1555.248      78.5    6.25    0.606  1555.854   0.00    2.683            4.00     0.00    0.00    0   0.00
   25.77  0.00582                                        .002987     0.08                    2.504                     0.00
  181.71  1549.95    5.375  1555.325      78.5    6.25    0.606  1555.931   0.00    2.683            4.00     0.00    0.00    0   0.00□□
```

WSE @ HEADWALL = 1555.3 + 1.2(0.6) = 1556.0

```
0
T1 LATERAL B
T2 LINNEL LANE
T3 FILE:980B1   QFILE:980B1Q
SO    101.711552.32  3                          1555.8
R     146.741555.31  3       .013
SH                   3
CD   1  4              1.00
CD   2  4              1.25
CD   3  4              1.50
CD   4  4              2.00
CD   5  4              2.50
CD   6  4              3.00
CD   7  4              3.50
CD   8  4              4.00
CD   9  4              4.50
CD  10  4              5.00
CD  11  4              5.50
CD  12  3              4.11     7.00
CD  13  3              6.03     7.00
CD  14  3              7.17    24.00
```

□□DATE: 10/ 4/2006
TIME: 18:58

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING



| CARD CODE | SECT NO | CHN TYPE | NO OF PIERS | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL | ZR | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD | 1 | 4 | | | 1.00 | | | | | | | | | | | | | | |
| CD | 2 | 4 | | | 1.25 | | | | | | | | | | | | | | |
| CD | 3 | 4 | | | 1.50 | | | | | | | | | | | | | | |
| CD | 4 | 4 | | | 2.00 | | | | | | | | | | | | | | |
| CD | 5 | 4 | | | 2.50 | | | | | | | | | | | | | | |
| CD | 6 | 4 | | | 3.00 | | | | | | | | | | | | | | |
| CD | 7 | 4 | | | 3.50 | | | | | | | | | | | | | | |
| CD | 8 | 4 | | | 4.00 | | | | | | | | | | | | | | |
| CD | 9 | 4 | | | 4.50 | | | | | | | | | | | | | | |
| CD | 10 | 4 | | | 5.00 | | | | | | | | | | | | | | |
| CD | 11 | 4 | | | 5.50 | | | | | | | | | | | | | | |
| CD | 12 | 3 | 0 | 0.00 | 4.11 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 13 | 3 | 0 | 0.00 | 6.03 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 14 | 3 | 0 | 0.00 | 7.17 | 24.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |

□□

F 0 5 1 5 P



WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

LATERAL B

HEADING LINE NO 2 IS -

LINNEL LANE

HEADING LINE NO 3 IS -

FILE:980B1 QFILE:980B1Q

□□

F 0 5 1 5 P



WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|---|---|---|---|---|
| | 102.12 | 1551.59 | 3 | 1555.67 |

ELEMENT NO 2 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 146.74 | 1555.31 | 3 | 0.013 | 0.00 | 0.00 | 0.00 | 0 |

ELEMENT NO 3 IS A SYSTEM HEADWORKS * *

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|---|---|---|---|---|
| | 146.74 | 1555.31 | 3 | 0.00 |

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC □□LICENSEE: R.B.F. & ASSOC. - SAN DIEGO

F0515P PAGE 1

WATER SURFACE PROFILE LISTING

LATERAL B
LINNEL LANE
FILE:980B1 QFILE:980B1Q

| STATION | INVERT ELEV | DEPTH OF FLOW | W.S. ELEV | Q | VEL | VEL HEAD | ENERGY GRD.EL. | SUPER ELEV | CRITICAL DEPTH | | HGT/ DIA | BASE/ ID NO. | ZL | NO PIER | AVBPR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/ELEM | SO | | | | | SF AVE | HF | | | NORM DEPTH | | | ZR | | |
| 102.12 | 1551.59 | 4.080 | 1555.670 | 10.3 | 5.83 | 0.528 | 1556.198 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| 28.95 | 0.08337 | | | | | .009615 | 0.28 | | | 0.600 | | | 0.00 | | |
| 131.07 | 1554.00 | 1.964 | 1555.968 | 10.3 | 5.83 | 0.528 | 1556.496 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| HYDRAULIC JUMP | | | | | | | | | | | | | 0.00 | | |
| 131.07 | 1554.00 | 0.757 | 1554.761 | 10.3 | 11.52 | 2.061 | 1556.822 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| 2.20 | 0.08337 | | | | | .035830 | 0.08 | | | 0.600 | | | 0.00 | | |
| 133.27 | 1554.19 | 0.774 | 1554.961 | 10.3 | 11.18 | 1.942 | 1556.903 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| 2.87 | 0.08337 | | | | | .032389 | 0.09 | | | 0.600 | | | 0.00 | | |
| 136.14 | 1554.43 | 0.804 | 1555.231 | 10.3 | 10.66 | 1.765 | 1556.996 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| 2.35 | 0.08337 | | | | | .028576 | 0.07 | | | 0.600 | | | 0.00 | | |
| 138.49 | 1554.62 | 0.836 | 1555.458 | 10.3 | 10.17 | 1.605 | 1557.063 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| 1.94 | 0.08337 | | | | | .025234 | 0.05 | | | 0.600 | | | 0.00 | | |
| 140.43 | 1554.78 | 0.869 | 1555.653 | 10.3 | 9.70 | 1.461 | 1557.114 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| 1.60 | 0.08337 | | | | | .022302 | 0.04 | | | 0.600 | | | 0.00 | | |
| 142.03 | 1554.92 | 0.904 | 1555.822 | 10.3 | 9.25 | 1.327 | 1557.149 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| 1.30 | 0.08337 | | | | | .019748 | 0.03 | | | 0.600 | | | 0.00 | | |
| 143.33 | 1555.03 | 0.942 | 1555.968 | 10.3 | 8.81 | 1.205 | 1557.173 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |
| 1.07 | 0.08337 | | | | | .017513 | 0.02 | | | 0.600 | | | 0.00 | | |
| 144.40 | 1555.12 | 0.981 | 1556.096 | 10.3 | 8.40 | 1.096 | 1557.192 | 0.00 | 1.235 | | 1.50 | 0.00 | 0.00 | 0 | 0.00 |

```
    0.84  0.08337                                        .015559     0.01                    0.600                  0.00
  145.24  1555.18    1.024  1556.209      10.3    8.02    0.998  1557.207    0.00    1.235            1.50    0.00   0.00   0    0.00
    0.66  0.08337                                        .013860     0.01                    0.600                  0.00          □□LICENSEE:
→R.B.F. & ASSOC. - SAN DIEGO                                F0515P                                                PAGE    2
                                                       WATER SURFACE PROFILE LISTING

                        LATERAL B
                        LINNEL LANE
                        FILE:980B1    QFILE:980B1Q

 STATION     INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                          HEAD   GRD.EL.  ELEV   DEPTH             DIA    ID NO.        PIER

 L/ELEM       SO                                          SF AVE     HF                     NORM DEPTH                ZR
*****************************************************************************************************************************
  145.90  1555.24    1.069  1556.309      10.3    7.64    0.907  1557.216    0.00    1.235            1.50    0.00   0.00   0    0.00
    0.45  0.08337                                        .012384     0.01                    0.600                  0.00
  146.35  1555.28    1.119  1556.397      10.3    7.28    0.824  1557.221    0.00    1.235            1.50    0.00   0.00   0    0.00
    0.29  0.08337                                        .011118     0.00                    0.600                  0.00
  146.64  1555.30    1.173  1556.475      10.3    6.95    0.749  1557.224    0.00    1.235            1.50    0.00   0.00   0    0.00
    0.10  0.08337                                        .010034     0.00                    0.600                  0.00
  146.74  1555.31    1.235  1556.545      10.3    6.62    0.680  1557.225    0.00    1.235            1.50    0.00   0.00   0    0.00□□
```

WSE IN CATCH BASIN = 1556.5 + 1.2(0.7) = 1557.3

```
0
T1 LATERAL C
T2 LINNEL LANE
T3 FILE:980C1   QFILE:980C1Q
SO    101.701552.33  3                          1555.8
R     137.481555.31  3      .013
SH                   3
CD   1  4              1.00
CD   2  4              1.25
CD   3  4              1.50
CD   4  4              2.00
CD   5  4              2.50
CD   6  4              3.00
CD   7  4              3.50
CD   8  4              4.00
CD   9  4              4.50
CD  10  4              5.00
CD  11  4              5.50
CD  12  3              4.11    7.00
CD  13  3              6.03    7.00
CD  14  3              7.17   24.00
```

□□DATE: 10/ 4/2006
TIME: 19: 4

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIERS | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL | ZR | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD | 1 | 4 | | | 1.00 | | | | | | | | | | | | | | |
| CD | 2 | 4 | | | 1.25 | | | | | | | | | | | | | | |
| CD | 3 | 4 | | | 1.50 | | | | | | | | | | | | | | |
| CD | 4 | 4 | | | 2.00 | | | | | | | | | | | | | | |
| CD | 5 | 4 | | | 2.50 | | | | | | | | | | | | | | |
| CD | 6 | 4 | | | 3.00 | | | | | | | | | | | | | | |
| CD | 7 | 4 | | | 3.50 | | | | | | | | | | | | | | |
| CD | 8 | 4 | | | 4.00 | | | | | | | | | | | | | | |
| CD | 9 | 4 | | | 4.50 | | | | | | | | | | | | | | |
| CD | 10 | 4 | | | 5.00 | | | | | | | | | | | | | | |
| CD | 11 | 4 | | | 5.50 | | | | | | | | | | | | | | |
| CD | 12 | 3 | 0 | 0.00 | 4.11 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 13 | 3 | 0 | 0.00 | 6.03 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 14 | 3 | 0 | 0.00 | 7.17 | 24.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |

□□

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

LATERAL C

HEADING LINE NO 2 IS -

LINNEL LANE

HEADING LINE NO 3 IS -

FILE:980C1 QFILE:980C1Q

□□

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

```
ELEMENT NO   1 IS A SYSTEM OUTLET      *          *      *
                   U/S DATA    STATION     INVERT  SECT                          W S ELEV
                                102.47 1551.59     3                             1555.67

ELEMENT NO   2 IS A REACH              *          *      *
                   U/S DATA    STATION     INVERT  SECT            N                        RADIUS  ANGLE  ANG PT  MAN H
                                137.48 1555.31     3           0.013                          0.00   0.00    0.00     0

ELEMENT NO   3 IS A SYSTEM HEADWORKS                     *                    *
                   U/S DATA    STATION     INVERT  SECT                          W S ELEV
                                137.48 1555.31     3                                0.00
```

```
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
 ** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC □□LICENSEE: R.B.F. &
→ASSOC. - SAN DIEGO                                                                                                                  →
                                                                                                                                PAGE    1
                                F0515P
                                                                WATER SURFACE PROFILE LISTING

                        LATERAL C
                        LINNEL LANE
                        FILE:980C1   QFILE:980C1Q

 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/    BASE/    ZL    NO  AVBPR
            ELEV   OF FLOW    ELEV                          HEAD   GRD.EL.   ELEV   DEPTH                DIA    ID NO.         PIER

 L/ELEM      SO                                          SF AVE     HF                    NORM DEPTH                    ZR
*************************************************************************************************************************************

   102.47  1551.59    4.080  1555.670       3.7    2.09    0.068  1555.738   0.00    0.735             1.50     0.00   0.00   0   0.00
    24.57  0.10626                                      .001227     0.03                    0.330                      0.00
   127.04  1554.20    1.500  1555.700       3.7    2.09    0.068  1555.768   0.00    0.735             1.50     0.00   0.00   0   0.00
     1.25  0.10626                                      .001149     0.00                    0.330                      0.00
   128.29  1554.33    1.360  1555.694       3.7    2.20    0.075  1555.769   0.00    0.735             1.50     0.00   0.00   0   0.00
     0.69  0.10626                                      .001123     0.00                    0.330                      0.00
   128.98  1554.41    1.280  1555.687       3.7    2.30    0.082  1555.769   0.00    0.735             1.50     0.00   0.00   0   0.00
     0.56  0.10626                                      .001215     0.00                    0.330                      0.00
   129.54  1554.47    1.213  1555.680       3.7    2.42    0.091  1555.771   0.00    0.735             1.50     0.00   0.00   0   0.00
     0.17  0.10626                                      .001338     0.00                    0.330                      0.00
   129.71  1554.48    1.155  1555.640       3.7    2.53    0.100  1555.740   0.00    0.735             1.50     0.00   0.00   0   0.00
HYDRAULIC JUMP                                                                                                           0.00
   129.71  1554.48    0.416  1554.901       3.7    9.25    1.329  1556.230   0.00    0.735             1.50     0.00   0.00   0   0.00
     0.36  0.10626                                      .040997     0.01                    0.330                      0.00
   130.07  1554.52    0.431  1554.954       3.7    8.79    1.199  1556.153   0.00    0.735             1.50     0.00   0.00   0   0.00
     1.33  0.10626                                      .035690     0.05                    0.330                      0.00
   131.40  1554.66    0.446  1555.110       3.7    8.39    1.093  1556.203   0.00    0.735             1.50     0.00   0.00   0   0.00
     1.12  0.10626                                      .031253     0.04                    0.330                      0.00
   132.52  1554.78    0.462  1555.245       3.7    7.99    0.992  1556.237   0.00    0.735             1.50     0.00   0.00   0   0.00
```

```
     0.94  0.10626                                        .027371     0.03                    0.330                 0.00
   133.46  1554.88    0.478  1555.361       3.7    7.63    0.904  1556.265   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.79  0.10626                                        .023970     0.02                    0.330                 0.00
```



WATER SURFACE PROFILE LISTING

LATERAL C
LINNEL LANE
FILE:980C1  QFILE:980C1Q

```
 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
            ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV   DEPTH                DIA   ID NO.        PIER
 L/ELEM      SO                                          SF AVE     HF                   NORM DEPTH                ZR
*****************************************************************************************************************************
   134.25  1554.97    0.495  1555.462       3.7    7.27    0.821  1556.283   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.67  0.10626                                        .020994     0.01                    0.330                 0.00
   134.92  1555.04    0.512  1555.550       3.7    6.93    0.745  1556.295   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.57  0.10626                                        .018388     0.01                    0.330                 0.00
   135.49  1555.10    0.530  1555.629       3.7    6.61    0.678  1556.307   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.47  0.10626                                        .016116     0.01                    0.330                 0.00
   135.96  1555.15    0.549  1555.698       3.7    6.30    0.617  1556.315   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.40  0.10626                                        .014135     0.01                    0.330                 0.00
   136.36  1555.19    0.569  1555.760       3.7    6.01    0.560  1556.320   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.32  0.10626                                        .012404     0.00                    0.330                 0.00
   136.68  1555.22    0.590  1555.815       3.7    5.73    0.509  1556.324   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.26  0.10626                                        .010885     0.00                    0.330                 0.00
   136.94  1555.25    0.611  1555.864       3.7    5.47    0.464  1556.328   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.20  0.10626                                        .009556     0.00                    0.330                 0.00
   137.14  1555.27    0.634  1555.908       3.7    5.21    0.422  1556.330   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.16  0.10626                                        .008395     0.00                    0.330                 0.00
   137.30  1555.29    0.657  1555.947       3.7    4.97    0.383  1556.330   0.00    0.735            1.50    0.00  0.00   0   0.00
     0.10  0.10626                                        .007373     0.00                    0.330                 0.00
```

```
  137.40  1555.30    0.681  1555.983       3.7    4.74    0.349  1556.332   0.00    0.735            1.50    0.00  0.00   0   0.00
    0.06  0.10626                                        .006483     0.00                     0.330                 0.00
  137.46  1555.31    0.707  1556.015       3.7    4.51    0.316  1556.331   0.00    0.735            1.50    0.00  0.00   0   0.00
    0.02  0.10626                                        .005693     0.00                     0.330                 0.00          □□LICENSEE:    →
→R.B.F. & ASSOC. - SAN DIEGO                                F0515P                                                PAGE    3
                                                      WATER SURFACE PROFILE LISTING

                        LATERAL C
                        LINNEL LANE
                        FILE:980C1   QFILE:980C1Q

 STATION     INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                          HEAD   GRD.EL.   ELEV   DEPTH            DIA    ID NO.        PIER
 L/ELEM       SO                                            SF AVE     HF                    NORM DEPTH                ZR
*****************************************************************************************************************************************
  137.48  1555.31    0.735  1556.045       3.7    4.30    0.287  1556.332   0.00    0.735            1.50    0.00  0.00   0   0.00□□
```

WSE IN CATCH BASIN = 1556.0 + L2(0.3) = 1556.6

```
0
T1 LATERAL D
T2 LINNEL LANE
T3 FILE:980D1   QFILE:980D1Q
SO     100.001551.88  6                          1555.9
R      120.711552.33  6       .013                          21.48
R      139.451552.73  6       .013
R      170.281553.39  6       .013
SH                    6
CD   1  4              1.00
CD   2  4              1.25
CD   3  4              1.50
CD   4  4              2.00
CD   5  4              2.50
CD   6  4              3.00
CD   7  4              3.50
CD   8  4              4.00
CD   9  4              4.50
CD  10  4              5.00
CD  11  4              5.50
CD  12  3              4.11     7.00
CD  13  3              6.03     7.00
CD  14  3              7.17    24.00
```

□□DATE: 10/ 5/2006
TIME: 17:33

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING



| CARD CODE | SECT NO | CHN TYPE | NO OF PIERS | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL | ZR | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD | 1 | 4 | | | 1.00 | | | | | | | | | | | | | | |
| CD | 2 | 4 | | | 1.25 | | | | | | | | | | | | | | |
| CD | 3 | 4 | | | 1.50 | | | | | | | | | | | | | | |
| CD | 4 | 4 | | | 2.00 | | | | | | | | | | | | | | |
| CD | 5 | 4 | | | 2.50 | | | | | | | | | | | | | | |
| CD | 6 | 4 | | | 3.00 | | | | | | | | | | | | | | |
| CD | 7 | 4 | | | 3.50 | | | | | | | | | | | | | | |
| CD | 8 | 4 | | | 4.00 | | | | | | | | | | | | | | |
| CD | 9 | 4 | | | 4.50 | | | | | | | | | | | | | | |
| CD | 10 | 4 | | | 5.00 | | | | | | | | | | | | | | |
| CD | 11 | 4 | | | 5.50 | | | | | | | | | | | | | | |
| CD | 12 | 3 | 0 | 0.00 | 4.11 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 13 | 3 | 0 | 0.00 | 6.03 | 7.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| CD | 14 | 3 | 0 | 0.00 | 7.17 | 24.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |

□□



F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

LATERAL D

HEADING LINE NO 2 IS -

LINNEL LANE

HEADING LINE NO 3 IS -

FILE:980D1 QFILE:980D1Q

□□



F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *
U/S DATA STATION INVERT SECT W S ELEV
100.00 1551.88 6 1555.90

ELEMENT NO 2 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
120.71 1552.33 6 0.013 0.00 21.48 0.00 0

ELEMENT NO 3 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
139.45 1552.73 6 0.013 0.00 0.00 0.00 0

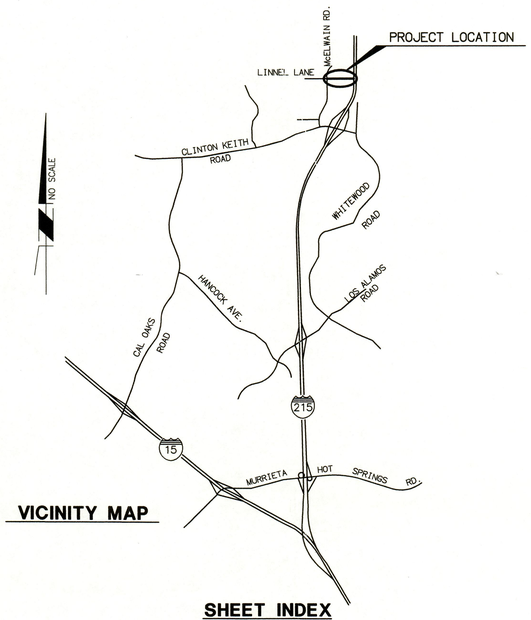
```
ELEMENT NO    4 IS A REACH                *         *     *
                U/S DATA    STATION    INVERT  SECT                N                                  RADIUS  ANGLE  ANG PT  MAN H
                              170.28 1553.39    6               0.013                                    0.00   0.00    0.00      0

ELEMENT NO    5 IS A SYSTEM HEADWORKS                 *                                 *
                U/S DATA    STATION    INVERT  SECT                                                W S ELEV
                              170.28 1553.39    6                                                     0.00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC □□LICENSEE: R.B.F. &
ASSOC. - SAN DIEGO                          F0515P                                                                                PAGE    1
                                                     WATER SURFACE PROFILE LISTING

                      LATERAL D
                      LINNEL LANE
                      FILE:980D1   QFILE:980D1Q

 STATION    INVERT   DEPTH     W.S.        Q      VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
             ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.        PIER

 L/ELEM      SO                                          SF AVE     HF                     NORM DEPTH                ZR
*****************************************************************************************************************************

   100.00  1551.88    4.020  1555.900      67.3    9.52    1.407  1557.307   0.00    2.620            3.00    0.00   0.00   0   0.00
    20.71  0.02173                                       .010181     0.21                    1.821                   0.00
   120.71  1552.33    3.918  1556.248      67.3    9.52    1.407  1557.655   0.00    2.620            3.00    0.00   0.00   0   0.00
    18.74  0.02134                                       .010181     0.19                    1.832                   0.00
   139.45  1552.73    3.709  1556.439      67.3    9.52    1.407  1557.846   0.00    2.620            3.00    0.00   0.00   0   0.00
    30.83  0.02141                                       .010181     0.31                    1.830                   0.00
   170.28  1553.39    3.363  1556.753      67.3    9.52    1.407  1558.160   0.00    2.620            3.00    0.00   0.00   0   0.00□□
```

WSE @ HEADWALL = 1556.8 + L2(1-4) = 1558.5

# THE ORCHARD
# DP 2005-1800 & CUP 2005-1844
# OFF SITE STREET STORM DRAIN PLANS
# FOR
# LINNEL LANE

## GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEARING OF THE PROPOSED WORK AREA, AND RELOCATION COSTS OF ALL EXISTING UTILITIES. PERMITTEE MUST INFORM THE CITY OF CONSTRUCTION SCHEDULE AT LEAST 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION. PHONE: (909) 698-1040
2. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF MURRIETA, PUBLIC WORKS DEPARTMENT IMPROVEMENT STANDARDS AND THE LATEST EDITION OF "STANDARD SPECIFICATIONS FOR PUBLIC WORKS" (GREEN BOOK) UNLESS OTHERWISE NOTED.
3. THE DEVELOPER WILL INSTALL STREET NAME SIGNS CONFORMING TO CITY STANDARD NO. 601.
4. CURB DEPRESSIONS AND DRIVEWAY APPROACHES WILL BE INSTALLED AND CONSTRUCTED ACCORDING TO CITY STANDARD NO. 308 AS DIRECTED IN THE FIELD.
5. BLUE RAISED REFLECTIVE PAVEMENT MARKERS SHALL BE PLACED TO MARK FIRE HYDRANTS AND/OR WATER SUPPLY LOCATIONS AT THE DIRECTION OF THE CITY INSPECTOR FOLLOWING FINAL SEALANT AND STRIPING.
6. WORK MAY NOT START UNTIL NECESSARY PERMITS HAVE BEEN OBTAINED.
7. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS WITH UNDERGROUND SERVICE ALERT AT 1-800-422-4133 AT LEAST TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION.
8. ALL PAVEMENT SECTIONS ARE AT MIN. REQUIREMENTS. ADDITIONAL SOIL TEST SHALL BE TAKEN AFTER ROUGH GRADING TO DETERMINE THE EXACT STREET SECTION REQUIREMENTS. USE CITY STANDARD NO. 320 IF EXPANSIVE SOILS ARE ENCOUNTERED.
9. DUST CONTROL SHALL BE MAINTAINED AT ALL TIMES, BY WATER OR OTHER APPROVED METHODS.
10. EQUIPMENT AND MATERIALS SHALL BE STORED IN A NEAT AND PROTECTED MANNER.
11. THE CONTRACTOR WILL CONDUCT HIS OPERATIONS AS TO OFFER THE LEAST POSSIBLE OBSTRUCTION AND INCONVENIENCE TO PUBLIC TRAFFIC, AND HE SHALL HAVE UNDER CONSTRUCTION NO GREATER LENGTH OR AMOUNT OF WORK THAN HE CAN EXECUTE PROPERLY ON EXISTING ROADS, TRAFFIC SHALL BE PERMITTED TO PASS THROUGH THE WORK AREA WITH AS LITTLE INCONVENIENCE AND DELAY AS POSSIBLE.
12. EXISTING TRAFFIC SIGNALS AND LIGHTING SYSTEMS SHALL BE KEPT IN OPERATION FOR THE BENEFIT OF THE TRAVELING PUBLIC AND TO MINIMIZE ANY INTERFERENCE WITH ROUTINE MAINTENANCE OF EXISTING SYSTEMS DURING WORK PROGRESS.
13. WHENEVER THE CONTRACTOR'S OPERATION CREATES A HAZARDOUS CONDITION TO TRAFFIC OR TO THE PUBLIC, HE SHALL FURNISH AT HIS OWN EXPENSE, SUCH FLAGMEN AND GUARDS AS ARE NECESSARY TO GIVE ADEQUATE WARNING TO THE PUBLIC OF ANY DANGEROUS CONDITIONS. HE SHALL ALSO FURNISH, ERECT AND MAINTAIN SUCH FENCES, BARRICADES, LIGHTS, SIGNS, AND OTHER DEVICES NECESSARY TO PREVENT ACCIDENTS AND INJURY TO THE PUBLIC.
14. WHERE SURVEY MONUMENTS EXIST, SUCH MONUMENTS WILL BE PROTECTED OR SHALL BE REFERENCED AND RESET PURSUANT TO BUSINESS AND PROFESSIONS CODE SECTIONS 8700 TO 8805 (LAND SURVEYOR'S ACT).
15. WHERE NEW A.C. PAVEMENT JOIN EXISTING PAVEMENT, SAWCUT TO A NEAT EDGE. THE SAWCUTS MUST BE PERPENDICULAR, PARALLEL OR RADIAL TO THE ROADWAY CENTERLINE OVERLAY AND FEATHER NEW A.C. PAVEMENT TO PROVIDE SMOOTH TRANSITION.
16. ALL EXISTING STREET SIGNS, ROADSIDE MARKERS, ETC. SHALL BE PROTECTED AND/OR REPLACED IN KIND TO THE CURRENT CITY STANDARD PLANS AND CURRENT TRAFFIC MANUAL AT NO COST TO THE CITY.
17. "ASPHALTIC EMULSION" (FOG SEAL) SHALL BE APPLIED NOT LESS THAN FOURTEEN DAYS FOLLOWING PLACEMENT OF THE ASPHALT SURFACING AND SHALL BE APPLIED AT A RATE OF 0.05 GALLON PER SQUARE YARD. ASPHALTIC EMULSION SHALL CONFORM TO SECTIONS 37, 39, AND 94 OF THE STATE STANDARD SPECIFICATIONS.
18. ALL UNDERGROUND FACILITIES, WITH LATERALS SHALL BE IN PLACE PRIOR TO PAVING THE STREET SECTION INCLUDING BUT NOT LIMITED TO, THE FOLLOWING WATER, SEWER, GAS, ELECTRIC, CABLE T.V., TELEPHONE AND DRAINAGE.
19. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ALL UTILITY LINES, INCLUDING ANY OTHER LINES NOT SHOWN ON THESE PLANS OR NOT ON RECORD.
20. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR TO APPLY TO THE CITY OF MURRIETA, ENGINEERING DEPARTMENT, FOR AN ENCROACHMENT PERMIT FOR ALL WORK ON EXISTING CITY MAINTAINED ROADS AND FOR UTILITY WORK WITHIN OFFERS OF DEDICATION FOR PUBLIC USE.
21. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER, TO INSTALL STREET CENTERLINE MONUMENTS AS REQUIRED BY CITY STANDARD NO. 616, 617, AND 618.
22. STREET LIGHTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CITY OF MURRIETA STANDARD NO. 619 OR 620.
23. APPROVAL OF THESE PLANS BY THE CITY OR ITS AGENTS DOES NOT RELIEVE THE APPLICANT AND HIS ENGINEER FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE APPROPRIATE PLAN REVISIONS SHALL BE PROMPTLY SUBMITTED TO THE CITY ENGINEER FOR REVIEW AND APPROVAL.
24. ALL GTE, SCE AND SCG FACILITIES WILL BE RELOCATED OR MODIFIED BY THE RESPECTIVE UTILITIES OR THEIR APPOINTED REPRESENTATIVES.
25. ALL WATER RELATED WORK SHALL BE DONE IN ACCORDANCE WITH THE SERVICING WATER DISTRICT STANDARDS AND SPECIFICATIONS.
26. ALL SEWER RELATED WORK SHALL BE DONE IN ACCORDANCE WITH THE SERVICING WATER DISTRICT STANDARDS AND SPECIFICATIONS.
27. ANY SERVICE SHUT DOWN SHALL BE DONE AT NIGHT, PRIOR TO ANY SHUT DOWN, THE CONTRACTOR SHALL NOTIFY THE DIRECTOR, ENGINEER, CUSTOMER, FIRE DEPARTMENT, SERVICING WATER DISTRICT, AND ALL OTHERS AFFECTED BY THE SHUT DOWN A MINIMUM OF THREE (3) WEEKS IN ADVANCE.
28. ALL UNDERGROUND FACILITIES, WITH LATERALS, SHALL BE IN PLACE PRIOR TO PAVING THE STREET SECTION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING: WATER, SEWER, ELECTRIC, GAS, DRAINAGE.
29. THE APPLICANT IS HEREBY NOTICED THAT THEY MUST COMPLY WITH ALL STATE AND FEDERAL ENDANGERED SPECIES LAW. THE CITY OF MURRIETA IS NOT RESPONSIBLE FOR ANY SUCH VIOLATION OF STATE OR FEDERAL ENDAGERED SPECIES LAW DUE TO THE APPLICANT'S NON-COMPLIANCE.
30. 24 HOUR EMERGENCY CONTACT: ALLAN DAVIS
    CELL NO. (760) 518-0660




VICINITY MAP

## SHEET INDEX


SHEET 1 TITLE SHEET
SHEET 2 STORM DRAIN - LINNEL LANE
SHEET 3 STORM DRAIN - HEADWALL DETAILS


## LEGEND

| | |
|---|---|
| TC | TOP OF CURB |
| FL | FLOWLINE |
| INV | INVERT |
| TB | TOP OF BERM |
| AC | ASPHALT CONCRETE |
| PCC | PORTLAND CEMENT CONCRETE |
| SSMH | SANITARY SEWER MANHOLE |
| SDMH | STORMDRAIN MANHOLE |
| EXIST | EXISTING |
| ℄ | CENTERLINE |
| R/W | RIGHT OF WAY |
| VAR. | VARIES |
| MIN. | MINIMUM |
| SD | EXISTING STORM DRAIN |
| W | EXISTING WATERLINE |
| | EXISTING WATER VALVE |
| GAS | EXISTING GAS VALVE |
| T | EXISTING TELEPHONE MANHOLE |
| T | EXISTING TELEPHONE RISER |
| | EXISTING STREET LIGHT |
| | PROPOSED STREET LIGHT |
| | PROPOSED STORM DRAIN PIPE |
| | PROPOSED RCFCD MH NO. 4 |
| | PROPOSED CATCH BASIN C.O.M. STD 401 W/ LOCAL DEPRESSION C.O.M. STD. 408a |
| S | SANITARY SEWER MANHOLE |
| PP | POWER POLE |
| | GUY WIRE |
| | SIGN |
| ER | ELECTRICAL RISER |
| VLT | ELECTRICAL VAULT |
| PB | PULL BOX |
| A 7 | DETAIL REFERENCE |
| | PLAN SHEET WHERE DETAIL IS LOCATED |

## CONSTRUCTION NOTES & QUANTITY ESTIMATE

| | NO. | ITEM TO BE CONSTRUCTED OR INSTALLED | QUANTITY | UNIT |
|---|---|---|---|---|
| | | DRAINAGE CONSTRUCTION NOTES | | |
| | D1 | CONSTRUCT 54" DIA RCP STORM DRAIN D-1800 | 235 | LF |
| | D2 | CONSTRUCT 48"RCP STORM DRAIN D-1300 | 452 | LF |
| | D3 | ---------- | --- | --- |
| | D4 | CONSTRUCT 18"RCP STORM DRAIN D-1250 | 72 | LF |
| | D5 | CONSTRUCT CATCH BASIN PER COM STD NO. 401 W/ LOCAL DEPRESSION PER C.O.M. STD. 408A | 2 | EA |
| ** | D6 | CONSTRUCT HEADWALL W/TYPE 'A' WINGWALL PER CALTRANS STD. D90 | 1 | EA |
| ** | D7 | CONSTRUCT HEADWALL W/ TYPE 'B' WINGWALL PER CALTRANS STD.NO. D-90 | 1 | EA |
| | D8 | CONSTRUCT MANHOLE NO.4 PER RCFCD STD. NO. MH254 | 3 | EA |
| | D9 | CONSTRUCT HEADWALL PER CALTRANS STD.NO. D-86B | 1 | EA |
| | D10 | REMOVE EXISTING CULVERT | 2 | EA |
| *** | D11 | CONSTRUCT '1/4 TON' RIP-RAP OVER 6"CLASS II BASE OVER MIRAFI 700X FILTER FABRIC OR APPROVED EQUAL. PER C.O.M. STD. 446a (TYPE 2) | 88 | CY |
| | D12 | INSTALL KRISTAR 'FLOGUARD +PLUS' INLET FILTER FGP-24CI PER DETAIL 'E' ON SHEET 3 | 2 | EA |

** NOTE: MODIFIED FOR SMALLER PIPE SIZE

*** NOTE: CONTRACTOR TO USE EXCAVATED ON-SITE ROCK (24"-36" DIA)

## BASIS OF BEARING

A BEARING OF N 89°28''49" W FOR THE NORTHERLY LINE OF PARCLE 1 & 2 OF PARCEL MAP 9768.

## DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS FOR THE CITY OF MURRIETA IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

RBF CONSULTING
40810 COUNTY CENTER DRIVE, SUITE 100
TEMECULA, CALIFORNIA 92591-6022
(951) 676-8042

WILLIAM D. KELLER
R.C.E. 44341
(EXPIRES 06-30-07)

05/04/07
DATE

APPROVED BY
CITY OF MURRIETA
ENGINEERING DEPARTMENT
DATE 9/7/07 EP 64551
BY

OWNER:
ALLAN DAVIS
RETAIL DEVELOPMENT ADVISORS CORP.
ORCHARD DEVELOPMENT GROUP. LLC
22875-F SAVI RANCH PARKWAY
YORBA LINDA, CA. 92887
714-282-1798

SOILS ENGINEER:
G.P.I.
GEOTECNICAL PROFESSIONALS INC.
5736 CORPORATE AVENUE
CYPRESS, CALIFORNIA
YORBA LINDA, CA. 92887
714-220-2211

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/ Developer of any responsibility for their accuracy.
Engineer of work — Date
RCE — EXP.

ENGINEERS NOTE:
THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY OF DESIGN AND ACCEPTABILITY OF THE WORK HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER CITY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE CITY.

Underground Service Alert
Call TOLL FREE
1-800
422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK — BRASS DISC ON CONCRETE POST
DESCRIPTON: STAMPED 600-16-68
LOCATION: 0.2 MI SOUTH ON WASHINGTON AVE. FROM MURRIETA POST OFFICE, 2.4 MI EAST ON LOS ALAMOS RD., 1 MI NORTH ON HWY 395 124' WEST OF THE SOUTH BOUND LANE AND 2' WEST OF THE HWY. R.O.W. FENCE 1' S'LY OF MARKER POST
RECORDED:
ELEVATION: 1356.76 DATUM:

RECOMMENDED FOR APPROVAL
WILLIAM G. BIXBY — DATE 9/11/07
PLAN CHECK FIRM / BUREAU VERITAS
R.C.E. NO.: 48819
EXP. DATE: 9-30-08

SEAL: REGISTERED PROFESSIONAL ENGINEER — WILLIAM D. KELLER — No. 44341 Exp. 6-30-07 — CIVIL — STATE OF CALIFORNIA

SCALE
HORIZONTAL
VERTICAL

RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
40810 COUNTY CENTER DRIVE, SUITE 100
TEMECULA, CALIFORNIA 92591-6022
951.676.8042 • FAX 951.676.7240 • www.RBF.com

PREPARED BY — DATE 05/04/07
ENGR. NAME TYPED WILLIAM D. KELLER
R.C.E. NO. 44341 EXP. DATE 6-30-07

| DATE | INITIAL | REVISION DESCRIPTION | SHT. NO. | DATE | INITIAL |
|---|---|---|---|---|---|
| ENGINEER OF WORK | | | | CITY APPROVAL | |

SHEET 1 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 3

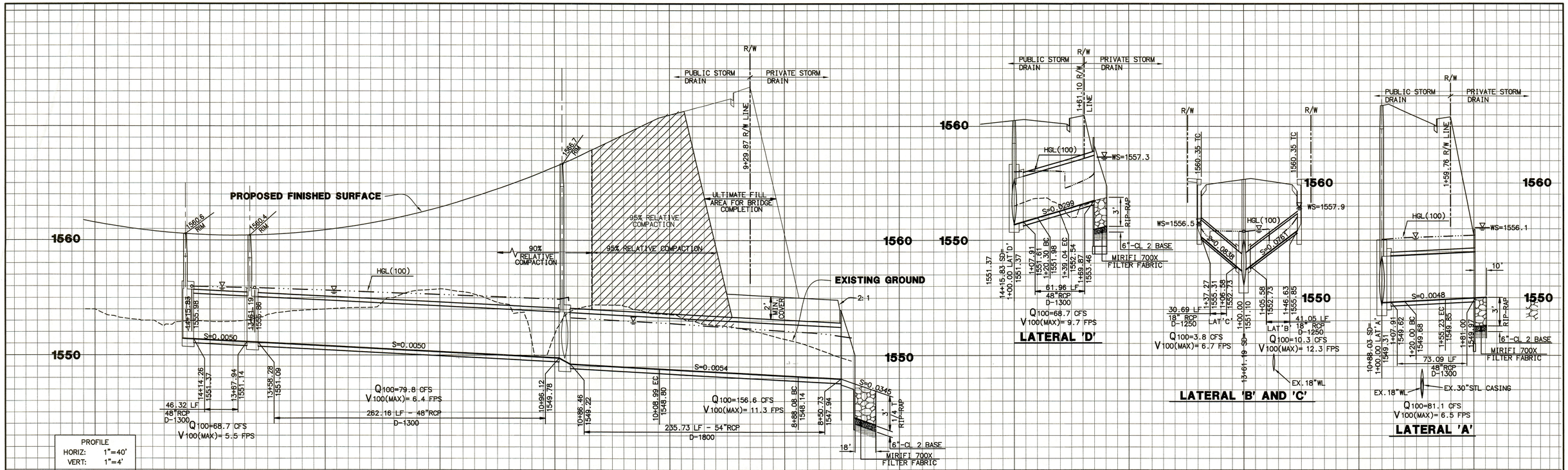
OFFSITE STORM DRAIN IMPROVEMENTS
DP 2005-1800 & CUP 2005-1844
LINNEL LANE
PM 32893
TITLE SHEET

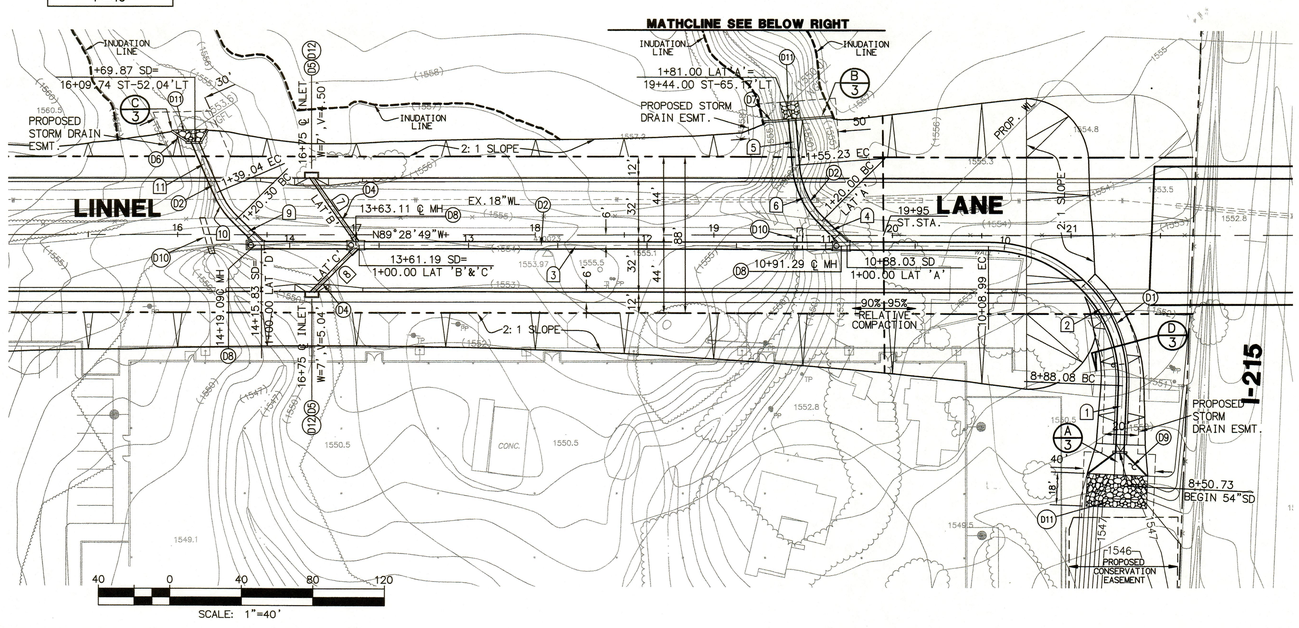
APPROVED — ROBERT K. MOCHLINE, P.E. ACTING CITY ENGINEER — DATE 5-18-07
RCE 63056, EXP. DATE 6/30/08

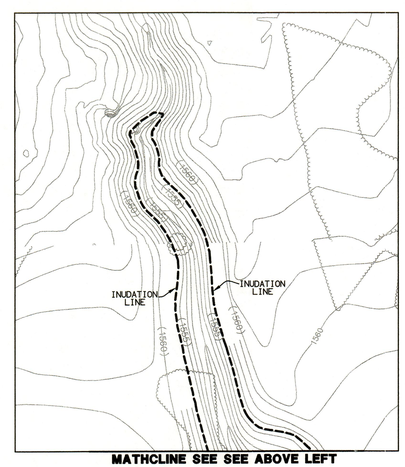
DWN BY: CHKD BY: FIELD BK:
PROJECT NO. 05-30150-ISSD-3795
DRAWING NO. 07-380

PM 32893

H:\PDATA\15100980\CADD\LAND\DLV\OFF-SITE IMPROVEMENTS\STORM DRAIN\980LINSD1.DWG WDK 5/4/07 1:23 pm




MATHCLINE SEE SEE ABOVE LEFT

## SD MANHOLE DATA TABLE

| LATERAL | ANGLE 'A' | L | B | C | D1/D2 | ELEV 'R' | ELEV 'S' |
|---|---|---|---|---|---|---|---|
| A | 45°02'12" | 10.5' | 48" | 8.33' | 54"/48" | 1549.62 | 1549.58 |
| B | 55°27'43" | 10.5' | 18" | 6' | 48" | 1552.73 | 1552.44 |
| C | 45°00'08" | 10.5' | 18" | 7' | 48" | 1552.73 | 1552.33 |
| D | 45°02'12" | 10.5' | 36" | 8.33' | 48" | 1551.61 | 1551.37 |

## LINE/CURVE DATA TABLE

| NO | BEARING/DELTA | RADIUS | LENGTH | TANGENT |
|---|---|---|---|---|
| 1 | N02°53'04"E | -- | 37.35' | -- |
| 2 | Δ=92°21'54" | 75.00' | 120.91' | 78.16' |
| 3 | N89°28'49"W | -- | 415.35' | -- |
| 4 | N44°26'37"W | -- | 20.00' | -- |
| 5 | N04°04'10"W | -- | 25.77' | -- |
| 6 | Δ=40°22'28" | 50.00' | 35.23' | 18.38' |
| 7 | N34°01'06"W | -- | 46.74' | -- |
| 8 | N45°31'02"E | -- | 37.48' | -- |
| 9 | N44°26'37"W | -- | 20.30' | -- |
| 10 | Δ=21°28'31" | 50.00' | 18.74' | 9.48' |
| 11 | N22°58'06"W | -- | 36.83' | -- |

## CONSTRUCTION NOTES

- (D1) — CONSTRUCT 54" RCPSTORM DRAIN (D1800)
- (D2) — CONSTRUCT 48"RCP STORM DRAIN (D-1300)
- (D4) — CONSTRUCT 18"RCP STORM DRAIN (D1250)
- (D5) — CONSTRUCT CATCH BASIN PER CITY OF MURRIETA STD NO. 401 W/ LOCAL DEPRESSION PER C.O.M. STD. 408A
- ** (D6) — CONSTRUCT HEADWALL W/TYPE 'A' WINGWALL PER CALTRANS STD. D90
- ** (D7) — CONSTRUCT HEADWALL W/ TYPE 'B' WINGWALL PER CALTRANS STD.NO. D-90
- (D8) — CONSTRUCT MANHOLE NO.4 PER RCFCD STD. NO. MH254
- (D9) — CONSTRUCT HEADWALL W/ WARPED WINGWALL PER CALTRANS STD.NO. D-86B
- (D10) — REMOVE EXISTING CULVERT
- *** (D11) — CONSTRUCT '1/4 TON' RIP-RAP OVER MIRAFI 700X FILTER FABRIC OVER 6" CLASS II BASE OR APPROVED EQUAL. TYPE 2 PER C.O.M. STD 446a
- (D12) — INSTALL KRISTAR 'FLOGUARD +PLUS' INLET FILTER FGP-7.0CI PER DETAIL 'E' SHEET 3

** NOTE: MODIFIED FOR SMALLER PIPE SIZE
*** NOTE: CONTRACTOR TO USE EXCAVATED ON-SITE ROCK (24"-36" DIA)

OWNER:
ALLAN DAVIS
RETAIL DEVELOPMENT ADVISORS CORP.
ORCHARD DEVELOPMENT GROUP. LLC
22875-F SAVI RANCH PARKWAY
YORBA LINDA, CA. 92887
714-282-1798

SOILS ENGINEER:
G.P.I.
GEOTECNICAL PROFESSIONALS INC.
5736 CORPORATE AVENUE
CYPRESS, CALIFORNIA
YORBA LINDA, CA. 92887
714-220-2211

"AS BUILT"
The receipt of As-Built Plans and City's acceptance thereof does not absolve the Subdivider/Developer of any responsibility for their accuracy.
Engineer of work — Date
RCE — EXP.

SEAL: REGISTERED PROFESSIONAL ENGINEER WILLIAM D. KELLER No. 44341 Exp. 6-30-07 CIVIL STATE OF CALIFORNIA

RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION
40810 COUNTY CENTER DRIVE, SUITE 100
TEMECULA, CALIFORNIA 92591-6022
951.676.8042 • FAX 951.676.7240 • www.RBF.com

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422-4133
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK — BRASS DISC ON CONCRETE POST
DESCRIPTON: STAMPED 600-16-68
LOCATION: 0.2 MI SOUTH ON WASHINGTON AVE. FROM MURRIETA POST OFFICE, 2.4 MI EAST ON LOS ALAMOS RD., 1 MI NORTH ON HWY 395 124' WEST OF THE SOUTH BOUND LANE AND 2' WEST OF THE HWY. R.O.W. FENCE 1' S'LY OF MARKER POST
RECORDED:
ELEVATION: 1356.76 DATUM:

RECOMMENDED FOR APPROVAL
WILLIAM G. BIXBY — DATE 5/11/07
PLAN CHECK FIRM: BUREAU VERITAS
R.C.E. NO.: 48819
EXP. DATE: 9-30-08

SCALE
HORIZONTAL
VERTICAL

PREPARED BY — DATE 05/04/07
ENGR. NAME TYPED WILLIAM D. KELLER
R.C.E NO. 44341 EXP. DATE 6-30-07

| DATE | INITIAL | REVISION DESCRIPTION | SHT. NO. | DATE | INITIAL |
|---|---|---|---|---|---|
| ENGINEER OF WORK | | | | CITY APPROVAL | |

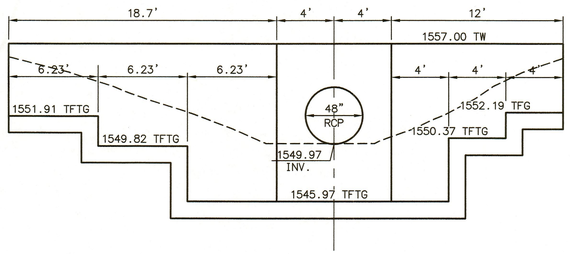
SHEET 2 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 3

OFFSITE STORM DRAIN IMPROVEMENTS
DP 2005-1800 & CUP 2005-1844
LINNEL LANE
PLAN AND PROFILE

APPROVED — ROBERT K. MOEHLING, P.E. RCE 63056 EXP. DATE 6/30/08 — CITY ENGINEER — DATE 5-18-07

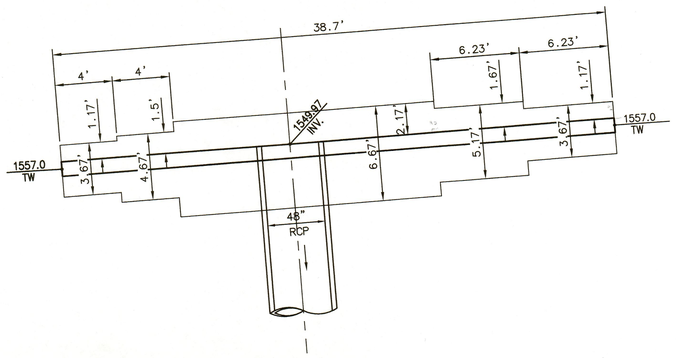
DWN BY:
CHKD BY:
FIELD BK:
PROJECT NO. 05-30150-ISSD-3795
DRAWING NO. 07-381

H:\PDATA\15100980\CADD\LAND\DLV\OFF-SITE IMPROVEMENTS\STORM DRAIN\980LINSD2.DWG MDK 5/4/07 1:25 pm



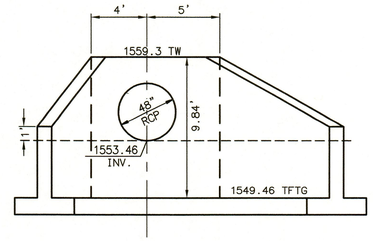

## ELEVATION

LOOKING DOWNSTREAM
SCALE: 1'=5'



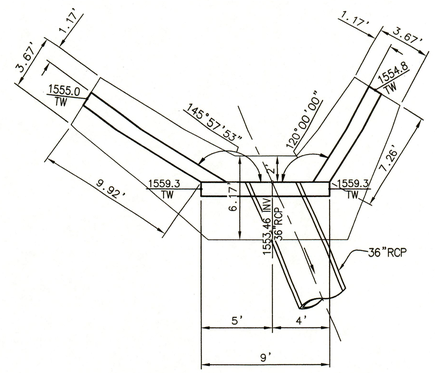

B/3 **PLAN VIEW**

SCALE: 1'=5'



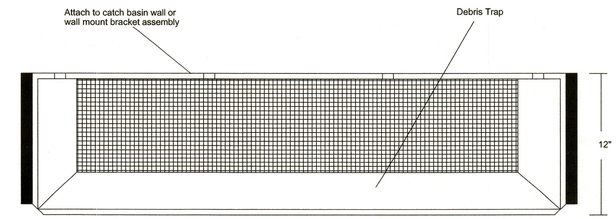

## ELEVATION

LOOKING DOWNSTREAM
SCALE: 1'=5'

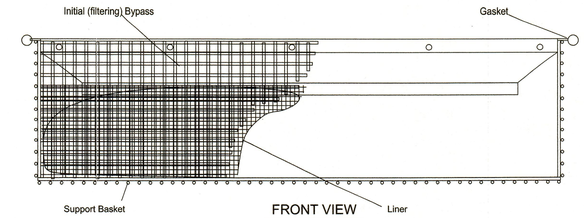



C/3 **PLAN VIEW**

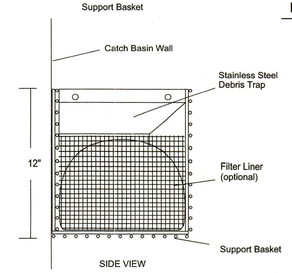
SCALE: 1'=5'




TOP VIEW




FRONT VIEW



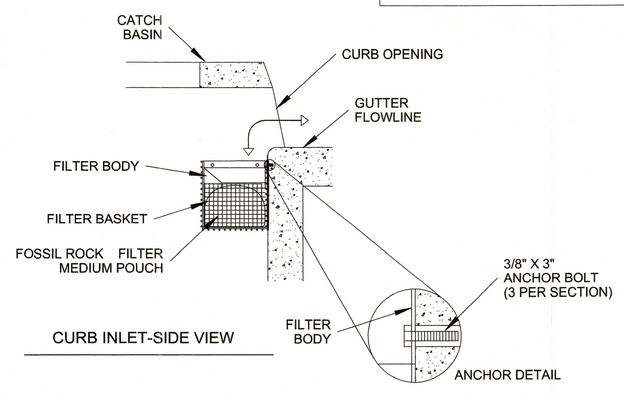

SIDE VIEW

**NOTES:**

1. **FloGard®+PLUS (curb mount) high capacity catch basin inserts are available in sizes to fit most industry-standard catch basin sizes and styles (see specifier chart). Refer to the FloGard®+PLUS (wall mount) insert for devices to fit non-standard or combination style catch basins.**
2. **Filter insert shall have both an "initial" filtering bypass and "ultimate" high-flow bypass feature.**
3. **Filter assembly shall be constructed from stainless steel (Type 304).**
4. **Allow a minimum of 2" of clearance below the inlet flowline, of allow a minimum of 14" clearance from bottom of inlet pipe to top of outlet pipe for in-line installations.**
5. **Filter medium shall be Fossil Rock ™ installed and maintained in accordance with manufacturer recommendations.**

**FLOGARD® +PLUS**
**CATCH BASIN FILTER INSERT**
(Curb Mount)
**CURB INLET**

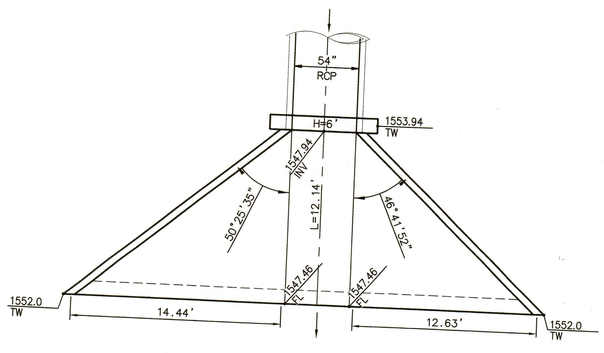
KriStar Enterprises, Inc., Santa Rosa, CA (800) 579-8819
11/05




CURB INLET-SIDE VIEW

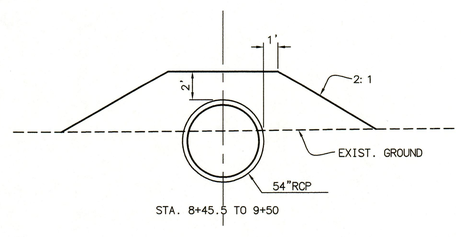
E/3 **INLET FILTER DETAIL**

NTS




A/3 **PLAN VIEW**

SCALE: 1'=5'




STA. 8+45.5 TO 9+50

D/3 **PIPE COVER DETAIL**

SCALE: 1'=5'

OWNER:
ALLAN DAVIS
RETAIL DEVELOPMENT ADVISORS CORP.
ORCHARD DEVELOPMENT GROUP. LLC
22875-F SAVI RANCH PARKWAY
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BENCH MARK DESCRIPTION: BRASS DISC ON CONCRETE POST STAMPED 600-16-68
LOCATION: 0.2 MI SOUTH ON WASHINGTON AVE. FROM MURRIETA POST OFFICE, 2.4 MI EAST ON LOS ALAMOS RD. 1 MI NORTH ON HWY 395 124' WEST OF THE SOUTH BOUND LANE AND 2' WEST OF THE HWY. R.O.W. FENCE 1' S'LY OF MARKER POST
RECORDED:
ELEVATION: 1356.76 DATUM:

RECOMMENDED FOR APPROVAL
WILLIAM G. BIXBY
PLAN CHECK FIRM: BUREAU VERITAS
R.C.E. NO.: 48819
EXP. DATE: 9-30-08
DATE 5/11/07

SCALE
HORIZONTAL
VERTICAL

PREPARED BY _____ DATE 05/04/07
ENGR. NAME TYPED WILLIAM D. KELLER
R.C.E NO. 44341 EXP. DATE 6-30-07

| DATE | INITIAL | REVISION DESCRIPTION | SHT. NO. | DATE | INITIAL |
|---|---|---|---|---|---|
| | | | | | |

ENGINEER OF WORK — CITY APPROVAL

SHEET 3 — CITY OF MURRIETA ENGINEERING DEPARTMENT — SHEETS 3

**OFFSITE STORM DRAIN IMPROVEMENTS**
**DP 2005-1800 & CUP 2005-1844**
**LINNEL LANE**
**HEADWALL DETAILS**

APPROVED _____ 5-18-07
ROBERT K. MUEHLING, P.E. ACTING CITY ENGINEER DATE
RCE 63056 EXP. DATE 6/30/08

DWN BY: _____
CHKD BY: _____
FIELD BK: _____
PROJECT NO. 05-30150-ISSD-3795
DRAWING NO. 07-382

H:\PDATA\15100980\CADD\LAND\DLV\OFF-SITE IMPROVEMENTS\STORM DRAIN\980LINSD3.DWG WDK 5/4/07 1:55 pm

# Proposed Hydrology Analysis

```
____________________________________________________________________________
___

****************************************************************************
***
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
         RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                       (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2006 Advanced Engineering Software (aes)
                       (Rational Tabling Version 6.0D)
                    Release Date: 06/01/2005  License ID 1553

                           Analysis prepared by:

                      LUNDSTROM ENGINEERING & SURVEYING
                           5333 MISSION CTR RD #115
                             SAN DIEGO, CA 92018


  ************************** DESCRIPTION OF STUDY
**************************
 * L244-05
*
 * PROPOSED 100 YEAR STORM
*
 *
*

****************************************************************************
*

   FILE NAME: C:\244PR100.DAT
   TIME/DATE OF STUDY: 09:16 06/26/2019
 ---------------------------------------------------------------------------
----
   USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 ---------------------------------------------------------------------------
----
   USER SPECIFIED STORM EVENT(YEAR) =  100.00
   SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
   SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE =
0.90
   2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.530
   100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.200
   COMPUTED RAINFALL INTENSITY DATA:
   STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
   SLOPE OF INTENSITY DURATION CURVE = 0.5500
   RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
   NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
         AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
   *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW
MODEL*
```

```
      HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:
MANNING
      WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE
FACTOR
 NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)
(n)
 ===  =====  =========  =================  ======  ===== ====== =====
=======
   1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167
0.0150

   GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
     1. Relative Flow-Depth =  1.00 FEET
        as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
     2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
   *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
    OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*


****************************************************************************
***
   FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
 ---------------------------------------------------------------------------
----
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
===
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
   TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   1575.00
   DOWNSTREAM ELEVATION(FEET) =   1573.00
   ELEVATION DIFFERENCE(FEET) =      2.00
   TC = 0.303*[(  100.00**3)/(     2.00)]**.2 =    4.182
   COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.707
   COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8898
   SOIL CLASSIFICATION IS "C"
   SUBAREA RUNOFF(CFS) =      0.42
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.42


****************************************************************************
***
   FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
 ---------------------------------------------------------------------------
----
   >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>(STREET TABLE SECTION #  1 USED)<<<<<

============================================================================
===
```

```
   UPSTREAM ELEVATION(FEET) = 1573.00  DOWNSTREAM ELEVATION(FEET) =
1565.00
   STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
   STREET HALFWIDTH(FEET) = 30.00

   DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
   INSIDE STREET CROSSFALL(DECIMAL) =  0.018
   OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

   SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
   STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
   Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =
0.0150
   Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

     **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.35
     STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
     STREET FLOW DEPTH(FEET) =  0.31
     HALFSTREET FLOOD WIDTH(FEET) =    8.34
     AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
     PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
   STREET FLOW TRAVEL TIME(MIN.) =   2.32   Tc(MIN.) =   7.32
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.817
   COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8878
   SOIL CLASSIFICATION IS "C"
   SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.83
   TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.25

   END OF SUBAREA STREET FLOW HYDRAULICS:
   DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.13
   FLOW VELOCITY(FEET/SEC.) =  3.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     500.00
FEET.


****************************************************************************
***
   FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
 ---------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =  1560.00  DOWNSTREAM(FEET) =  1559.50
   FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.2 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
   GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       4.25
   PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   7.47
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     550.00
FEET.
```

```
****************************************************************************
   FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
 ---------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

============================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.773
   COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
   SOIL CLASSIFICATION IS "C"
   SUBAREA AREA(ACRES) =    7.49   SUBAREA RUNOFF(CFS) =   25.09
   TOTAL AREA(ACRES) =        8.7   TOTAL RUNOFF(CFS) =      29.34
   TC(MIN.) =   7.47


****************************************************************************
   FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  41
 ---------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =  1559.50  DOWNSTREAM(FEET) =  1557.00
   FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  36.0 INCH PIPE IS  20.6 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
   GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      29.34
   PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   8.54
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1000.00
FEET.


****************************************************************************
   FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
 ---------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

============================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.506
   COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869
   SOIL CLASSIFICATION IS "C"
   SUBAREA AREA(ACRES) =    5.73   SUBAREA RUNOFF(CFS) =   17.82
   TOTAL AREA(ACRES) =       14.4   TOTAL RUNOFF(CFS) =      47.15
```

```
   TC(MIN.) =   8.54

****************************************************************************
***
   FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  41
 ---------------------------------------------------------------------------
----
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

============================================================================
===
   ELEVATION DATA: UPSTREAM(FEET) =  1552.50  DOWNSTREAM(FEET) =  1551.00
   FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  48.0 INCH PIPE IS  21.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   8.87
   GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      47.15
   PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   8.92
   LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1200.00
FEET.

============================================================================
===
   END OF STUDY SUMMARY:
   TOTAL AREA(ACRES)     =       14.4  TC(MIN.) =      8.92
   PEAK FLOW RATE(CFS)   =      47.15

============================================================================
===

============================================================================
===
   END OF RATIONAL METHOD ANALYSIS
```

# Table of Contents

********** POND ROUTING **********

POND 6..... Pond E-V-Q Table ..... 1.01

POND 6 IN 100
Node: Pond Inflow Summary ..... 1.04

POND 6 INF 100
Pond Infiltration HYG ..... 1.07

POND 6 OUT 100
Pond Routing Summary ..... 1.09
Detention Time ..... 1.10

S/N: B21A014070CD Lundstrom & Assoc.
PondPack Ver. 8.0068 Time: 10:20 AM Date: 6/26/2019
♀
Type.... Pond E-V-Q Table Page 1.01
Name.... POND 6
File.... C:\pondpack\L244-05 DETENTION.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\pondpack\
Inflow HYG file = NONE STORED - POND 6 IN 100
Outflow HYG file = NONE STORED - POND 6 OUT 100

Pond Node Data = POND 6
Pond Volume Data = POND 6
Pond Outlet Data = Outlet 1

Infiltration = 6.35 cfs

INITIAL CONDITIONS
---
Starting WS Elev = .00 ft
Starting Volume = 0 cu.ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = 1.00 min

| Elevation ft | Outflow cfs | Storage cu.ft | Infilt. cfs | Q Total cfs | 2S/t + O cfs |
|---|---|---|---|---|---|
| .00 | .00 | 0 | .00 | .00 | .00 |
| .10 | .00 | 1143 | 6.35 | 6.35 | 44.45 |
| .20 | .00 | 2286 | 6.35 | 6.35 | 82.55 |
| .30 | .00 | 3429 | 6.35 | 6.35 | 120.65 |
| .40 | .00 | 4572 | 6.35 | 6.35 | 158.75 |
| .50 | .00 | 5715 | 6.35 | 6.35 | 196.85 |
| .60 | .00 | 6858 | 6.35 | 6.35 | 234.95 |
| .70 | .00 | 8001 | 6.35 | 6.35 | 273.05 |
| .80 | .00 | 9144 | 6.35 | 6.35 | 311.15 |
| .90 | .00 | 10287 | 6.35 | 6.35 | 349.25 |
| 1.00 | .00 | 11430 | 6.35 | 6.35 | 387.35 |
| 1.10 | .00 | 12573 | 6.35 | 6.35 | 425.45 |
| 1.20 | .00 | 13716 | 6.35 | 6.35 | 463.55 |
| 1.30 | .00 | 14859 | 6.35 | 6.35 | 501.65 |
| 1.40 | .00 | 16002 | 6.35 | 6.35 | 539.75 |
| 1.50 | .00 | 17145 | 6.35 | 6.35 | 577.85 |
| 1.60 | .00 | 18288 | 6.35 | 6.35 | 615.95 |

| | | | | | |
|---|---|---|---|---|---|
| 1.70 | .00 | 19431 | 6.35 | 6.35 | 654.05 |
| 1.80 | .00 | 20574 | 6.35 | 6.35 | 692.15 |
| 1.90 | .00 | 21717 | 6.35 | 6.35 | 730.25 |

S/N: B21A014070CD Lundstrom & Assoc.
PondPack Ver. 8.0068 Time: 10:20 AM Date: 6/26/2019
♀
Type.... Pond E-V-Q Table Page 1.02
Name.... POND 6
File.... C:\pondpack\L244-05 DETENTION.PPW

LEVEL POOL ROUTING DATA

```
HYG Dir          = C:\pondpack\
Inflow  HYG file = NONE STORED - POND 6       IN  100
Outflow HYG file = NONE STORED - POND 6       OUT 100

Pond Node   Data = POND 6
Pond Volume Data = POND 6
Pond Outlet Data = Outlet 1

Infiltration =     6.35 cfs

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =      .00 ft
Starting Volume    =        0 cu.ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =     1.00 min
```

| Elevation ft | Outflow cfs | Storage cu.ft | Infilt. cfs | Q Total cfs | 2S/t + O cfs |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 2.00 | .00 | 22860 | 6.35 | 6.35 | 768.35 |
| 2.10 | .00 | 24003 | 6.35 | 6.35 | 806.45 |
| 2.20 | .00 | 25146 | 6.35 | 6.35 | 844.55 |
| 2.30 | .00 | 26289 | 6.35 | 6.35 | 882.65 |
| 2.40 | .00 | 27432 | 6.35 | 6.35 | 920.75 |
| 2.50 | .00 | 28575 | 6.35 | 6.35 | 958.85 |
| 2.60 | .00 | 29718 | 6.35 | 6.35 | 996.95 |
| 2.70 | .00 | 30861 | 6.35 | 6.35 | 1035.05 |
| 2.80 | .00 | 32004 | 6.35 | 6.35 | 1073.15 |
| 2.90 | .00 | 33147 | 6.35 | 6.35 | 1111.25 |
| 3.00 | .00 | 34290 | 6.35 | 6.35 | 1149.35 |
| 3.10 | .89 | 35613 | 6.35 | 7.24 | 1194.34 |
| 3.20 | 2.53 | 36936 | 6.35 | 8.88 | 1240.08 |
| 3.30 | 4.65 | 38259 | 6.35 | 11.00 | 1286.29 |
| 3.40 | 7.15 | 39582 | 6.35 | 13.50 | 1332.90 |
| 3.50 | 10.00 | 40905 | 6.35 | 16.35 | 1379.84 |
| 3.60 | 13.14 | 42228 | 6.35 | 19.49 | 1427.09 |
| 3.70 | 16.56 | 43551 | 6.35 | 22.91 | 1474.61 |
| 3.80 | 20.23 | 44874 | 6.35 | 26.58 | 1522.38 |
| 3.90 | 24.14 | 46197 | 6.35 | 30.49 | 1570.39 |



Type.... Pond E-V-Q Table Page 1.03
Name.... POND 6
File.... C:\pondpack\L244-05 DETENTION.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\pondpack\
Inflow HYG file = NONE STORED - POND 6 IN 100
Outflow HYG file = NONE STORED - POND 6 OUT 100

Pond Node Data = POND 6
Pond Volume Data = POND 6
Pond Outlet Data = Outlet 1

Infiltration = 6.35 cfs

INITIAL CONDITIONS
---
Starting WS Elev = .00 ft
Starting Volume = 0 cu.ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = 1.00 min

| Elevation ft | Outflow cfs | Storage cu.ft | Infilt. cfs | Q Total cfs | 2S/t + O cfs |
|---|---|---|---|---|---|
| 4.00 | 28.27 | 47520 | 6.35 | 34.62 | 1618.62 |

S/N: B21A014070CD Lundstrom & Assoc.
PondPack Ver. 8.0068 Time: 10:20 AM Date: 6/26/2019
♀

Type.... Node: Pond Inflow Summary Page 1.04
Name.... POND 6 IN Event: 100 yr
File.... C:\pondpack\L244-05 DETENTION.PPW
Storm... 100 Tag: 100

SUMMARY FOR HYDROGRAPH ADDITION
at Node: POND 6 IN

HYG Directory: C:\pondpack\

| Upstream Link ID | Upstream Node ID | HYG file | HYG ID | HYG tag |
|---|---|---|---|---|
| ADDLINK 10 | HYD | | HYG 1 | 100 YR |

INFLOWS TO: POND 6 IN

| HYG file | HYG ID | HYG tag | Volume cu.ft | Peak Time min | Peak Flow cfs |
|---|---|---|---|---|---|
| | HYG 1 | 100 YR | 68958 | 252.00 | 47.20 |

TOTAL FLOW INTO: POND 6 IN

| HYG file | HYG ID | HYG tag | Volume cu.ft | Peak Time min | Peak Flow cfs |
|---|---|---|---|---|---|
| | POND 6 IN | 100 | 68958 | 252.00 | 47.20 |

S/N: B21A014070CD Lundstrom & Assoc.
PondPack Ver. 8.0068 Time: 10:20 AM Date: 6/26/2019
♀
Type.... Node: Pond Inflow Summary Page 1.05
Name.... POND 6 IN Event: 100 yr
File.... C:\pondpack\L244-05 DETENTION.PPW
Storm... 100 Tag: 100

TOTAL NODE INFLOW...
HYG file =
HYG ID = POND 6 IN
HYG Tag = 100
---
Peak Discharge = 47.20 cfs
Time to Peak = 252.00 min
HYG Volume = 68958 cu.ft
---

HYDROGRAPH ORDINATES (cfs)
Output Time increment = 1.00 min
Time on left represents time for first value in each row.

| Time min | | | | | |
|---|---|---|---|---|---|
| 9.00 | .00 | .10 | .20 | .30 | .40 |
| 14.00 | .50 | .60 | .70 | .80 | .90 |
| 19.00 | .91 | .92 | .93 | .94 | .96 |
| 24.00 | .97 | .98 | .99 | 1.00 | 1.00 |
| 29.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 34.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 39.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 44.00 | 1.00 | 1.00 | 1.01 | 1.02 | 1.03 |
| 49.00 | 1.04 | 1.06 | 1.07 | 1.08 | 1.09 |
| 54.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 59.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 64.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 69.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.11 |
| 74.00 | 1.12 | 1.13 | 1.14 | 1.16 | 1.17 |
| 79.00 | 1.18 | 1.19 | 1.20 | 1.20 | 1.20 |
| 84.00 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |

| | | | | | |
|---|---|---|---|---|---|
| 89.00 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| 94.00 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| 99.00 | 1.20 | 1.21 | 1.22 | 1.23 | 1.24 |
| 104.00 | 1.26 | 1.27 | 1.28 | 1.29 | 1.30 |
| 109.00 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 |
| 114.00 | 1.30 | 1.30 | 1.30 | 1.30 | 1.31 |
| 119.00 | 1.32 | 1.33 | 1.34 | 1.36 | 1.37 |
| 124.00 | 1.38 | 1.39 | 1.40 | 1.41 | 1.42 |
| 129.00 | 1.43 | 1.44 | 1.46 | 1.47 | 1.48 |
| 134.00 | 1.49 | 1.50 | 1.51 | 1.52 | 1.53 |
| 139.00 | 1.54 | 1.56 | 1.57 | 1.58 | 1.59 |
| 144.00 | 1.60 | 1.60 | 1.60 | 1.60 | 1.60 |
| 149.00 | 1.60 | 1.60 | 1.60 | 1.60 | 1.60 |
| 154.00 | 1.62 | 1.64 | 1.67 | 1.69 | 1.71 |
| 159.00 | 1.73 | 1.76 | 1.78 | 1.80 | 1.81 |

S/N: B21A014070CD Lundstrom & Assoc.
PondPack Ver. 8.0068 Time: 10:20 AM Date: 6/26/2019
♀

Type.... Node: Pond Inflow Summary Page 1.06
Name.... POND 6 IN Event: 100 yr
File.... C:\pondpack\L244-05 DETENTION.PPW
Storm... 100 Tag: 100

HYDROGRAPH ORDINATES (cfs)
Output Time increment = 1.00 min
Time on left represents time for first value in each row.

| Time min | | | | | |
|---|---|---|---|---|---|
| 164.00 | 1.82 | 1.83 | 1.84 | 1.86 | 1.87 |
| 169.00 | 1.88 | 1.89 | 1.90 | 1.92 | 1.94 |
| 174.00 | 1.97 | 1.99 | 2.01 | 2.03 | 2.06 |
| 179.00 | 2.08 | 2.10 | 2.11 | 2.12 | 2.13 |
| 184.00 | 2.14 | 2.16 | 2.17 | 2.18 | 2.19 |
| 189.00 | 2.20 | 2.23 | 2.27 | 2.30 | 2.33 |
| 194.00 | 2.37 | 2.40 | 2.43 | 2.47 | 2.50 |
| 199.00 | 2.52 | 2.54 | 2.57 | 2.59 | 2.61 |
| 204.00 | 2.63 | 2.66 | 2.68 | 2.70 | 2.77 |

| | | | | | |
|---|---|---|---|---|---|
| 209.00 | 2.83 | 2.90 | 2.97 | 3.03 | 3.10 |
| 214.00 | 3.17 | 3.23 | 3.30 | 3.36 | 3.41 |
| 219.00 | 3.47 | 3.52 | 3.58 | 3.63 | 3.69 |
| 224.00 | 3.74 | 3.80 | 4.00 | 4.20 | 4.40 |
| 229.00 | 4.60 | 4.80 | 5.00 | 5.20 | 5.40 |
| 234.00 | 5.60 | 6.24 | 6.89 | 7.53 | 8.18 |
| 239.00 | 8.82 | 9.47 | 10.11 | 10.76 | 11.40 |
| 244.00 | 15.38 | 19.36 | 23.34 | 27.31 | 31.29 |
| 249.00 | 35.27 | 39.25 | 43.22 | 47.20 | 42.45 |
| 254.00 | 37.71 | 32.96 | 28.22 | 23.48 | 18.73 |
| 259.00 | 13.99 | 9.24 | 4.50 | 4.33 | 4.17 |
| 264.00 | 4.00 | 3.83 | 3.67 | 3.50 | 3.33 |
| 269.00 | 3.17 | 3.00 | 2.97 | 2.93 | 2.90 |
| 274.00 | 2.87 | 2.83 | 2.80 | 2.77 | 2.73 |
| 279.00 | 2.70 | 2.66 | 2.61 | 2.57 | 2.52 |
| 284.00 | 2.48 | 2.43 | 2.39 | 2.34 | 2.30 |
| 289.00 | 2.27 | 2.23 | 2.20 | 2.17 | 2.13 |
| 294.00 | 2.10 | 2.07 | 2.03 | 2.00 | 1.97 |
| 299.00 | 1.93 | 1.90 | 1.87 | 1.83 | 1.80 |
| 304.00 | 1.77 | 1.73 | 1.70 | 1.68 | 1.66 |
| 309.00 | 1.63 | 1.61 | 1.59 | 1.57 | 1.54 |
| 314.00 | 1.52 | 1.50 | 1.49 | 1.48 | 1.47 |
| 319.00 | 1.46 | 1.44 | 1.43 | 1.42 | 1.41 |
| 324.00 | 1.40 | 1.39 | 1.38 | 1.37 | 1.36 |
| 329.00 | 1.34 | 1.33 | 1.32 | 1.31 | 1.30 |
| 334.00 | 1.29 | 1.28 | 1.27 | 1.26 | 1.24 |
| 339.00 | 1.23 | 1.22 | 1.21 | 1.20 | 1.19 |
| 344.00 | 1.18 | 1.17 | 1.16 | 1.14 | 1.13 |
| 349.00 | 1.12 | 1.11 | 1.10 | 1.09 | 1.08 |
| 354.00 | 1.07 | 1.06 | 1.04 | 1.03 | 1.02 |
| 359.00 | 1.01 | 1.00 | .89 | .78 | .67 |
| 364.00 | .56 | .44 | .33 | .22 | .11 |
| 369.00 | .00 | | | | |

Type.... Pond Infiltration HYG 
Name.... POND 6 INF Tag: 100 Event: 100 yr
File.... C:\pondpack\
Storm... 100 Tag: 100

HYG file =
HYG ID = POND 6 INF
HYG Tag = 100

---

Peak Discharge = 6.35 cfs
Time to Peak = 238.00 min
HYG Volume = 68958 cu.ft

---

HYDROGRAPH ORDINATES (cfs)
Output Time increment = 1.00 min
Time on left represents time for first value in each row.

| Time min | | | | | |
|---|---|---|---|---|---|
| 9.00 | .00 | .01 | .05 | .11 | .18 |
| 14.00 | .26 | .34 | .43 | .52 | .61 |
| 19.00 | .70 | .76 | .81 | .85 | .88 |
| 24.00 | .90 | .92 | .94 | .95 | .97 |
| 29.00 | .98 | .98 | .99 | .99 | .99 |
| 34.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 39.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 44.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 |
| 49.00 | 1.02 | 1.03 | 1.04 | 1.05 | 1.06 |
| 54.00 | 1.07 | 1.08 | 1.08 | 1.09 | 1.09 |
| 59.00 | 1.09 | 1.10 | 1.10 | 1.10 | 1.10 |
| 64.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 69.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 74.00 | 1.11 | 1.11 | 1.12 | 1.13 | 1.14 |
| 79.00 | 1.15 | 1.16 | 1.17 | 1.18 | 1.18 |
| 84.00 | 1.19 | 1.19 | 1.19 | 1.20 | 1.20 |
| 89.00 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| 94.00 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| 99.00 | 1.20 | 1.20 | 1.21 | 1.21 | 1.22 |
| 104.00 | 1.23 | 1.24 | 1.25 | 1.26 | 1.27 |
| 109.00 | 1.28 | 1.28 | 1.29 | 1.29 | 1.29 |
| 114.00 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 |
| 119.00 | 1.31 | 1.31 | 1.32 | 1.33 | 1.34 |
| 124.00 | 1.35 | 1.36 | 1.37 | 1.38 | 1.39 |
| 129.00 | 1.40 | 1.41 | 1.42 | 1.43 | 1.44 |
| 134.00 | 1.46 | 1.47 | 1.48 | 1.49 | 1.50 |
| 139.00 | 1.51 | 1.52 | 1.53 | 1.54 | 1.56 |
| 144.00 | 1.57 | 1.58 | 1.58 | 1.59 | 1.59 |
| 149.00 | 1.59 | 1.60 | 1.60 | 1.60 | 1.60 |
| 154.00 | 1.60 | 1.61 | 1.62 | 1.64 | 1.66 |
| 159.00 | 1.68 | 1.70 | 1.72 | 1.74 | 1.76 |

S/N: B21A014070CD Lundstrom & Assoc.
PondPack Ver. 8.0068 Time: 10:20 AM Date: 6/26/2019
♀
Type.... Pond Infiltration HYG Page 1.08
Name.... POND 6 INF Tag: 100 Event: 100 yr
File.... C:\pondpack\
Storm... 100 Tag: 100

HYDROGRAPH ORDINATES (cfs)
Output Time increment = 1.00 min
Time on left represents time for first value in each row.

| Time min | | | | | |
|---|---|---|---|---|---|
| 164.00 | 1.77 | 1.79 | 1.80 | 1.82 | 1.83 |
| 169.00 | 1.84 | 1.85 | 1.87 | 1.88 | 1.89 |
| 174.00 | 1.91 | 1.93 | 1.95 | 1.97 | 1.99 |
| 179.00 | 2.01 | 2.03 | 2.06 | 2.07 | 2.09 |
| 184.00 | 2.10 | 2.12 | 2.13 | 2.14 | 2.15 |
| 189.00 | 2.17 | 2.18 | 2.20 | 2.22 | 2.25 |
| 194.00 | 2.28 | 2.31 | 2.34 | 2.37 | 2.40 |
| 199.00 | 2.43 | 2.46 | 2.49 | 2.51 | 2.54 |
| 204.00 | 2.56 | 2.59 | 2.61 | 2.63 | 2.66 |
| 209.00 | 2.70 | 2.75 | 2.80 | 2.86 | 2.92 |
| 214.00 | 2.98 | 3.04 | 3.11 | 3.17 | 3.23 |
| 219.00 | 3.29 | 3.35 | 3.41 | 3.46 | 3.52 |
| 224.00 | 3.58 | 3.63 | 3.71 | 3.82 | 3.96 |
| 229.00 | 4.11 | 4.28 | 4.46 | 4.64 | 4.83 |
| 234.00 | 5.02 | 5.28 | 5.65 | 6.09 | 6.35 |
| 239.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 244.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 249.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 254.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 259.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 264.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 269.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 274.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 279.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 284.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 289.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 294.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 299.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 304.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 309.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 314.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 319.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 324.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 329.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 334.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 339.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |

| | | | | | |
|---|---|---|---|---|---|
| 344.00 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| 349.00 | 6.35 | 6.35 | 6.35 | 6.35 | 5.55 |
| 354.00 | 4.27 | 3.35 | 2.69 | 2.22 | 1.88 |
| 359.00 | 1.63 | 1.45 | 1.31 | 1.17 | 1.04 |
| 364.00 | .92 | .80 | .68 | .57 | .45 |
| 369.00 | .34 | .24 | .17 | .12 | .09 |
| 374.00 | .06 | .05 | .03 | .02 | .02 |
| 379.00 | .01 | .01 | .01 | .00 | .00 |
| 384.00 | .00 | | | | |

```
S/N: B21A014070CD            Lundstrom & Assoc.
PondPack Ver. 8.0068                Time: 10:20 AM          Date: 6/26/2019
♀
   Type.... Pond Routing Summary                                  Page 1.09
   Name.... POND 6       OUT   Tag: 100                       Event: 100 yr
   File.... C:\pondpack\L244-05 DETENTION.PPW
   Storm... 100   Tag: 100

                       LEVEL POOL ROUTING SUMMARY

    HYG Dir          = C:\pondpack\
    Inflow  HYG file = NONE STORED - POND 6       IN  100
    Outflow HYG file = NONE STORED - POND 6       OUT 100

    Pond Node   Data = POND 6
    Pond Volume Data = POND 6
    Pond Outlet Data = Outlet 1

    Infiltration =     6.35 cfs

    INITIAL CONDITIONS
    ----------------------------------
    Starting WS Elev   =      .00 ft
    Starting Volume    =        0 cu.ft
    Starting Outflow   =      .00 cfs
    Starting Infiltr.  =      .00 cfs
    Starting Total Qout=      .00 cfs
    Time Increment     =     1.00 min
```

```
INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     47.20 cfs    at    252.00 min
Peak Outflow      =       .00 cfs    at     10.00 min
Peak Infiltration =      6.35 cfs    at    238.00 min
-----------------------------------------------------
Peak Elevation    =      2.20 ft
Peak Storage =          25150 cu.ft
=====================================================


MASS BALANCE (cu.ft)
--------------------------
+ Initial Vol  =           0
+ HYG Vol IN   =       68958
- Infiltration =       68958
- HYG Vol OUT  =           0
- Retained Vol =           0
                  ----------
Unrouted Vol =          -1 cu.ft  (.001% of Inflow Volume)
```





DETENTION TIMES SUMMARY

```
HYG Dir          = C:\pondpack\
Inflow  HYG file = NONE STORED - POND 6       IN  100
```

```
Outflow HYG file = NONE STORED - POND 6       OUT 100

Pond Node   Data = POND 6
Pond Volume Data = POND 6
Pond Outlet Data = Outlet 1

Infiltration =     6.35 cfs

APPROXIMATE DETENTION TIME
--------------------------------------
Tp, Outflow + Infilt.   =    238.00 min
Tp, Total Inflow        =    252.00 min
Peak to Peak            =    -14.00 min

Qout+Infilt. Centroid   =    249.81 min
Inflow Centroid         =    225.84 min
Centroid to Centroid    =     23.97 min

Weighted Avg. Plug Time =     24.82 min
Max.Plug Vol. Plug Time =     38.37 min
Max.Inflow Plug Volume  =      2713 cu.ft   (From 251.00 to 252.00 min)
--------------------------------------
```

S/N: B21A014070CD Lundstrom & Assoc.
PondPack Ver. 8.0068 Time: 10:20 AM Date: 6/26/2019
♀
Appendix A A-1

Index of Starting Page Numbers for ID Names

----- P -----
POND 6 IN 100... 1.04
POND 6 INF 100... 1.07
POND 6 OUT 100... 1.09, 1.10

S/N: B21A014070CD Lundstrom & Assoc.
PondPack Ver. 8.0068 Time: 10:20 AM Date: 6/26/2019
♀