# Appendix F
## Hydrology Study

ESA

# PRELIMINARY HYDROLOGY AND HYDRAULICS STUDY FOR THE VILLAGES AT PASEO DEL SOL

## TTM 36483 – PLANNING AREA 4

CITY OF TEMECULA
CALIFORNIA

*PREPARED FOR:*

CAL-PASEO DEL SOL, LLC.
4790 EASTGATE MALL SUITE 150
SAN DIEGO, CA 92121
(858) 217-2706

*PREPARED BY:*

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*DATE PREPARED:*
DECEMBER 10, 2016
REVISED:
MAY 17, 2019

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MAY 17, 2019
JUNE 6, 2019

This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.


Joseph L. Castaneda RCE 59835
Registered Civil Engineer

05/17/2019
Date

Seal

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## I. INTRODUCTION

The Villages at Paseo Del Sol is a Specific Plan (Specific Plan No. 219, Amendment No. 8) which is located in the City of Temecula. This report is specifically for Planning Area 4A of the Specific Plan, also referred to as Tentative Tract Map 36483. Planning area 4A proposes to construct approximately 43 acres of medium-high density residential development. The scope of this report includes:

- Determine the peak 100-year peak flow rates for post-project conditions for onsite areas using the Riverside County Flood Control and Water Conservation District (RCFC & WCD) Rational Method.
- Determine the required storm drain improvements to flood protect the site.
- Preparation of a hydrology and hydraulic report, which consists of hydrological and analytical results and exhibits

## II. PROJECT SITE AND DRAINAGE OVERVIEW

The Villages at Paseo Del Sol – TTM 36483 – Planning Area 4A, is a proposed medium-high density residential development located in the City of Temecula. The project site is roughly bounded by De Portola Road to the north, Butterfield Stage Road to the east, Temecula Parkway to the south, and residential development to the west.

The project site has been previously graded, and incorporates fill, earthen drainage ditches, and minor erosion control for the fill area. Currently, the project site discharges into the existing Line "S" Storm Drain system located within Temecula Parkway. The Line "S" Storm Drain is an 84" – 96" MS4 Facility maintained by Riverside County Flood Control and Water Conservation District. The Line "S" Storm Drain discharges directly into the Temecula Creek Channel (see Line "S" storm drain plans in Excerpt "A"). The offsite storm drain improvements have been analyzed as part of a separate report. This report supports the calculations and analyses for the onsite area only. The post-project onsite area will discharge into the proposed Line "A" Storm Drain system, which connects to the existing Line "A" Storm Drain (see Excerpt B) at De Portola Road and traverses the project site to the south, where it connects with the existing Line "S" Storm Drain.

The project site will construct medium-high density residential homes, a biofiltration basin, a subsurface basin and a modular wetlands for water quality treatment. The project site will also address hydromodifications as required by the Water Quality Management Plan. The water quality treatment has been discussed in the Water Quality Management Plan, and the hydromodification analyses has been included in a separate study.

The project did not require a pre-project condition analyses since the project is draining to existing MDP facilities, and have been designed for the ultimate build out of the tributary area. Any minor increase in flow rates will not adversely impact the design of the MDP system. The project is not within a 100-year flood hazard.

## III. HYDROLOGY ANALYSIS

The RCFC & WCD Hydrology Manual (Reference 1) was used to develop the hydrological parameters for the rational method. The calculations were performed using the computer program developed by Civil Cadd/Civil Design.

The existing soil types are Soils A and D, and is shown in Exhibit C. Exhibit C is a Hydrologic Soils Map which was obtained from the United States Department of Agriculture, Natural Resources Conservation Service (NRCS) WebSoil Survey.

The following rainfall depths (in inches) were utilized in the hydrology analyses, which were obtained from the RCFC & WCD Hydrology Manual's Isohyetal Maps:

| Storm Event | 1-Hour Duration |
|---|---|
| 2-Year | 0.55 |
| 100-Year | 1.30 |

The slope value used for the rational method value is 0.55. The rainfall maps have been included Exhibit D, and the slope of intensity duration curves have been included as Exhibit E.

The onsite watershed areas have been designated as areas A and B. Area A is tributary to the Line A1 and A2 systems, and Area B is the area tributary to the Line A2 systems. The onsite area was analyzed as condominium development, since this project site is medium-high density residential. The average lot size ranges from 5,200 sq. ft. to 7,000 sq. ft., which is smaller than the smallest lots for single family residential (1/4 acre residential). Therefore, the next higher impervious cover is associated with condominiums, per the RCFC&WCD Hydrology Manual.

Area A was broken into two separate areas with Area A1 being the area tributary to the splitter structure and Area A2 being the remainder of Area A. This was done in order to obtain a flow rate for the splitter structure, and then being able to add the flow rate through the splitter structure directly to the flows in the storm drain system downstream of the structure. Both hydrology models have been included in Appendix A.

Areas C through E are the offsite street areas. Butterfield Stage Road and De Portola

Road are tributary to existing catch basins, and Temecula Parkway flows continue to the south west to a catch basin approximately 280 feet downstream of the project site. The existing catch basins have all been sized for the ultimate tributary flow rate.

The rational method hydrology calculations have been included in Appendix A, and the rational method hydrology map has been included as Exhibit A.

## IV. HYDRAULIC ANALYSIS

The proposed project will incorporate subsurface storm drain to convey the flows generated from the onsite area. The offsite storm drain systems are being designed and analyzed per a separate study. During the preliminary stages, the storm drain systems were sized using normal depth calculations and a minimum slope of 0.5%, with the exception of the Line A1 storm drain crossing the Line A extension. During final engineering, the storm drain systems will be analyzed using the Water Surface Profile Gradient Program and downstream water surface elevations obtained from the Line A system and southerly channel system. The catch basins were sized using normal depth calculations, and detailed catch basin flow by analyses were calculated to determine the intercepted flows and corresponding pipe flow rates.

Street capacity calculations were performed in order to access the flooding within the streets, and ensure that the flows meet the following street design criteria:

- 10-year storm event flows shall be contained within the top of curb elevation
- 100-year storm event flows shall be contained within the right-of-way elevation

These parameters controlled the location in which catch basins were required. For locations other than low points, catch basins were provided when the abovementioned street criteria was exceeded. Due to the street section being a 60' width right-of-way to right-of-way, the centerline depth is 0.55 feet above the gutter flow line, and the top of curb is 0.50 feet above the gutter flow line, therefore the 10-year flows will be contained within one side of the street. Rating tables for the street capacity calculations for various slopes have been included in Appendix B.

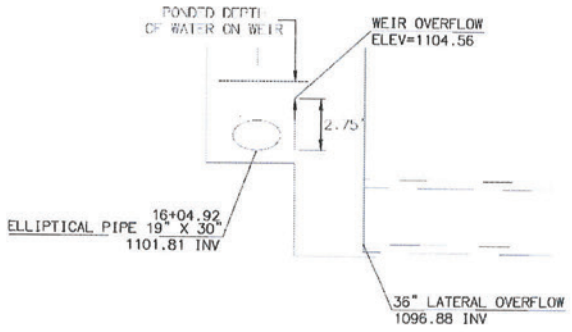
Once the location of the catch basins were determined, the catch basin sizing calculations were performed, and a spreadsheet summarizing the intercepted vs. by-pass flows was prepared. The following paragraphs document key factors in the hydraulic analyses.

The half street capacity at Catch Basin #1 is 10.51 $ft^3/s$, therefore an additional 1.36 $ft^3/s$ will overtop the centerline to Catch Basin #2. A catch basin flow by summary table has been provided in Appendix B.

During the preliminary stages, soffit control spreadsheets were utilized to size the storm drain systems. The downstream water surface elevation within the basin was obtained from a weir equation that utilized a 16 foot weir with a flow line elevation of 1104.00 (which was obtained from the Technical Memorandum: SWMM Modeling for Hydromodification Compliance of: Villas at Paseo del Sol, Temecula, CA, prepared by REC Consultants, and has been included as an attachment to the Water Quality Management Plan). Using these parameters, the resulting 100-year water surface elevation over the weir is 1105.26, and is the starting water surface elevation for Lines A1 and A2.

Due to the elevations of the storm drain and the starting water surface elevation, Line A1 had to incorporate elliptical pipe and some double elliptical pipe due to cover issues and crossing the main Line A system. The flow rates within the systems were based upon the hydrology flow rates for the mainlines (systems with more than one reach) and the intercepted flow rates for the laterals (one reach systems).

The elevations of the site and the requirement for the crossing of Line A resulted in the design of a splitter structure that would allow for low flows to bypass to the biofiltration basin, and for flows in excess to pass to Lateral A1 and discharge directly into the Line A system. In order to determine the flows that are tributary to the low flow system and the bypass system, an iterative calculation had to be performed using a nomograph for the low flow and a weir equation for the overtopping flows. The baffle wall inside the splitter structure is 2.75 feet higher than the invert of the 24" equivalent pipe. Therefore, the depth of water at the upstream end of the 24" pipe would be 2.75 feet more than the depth of water on top of the weir, as shown in the figure below:




An iteration was performed until the depth of water at the 24" pipe was equal to the depth of water on the weir plus 2.75 feet. Based upon a nomograph (included in Appendix B), a flow rate of 23 $ft^3/s$ would result in an approximate depth of 3.50 feet (elevation 1105.31). The remaining flow rate through the weir would be 33.76 $ft^3/s$

minus 23.00 $ft^3/s$, equaling 10.76 $ft^3/s$. Using an 8 foot weir length, the resulting ponded depth on the weir is 0.59 feet. The weir invert elevation is 1104.56, resulting in a water surface elevation of 1105.15. This is only 0.16 feet off from the nomograph water surface elevation of 1105.31, and therefore the flows are nearly balanced within the structure. The 23.00 $ft^3/s$ was added to the flow rates within the pipe downstream of the structure directly. It should be noted that the flow rate of 23.00 $ft^3/s$ is based upon a singular 24" pipe (or equivalent elliptical pipe), however, the required pipe to convey the flows downstream (due to upstream water surface elevations at Catch Basins #3 and #4). During final engineering, the exact design of this will be determined, and that the analyses and design are consistent.

The Lateral A bypass storm drain utilized a starting water surface elevation that was obtained from the Tentative Tract Map 36483 Storm Drain Plan for Line "A", and was interpolated to be approximately 1104.50. The upstream water surface elevation for Lateral A could not exceed 1104.56 (which is the flow line elevation of the baffle wall/weir located inside of the splitter structure), and based upon the calculations using a 42" storm drain, the upstream water surface elevation is 1104.53, therefore the splitter structure will function in the 100-year condition. The downstream water surface elevation for the Line B system was also obtained from the Line A improvement plans, and was interpolated to be approximately 1106.50. The Line C storm drain utilized the soffit elevation as the starting water surface elevation, since the water surface elevation in the channel is significantly lower than the storm drain. This would result in the most conservative storm drain size.

The lateral storm drain systems utilized a minimum slope of 0.5% for the preliminary analyses. During final engineering, detailed water surface profile gradient program calculations (and additional hydraulic calculations as needed) will be provided.

The street capacity calculations, catch basin sizing calculations, catch basin flow-by summary table, and storm drain sizing calculations have been included in Appendix B. The Drainage Facilities Map has been included as Exhibit B.

## V. CONCLUSIONS

Preliminary hydrology and hydraulic analyses were performed for the Villages at Paseo Del Sol – TTM 36483 – Planning Area 4A to determine the required storm drain to flood protect the site and meet the street flooding criteria. The following can be concluded:

1. The limits of storm drain allow for the 10-year flows to be contained within the top-of-curb elevation and the 100-year flows to be contained within the right-of-way elevation.

2. The proposed storm drain systems will adequately convey the proposed 100-year flow rates.

## VI. REFERENCES

1. Riverside County Flood Control and Water Conservation District Hydrology Manual, April 1978.
2. Los Angeles County Flood Control Design Manual, March 1982

# FIGURES

**FIGURE 1:** VICINITY MAP


# VILLAGES AT PASEO DEL SOL - PLANNING AREA 4
# VICINITY MAP

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FIGURE 1

Drawing Name: O:\108.30.13\Engineering\Hydrology_Plan\Exhibits\Vicinity Map.dwg
Last Opened: Dec 13, 2018 - 11:58am by jcarver

# APPENDICES

# APPENDIX A: POST-PROJECT CONDITION ONSITE RATIONAL METHOD HYDROLOGY ANALYSIS

# APPENDIX A.1: AREA A

## 100-YEAR

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
       Rational Hydrology Study        Date: 05/17/19  File:ARA1100.out
------------------------------------------------------------------------
108.30.13
100-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA A1
ARA1100.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6279

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.300(In/Hr)
Slope of intensity duration curve = 0.5500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   728.000(Ft.)
Top (of initial area) elevation =  1125.000(Ft.)
Bottom (of initial area) elevation =  1113.300(Ft.)
Difference in elevation =    11.700(Ft.)
Slope =    0.01607  s(percent)=       1.61
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.799 min.
Rainfall intensity =      3.180(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.615(CFS)
Total initial stream area =        2.050(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1113.300(Ft.)
End of street segment elevation =  1109.500(Ft.)
Length of street segment  =   413.000(Ft.)
```

```
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      8.839(CFS)
Depth of flow =   0.468(Ft.), Average velocity =   2.657(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.763(Ft.)
Flow velocity =   2.66(Ft/s)
Travel time =    2.59 min.     TC =   14.39  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      2.851(In/Hr) for a   100.0 year storm
Subarea runoff =      6.259(CFS) for      2.560(Ac.)
Total runoff =     11.874(CFS)        Total area =       4.610(Ac.)
Street flow at end of street =     11.874(CFS)
Half street flow at end of street =      5.937(CFS)
Depth of flow =   0.510(Ft.), Average velocity =   2.752(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    0.48(Ft.)
Flow width (from curb towards crown)=  12.846(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1105.500(Ft.)
Downstream point/station elevation =  1105.000(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.874(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    11.874(CFS)
Normal flow depth in pipe =   13.22(In.)
Flow top width inside pipe =   15.90(In.)
Critical Depth =   15.71(In.)
Pipe flow velocity =      8.53(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    14.45 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.610(Ac.)
Runoff from this stream =     11.874(CFS)
Time of concentration =   14.45 min.
Rainfall intensity =     2.844(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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Process from Point/Station      104.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance =   766.000(Ft.)
Top (of initial area) elevation =  1119.100(Ft.)
Bottom (of initial area) elevation =  1109.700(Ft.)
Difference in elevation =     9.400(Ft.)
Slope =    0.01227  s(percent)=       1.23
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.709 min.
Rainfall intensity =      3.053(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.069(CFS)
Total initial stream area =        1.550(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation =  1105.700(Ft.)
Downstream point/station elevation =  1105.000(Ft.)
Pipe length  =   137.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.069(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.069(CFS)
Normal flow depth in pipe =   10.93(In.)
Flow top width inside pipe =   13.34(In.)
Critical Depth =    9.80(In.)
Pipe flow velocity =      4.25(Ft/s)
Travel time through pipe =    0.54 min.
Time of concentration (TC) =    13.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      4.069(CFS)
Time of concentration =   13.25 min.
Rainfall intensity =     2.984(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       11.874      14.45               2.844
2        4.069      13.25               2.984
Largest stream flow has longer time of concentration
Qp =     11.874 + sum of
          Qb          Ia/Ib
           4.069 *     0.953 =      3.879
Qp =     15.753

Total of 2 main streams to confluence:
Flow rates before confluence point:
      11.874       4.069
Area of streams before confluence:
        4.610        1.550
```

```
Results of confluence:
Total flow rate =      15.753(CFS)
Time of concentration =     14.450 min.
Effective stream area after confluence  =       6.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1105.000(Ft.)
Downstream point/station elevation =  1104.000(Ft.)
Pipe length  =     55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     15.753(CFS)
Nearest computed pipe diameter  =      21.00(In.)
Calculated individual pipe flow  =     15.753(CFS)
Normal flow depth in pipe =    13.41(In.)
Flow top width inside pipe =    20.18(In.)
Critical Depth =    17.59(In.)
Pipe flow velocity =       9.71(Ft/s)
Travel time through pipe =     0.09 min.
Time of concentration (TC) =     14.54 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      108.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =       6.160(Ac.)
Runoff from this stream =      15.753(CFS)
Time of concentration =    14.54 min.
Rainfall intensity =      2.834(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.100 to Point/Station      107.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =    421.000(Ft.)
Top (of initial area) elevation =  1128.000(Ft.)
Bottom (of initial area) elevation =  1107.000(Ft.)
Difference in elevation =     21.000(Ft.)
Slope =    0.04988  s(percent)=       4.99
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =     7.557 min.
Rainfall intensity =      4.063(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.869
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.566(CFS)
Total initial stream area =        1.010(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.200 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1104.500(Ft.)
Downstream point/station elevation =  1104.000(Ft.)
Pipe length  =     21.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =     3.566(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.566(CFS)
Normal flow depth in pipe =    7.04(In.)
Flow top width inside pipe =   11.82(In.)
Critical Depth =    9.68(In.)
Pipe flow velocity =      7.45(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     7.60 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.200 to Point/Station      108.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.010(Ac.)
Runoff from this stream =      3.566(CFS)
Time of concentration =    7.60 min.
Rainfall intensity =     4.049(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                  (In/Hr)


1       15.753     14.54                2.834
2        3.566      7.60                4.049
Largest stream flow has longer time of concentration
Qp =     15.753 + sum of
          Qb          Ia/Ib
           3.566 *    0.700 =      2.496
Qp =     18.249

Total of 2 main streams to confluence:
Flow rates before confluence point:
      15.753       3.566
Area of streams before confluence:
        6.160        1.010


Results of confluence:
Total flow rate =     18.249(CFS)
Time of concentration =    14.544 min.
Effective stream area after confluence  =      7.170(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      113.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1104.000(Ft.)
Downstream point/station elevation =  1103.500(Ft.)
Pipe length  =   239.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.249(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    18.249(CFS)
Normal flow depth in pipe =   23.86(In.)
Flow top width inside pipe =   24.21(In.)
Critical Depth =   17.37(In.)
Pipe flow velocity =      4.36(Ft/s)
Travel time through pipe =    0.91 min.
Time of concentration (TC) =    15.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      113.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
```

```
In Main Stream number: 1
Stream flow area =      7.170(Ac.)
Runoff from this stream =      18.249(CFS)
Time of concentration =   15.46 min.
Rainfall intensity =     2.741(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   748.000(Ft.)
Top (of initial area) elevation =  1120.000(Ft.)
Bottom (of initial area) elevation =  1107.200(Ft.)
Difference in elevation =    12.800(Ft.)
Slope =    0.01711  s(percent)=       1.71
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.779 min.
Rainfall intensity =      3.183(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.621(CFS)
Total initial stream area =        2.050(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      113.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1104.500(Ft.)
Downstream point/station elevation =  1103.500(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.621(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.621(CFS)
Normal flow depth in pipe =    8.72(In.)
Flow top width inside pipe =   10.70(In.)
Critical Depth =   11.32(In.)
Pipe flow velocity =      9.19(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    11.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      113.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.050(Ac.)
Runoff from this stream =      5.621(CFS)
Time of concentration =   11.84 min.
Rainfall intensity =     3.175(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      112.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   779.000(Ft.)
Top (of initial area) elevation =  1120.000(Ft.)
Bottom (of initial area) elevation =  1107.200(Ft.)
```

```
Difference in elevation =    12.800(Ft.)
Slope =    0.01643  s(percent)=       1.64
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.069 min.
Rainfall intensity =      3.141(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      6.760(CFS)
Total initial stream area =        2.500(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1104.500(Ft.)
Downstream point/station elevation =  1103.500(Ft.)
Pipe length  =    17.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.760(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.760(CFS)
Normal flow depth in pipe =    7.99(In.)
Flow top width inside pipe =   11.32(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.17(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    12.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.500(Ac.)
Runoff from this stream =      6.760(CFS)
Time of concentration =   12.09 min.
Rainfall intensity =     3.137(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                 (In/Hr)


1        18.249      15.46                2.741
2         5.621      11.84                3.175
3         6.760      12.09                3.137
Largest stream flow has longer time of concentration
Qp =      18.249 + sum of
           Qb          Ia/Ib
            5.621 *     0.863 =      4.853
           Qb          Ia/Ib
            6.760 *     0.874 =      5.906
Qp =      29.007

Total of 3 main streams to confluence:
Flow rates before confluence point:
      18.249       5.621       6.760
Area of streams before confluence:
        7.170       2.050       2.500


Results of confluence:
```

```
Total flow rate =      29.007(CFS)
Time of concentration =     15.459 min.
Effective stream area after confluence  =      11.720(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      114.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1103.500(Ft.)
Downstream point/station elevation =  1103.000(Ft.)
Pipe length  =     98.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     29.007(CFS)
Nearest computed pipe diameter  =      30.00(In.)
Calculated individual pipe flow  =     29.007(CFS)
Normal flow depth in pipe =   24.33(In.)
Flow top width inside pipe =   23.49(In.)
Critical Depth =   22.03(In.)
Pipe flow velocity =       6.80(Ft/s)
Travel time through pipe =     0.24 min.
Time of concentration (TC) =     15.70 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      114.000 to Point/Station      114.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.824
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Time of concentration =    15.70 min.
Rainfall intensity =       2.718(In/Hr) for a   100.0 year storm
Subarea runoff =       4.748(CFS) for      2.120(Ac.)
Total runoff =     33.755(CFS)        Total area =      13.840(Ac.)
End of computations, total study area =           13.84 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.388
Area averaged RI index number =  75.0
```

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
       Rational Hydrology Study        Date: 05/16/19  File:ARA2100.out
------------------------------------------------------------------------
108.30.13
100-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA A2
ARA2100.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6279

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.300(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      116.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   707.000(Ft.)
Top (of initial area) elevation =  1119.500(Ft.)
Bottom (of initial area) elevation =  1106.000(Ft.)
Difference in elevation =    13.500(Ft.)
Slope =    0.01909  s(percent)=       1.91
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.266 min.
Rainfall intensity =      3.262(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.512(CFS)
Total initial stream area =        1.960(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      116.000 to Point/Station      119.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1103.500(Ft.)
Downstream point/station elevation =  1101.800(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =     5.512(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.512(CFS)
Normal flow depth in pipe =    9.13(In.)
Flow top width inside pipe =   10.24(In.)
Critical Depth =   11.28(In.)
Pipe flow velocity =      8.60(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    11.38 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      116.000 to Point/Station      119.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.960(Ac.)
Runoff from this stream =      5.512(CFS)
Time of concentration =   11.38 min.
Rainfall intensity =     3.243(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      117.000 to Point/Station      118.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   433.000(Ft.)
Top (of initial area) elevation =  1110.000(Ft.)
Bottom (of initial area) elevation =  1106.000(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00924  s(percent)=       0.92
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.707 min.
Rainfall intensity =      3.354(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.764(CFS)
Total initial stream area =        1.300(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1103.500(Ft.)
Downstream point/station elevation =  1101.800(Ft.)
Pipe length  =   145.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.764(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.764(CFS)
Normal flow depth in pipe =    9.59(In.)
Flow top width inside pipe =    9.62(In.)
Critical Depth =    9.91(In.)
Pipe flow velocity =      5.60(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    11.14 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.300(Ac.)
Runoff from this stream =      3.764(CFS)
Time of concentration =   11.14 min.
Rainfall intensity =     3.282(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1        5.512     11.38               3.243
2        3.764     11.14               3.282
Largest stream flow has longer time of concentration
Qp =      5.512 + sum of
          Qb          Ia/Ib
           3.764 *    0.988 =      3.719
Qp =      9.231

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.512       3.764
Area of streams before confluence:
        1.960        1.300


Results of confluence:
Total flow rate =      9.231(CFS)
Time of concentration =    11.385 min.
Effective stream area after confluence  =      3.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      122.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1101.800(Ft.)
Downstream point/station elevation =  1101.600(Ft.)
Pipe length  =   145.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.231(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =     9.231(CFS)
Normal flow depth in pipe =   18.30(In.)
Flow top width inside pipe =   25.23(In.)
Critical Depth =   12.55(In.)
Pipe flow velocity =      3.22(Ft/s)
Travel time through pipe =    0.75 min.
Time of concentration (TC) =    12.14 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      122.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.260(Ac.)
Runoff from this stream =      9.231(CFS)
Time of concentration =   12.14 min.
Rainfall intensity =     3.131(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      121.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   565.000(Ft.)
Top (of initial area) elevation =  1123.700(Ft.)
Bottom (of initial area) elevation =  1110.200(Ft.)
```

```
Difference in elevation =    13.500(Ft.)
Slope =    0.02389  s(percent)=       2.39
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.848 min.
Rainfall intensity =      3.512(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.223(CFS)
Total initial stream area =        1.720(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      121.000 to Point/Station      122.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1106.200(Ft.)
Downstream point/station elevation =  1101.600(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.223(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.223(CFS)
Normal flow depth in pipe =    6.24(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =   11.13(In.)
Pipe flow velocity =     12.66(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     9.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      121.000 to Point/Station      122.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.720(Ac.)
Runoff from this stream =      5.223(CFS)
Time of concentration =    9.93 min.
Rainfall intensity =     3.497(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        9.231     12.14               3.131
2        5.223      9.93               3.497
Largest stream flow has longer time of concentration
Qp =      9.231 + sum of
          Qb         Ia/Ib
           5.223 *    0.895 =      4.677
Qp =     13.908

Total of 2 main streams to confluence:
Flow rates before confluence point:
       9.231       5.223
Area of streams before confluence:
        3.260        1.720


Results of confluence:
Total flow rate =     13.908(CFS)
Time of concentration =    12.136 min.
Effective stream area after confluence  =      4.980(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      122.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1101.600(Ft.)
Downstream point/station elevation =  1100.800(Ft.)
Pipe length  =   244.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.908(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    13.908(CFS)
Normal flow depth in pipe =   18.00(In.)
Flow top width inside pipe =   25.46(In.)
Critical Depth =   15.55(In.)
Pipe flow velocity =      4.94(Ft/s)
Travel time through pipe =    0.82 min.
Time of concentration (TC) =    12.96 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      122.000 to Point/Station      128.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.980(Ac.)
Runoff from this stream =     13.908(CFS)
Time of concentration =   12.96 min.
Rainfall intensity =     3.020(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      123.000 to Point/Station      124.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   750.000(Ft.)
Top (of initial area) elevation =  1125.500(Ft.)
Bottom (of initial area) elevation =  1109.000(Ft.)
Difference in elevation =    16.500(Ft.)
Slope =    0.02200  s(percent)=       2.20
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.214 min.
Rainfall intensity =      3.270(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      7.219(CFS)
Total initial stream area =        2.560(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      124.000 to Point/Station      127.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1105.000(Ft.)
Downstream point/station elevation =  1102.000(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.219(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     7.219(CFS)
Normal flow depth in pipe =    7.34(In.)
Flow top width inside pipe =   11.70(In.)
Critical depth could not be calculated.
```

```
Pipe flow velocity =     14.33(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    11.25 min.


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Process from Point/Station      124.000 to Point/Station      127.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.560(Ac.)
Runoff from this stream =      7.219(CFS)
Time of concentration =   11.25 min.
Rainfall intensity =     3.264(In/Hr)


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Process from Point/Station      125.000 to Point/Station      126.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   608.000(Ft.)
Top (of initial area) elevation =  1123.700(Ft.)
Bottom (of initial area) elevation =  1109.000(Ft.)
Difference in elevation =    14.700(Ft.)
Slope =    0.02418  s(percent)=       2.42
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.118 min.
Rainfall intensity =      3.460(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.864
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.964(CFS)
Total initial stream area =        1.660(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      126.000 to Point/Station      127.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1105.000(Ft.)
Downstream point/station elevation =  1102.000(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.964(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.964(CFS)
Normal flow depth in pipe =    5.88(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =   10.98(In.)
Pipe flow velocity =     12.98(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    10.16 min.


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Process from Point/Station      126.000 to Point/Station      127.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.660(Ac.)
Runoff from this stream =      4.964(CFS)
Time of concentration =   10.16 min.
Rainfall intensity =     3.452(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

```
 No.       (CFS)        (min)                  (In/Hr)


1        7.219      11.25                 3.264
2        4.964      10.16                 3.452
Largest stream flow has longer time of concentration
Qp =      7.219 + sum of
          Qb          Ia/Ib
           4.964 *     0.945 =       4.693
Qp =     11.912

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.219        4.964
Area of streams before confluence:
        2.560        1.660
Results of confluence:
Total flow rate =      11.912(CFS)
Time of concentration =     11.254 min.
Effective stream area after confluence =       4.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      127.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1102.000(Ft.)
Downstream point/station elevation =  1100.800(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.912(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    11.912(CFS)
Normal flow depth in pipe =   10.62(In.)
Flow top width inside pipe =   17.71(In.)
Critical Depth =   15.74(In.)
Pipe flow velocity =     10.98(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    11.31 min.


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Process from Point/Station      127.000 to Point/Station      128.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.220(Ac.)
Runoff from this stream =     11.912(CFS)
Time of concentration =   11.31 min.
Rainfall intensity =     3.254(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1       13.908      12.96                3.020
2       11.912      11.31                3.254
Largest stream flow has longer time of concentration
Qp =     13.908 + sum of
          Qb          Ia/Ib
          11.912 *     0.928 =      11.055
Qp =     24.963

Total of 2 main streams to confluence:
Flow rates before confluence point:
      13.908       11.912
Area of streams before confluence:
        4.980        4.220
```

```
Results of confluence:
Total flow rate =      24.963(CFS)
Time of concentration =     12.960 min.
Effective stream area after confluence  =       9.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      131.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1100.800(Ft.)
Downstream point/station elevation =  1100.300(Ft.)
Pipe length  =   160.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.963(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    24.963(CFS)
Normal flow depth in pipe =   23.25(In.)
Flow top width inside pipe =   30.11(In.)
Critical Depth =   19.88(In.)
Pipe flow velocity =       5.58(Ft/s)
Travel time through pipe =     0.48 min.
Time of concentration (TC) =     13.44 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      131.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =       9.200(Ac.)
Runoff from this stream =      24.963(CFS)
Time of concentration =   13.44 min.
Rainfall intensity =     2.960(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      129.000 to Point/Station      130.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   242.000(Ft.)
Top (of initial area) elevation =  1110.000(Ft.)
Bottom (of initial area) elevation =  1107.000(Ft.)
Difference in elevation =      3.000(Ft.)
Slope =    0.01240  s(percent)=       1.24
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.000 min.
Rainfall intensity =      3.938(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.393(CFS)
Total initial stream area =        0.700(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      131.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1103.000(Ft.)
Downstream point/station elevation =  1100.300(Ft.)
Pipe length  =    14.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.393(CFS)
Nearest computed pipe diameter  =      6.00(In.)
```

```
Calculated individual pipe flow  =     2.393(CFS)
Normal flow depth in pipe =    4.77(In.)
Flow top width inside pipe =    4.85(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.30(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      131.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.700(Ac.)
Runoff from this stream =      2.393(CFS)
Time of concentration =    8.02 min.
Rainfall intensity =     3.933(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                  (In/Hr)


1       24.963     13.44                2.960
2        2.393      8.02                3.933
Largest stream flow has longer time of concentration
Qp =     24.963 + sum of
          Qb         Ia/Ib
           2.393 *    0.753 =      1.801
Qp =     26.764

Total of 2 main streams to confluence:
Flow rates before confluence point:
      24.963       2.393
Area of streams before confluence:
       9.200        0.700


Results of confluence:
Total flow rate =     26.764(CFS)
Time of concentration =    13.438 min.
Effective stream area after confluence  =      9.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      131.000 to Point/Station      137.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1100.300(Ft.)
Downstream point/station elevation =  1100.200(Ft.)
Pipe length  =    17.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.764(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    26.764(CFS)
Normal flow depth in pipe =   21.26(In.)
Flow top width inside pipe =   27.26(In.)
Critical Depth =   21.16(In.)
Pipe flow velocity =      7.19(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    13.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      131.000 to Point/Station      137.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.900(Ac.)
```

```
Runoff from this stream =      26.764(CFS)
Time of concentration =    13.48 min.
Rainfall intensity =      2.956(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      133.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =    826.000(Ft.)
Top (of initial area) elevation =   1146.300(Ft.)
Bottom (of initial area) elevation =   1106.300(Ft.)
Difference in elevation =     40.000(Ft.)
Slope =     0.04843   s(percent)=        4.84
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =     9.954 min.
Rainfall intensity =       3.492(In/Hr) for a    100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.829
Decimal fraction soil group A = 0.420
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.580
RI index for soil(AMC 2)   =  56.94
Pervious area fraction =  0.350; Impervious fraction =   0.650
Initial subarea runoff =      13.756(CFS)
Total initial stream area =         4.750(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      133.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   1102.300(Ft.)
Downstream point/station elevation =   1101.000(Ft.)
Pipe length  =     67.00(Ft.)    Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     13.756(CFS)
Nearest computed pipe diameter  =      18.00(In.)
Calculated individual pipe flow  =     13.756(CFS)
Normal flow depth in pipe =    13.88(In.)
Flow top width inside pipe =    15.13(In.)
Critical Depth =    16.50(In.)
Pipe flow velocity =       9.41(Ft/s)
Travel time through pipe =     0.12 min.
Time of concentration (TC) =     10.07 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      133.000 to Point/Station      136.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =       4.750(Ac.)
Runoff from this stream =      13.756(CFS)
Time of concentration =    10.07 min.
Rainfall intensity =      3.469(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      135.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =    258.000(Ft.)
Top (of initial area) elevation =   1110.700(Ft.)
Bottom (of initial area) elevation =   1107.200(Ft.)
Difference in elevation =      3.500(Ft.)
Slope =     0.01357   s(percent)=        1.36
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =     8.060 min.
```

```
Rainfall intensity =      3.921(In/Hr) for a   100.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.165(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      135.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1103.200(Ft.)
Downstream point/station elevation =  1101.000(Ft.)
Pipe length  =    12.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.165(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.165(CFS)
Normal flow depth in pipe =    4.22(In.)
Flow top width inside pipe =    8.98(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.58(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     8.07 min.


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Process from Point/Station      135.000 to Point/Station      136.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      3.165(CFS)
Time of concentration =    8.07 min.
Rainfall intensity =     3.918(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                  (In/Hr)


1       13.756     10.07                  3.469
2        3.165      8.07                  3.918
Largest stream flow has longer time of concentration
Qp =     13.756 + sum of
          Qb         Ia/Ib
           3.165 *    0.885 =      2.803
Qp =     16.559

Total of 2 streams to confluence:
Flow rates before confluence point:
      13.756       3.165
Area of streams before confluence:
        4.750        0.930
Results of confluence:
Total flow rate =     16.559(CFS)
Time of concentration =    10.072 min.
Effective stream area after confluence =      5.680(Ac.)


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Process from Point/Station      136.000 to Point/Station      137.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1101.000(Ft.)
```

```
Downstream point/station elevation =  1100.200(Ft.)
Pipe length  =   115.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.559(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    16.559(CFS)
Normal flow depth in pipe =   17.44(In.)
Flow top width inside pipe =   21.39(In.)
Critical Depth =   17.61(In.)
Pipe flow velocity =      6.77(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    10.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      136.000 to Point/Station      137.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.680(Ac.)
Runoff from this stream =     16.559(CFS)
Time of concentration =   10.36 min.
Rainfall intensity =     3.417(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1       26.764     13.48               2.956
2       16.559     10.36               3.417
Largest stream flow has longer time of concentration
Qp =     26.764 + sum of
          Qb          Ia/Ib
          16.559 *    0.865 =     14.325
Qp =     41.089

Total of 2 main streams to confluence:
Flow rates before confluence point:
      26.764      16.559
Area of streams before confluence:
        9.900        5.680


Results of confluence:
Total flow rate =     41.089(CFS)
Time of concentration =    13.477 min.
Effective stream area after confluence  =     15.580(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      137.000 to Point/Station      137.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.794
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.900; Impervious fraction =  0.100
Time of concentration =    13.48 min.
Rainfall intensity =      2.956(In/Hr) for a   100.0 year storm
Subarea runoff =      2.159(CFS) for      0.920(Ac.)
Total runoff =     43.249(CFS)       Total area =      16.500(Ac.)
End of computations, total study area =           16.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.381
```

Area averaged RI index number = 69.8

## 10-YEAR

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
       Rational Hydrology Study        Date: 05/17/19  File:ARA110.out
------------------------------------------------------------------------
108.30.13
10-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA A
ARA110.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6279

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.859(In/Hr)
Slope of intensity duration curve = 0.5500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   728.000(Ft.)
Top (of initial area) elevation =  1125.000(Ft.)
Bottom (of initial area) elevation =  1113.300(Ft.)
Difference in elevation =    11.700(Ft.)
Slope =    0.01607  s(percent)=       1.61
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.799 min.
Rainfall intensity =      2.100(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.638(CFS)
Total initial stream area =        2.050(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      102.000 to Point/Station      103.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1113.300(Ft.)
End of street segment elevation =  1109.500(Ft.)
Length of street segment  =   413.000(Ft.)
```

```
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  22.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.083
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      5.715(CFS)
Depth of flow =   0.412(Ft.), Average velocity =   2.510(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.961(Ft.)
Flow velocity =   2.51(Ft/s)
Travel time =    2.74 min.     TC =   14.54  min.
 Adding area flow to street
CONDOMINIUM subarea type
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Rainfall intensity =      1.872(In/Hr) for a    10.0 year storm
Subarea runoff =      4.024(CFS) for      2.560(Ac.)
Total runoff =      7.661(CFS)       Total area =       4.610(Ac.)
Street flow at end of street =      7.661(CFS)
Half street flow at end of street =      3.831(CFS)
Depth of flow =   0.450(Ft.), Average velocity =   2.598(Ft/s)
Flow width (from curb towards crown)=   9.847(Ft.)


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Process from Point/Station      103.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1105.500(Ft.)
Downstream point/station elevation =  1105.000(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.661(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.661(CFS)
Normal flow depth in pipe =   11.48(In.)
Flow top width inside pipe =   12.71(In.)
Critical Depth =   13.18(In.)
Pipe flow velocity =      7.60(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    14.61 min.


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Process from Point/Station      103.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.610(Ac.)
Runoff from this stream =      7.661(CFS)
Time of concentration =   14.61 min.
Rainfall intensity =     1.867(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      104.000 to Point/Station      105.000
**** INITIAL AREA EVALUATION ****
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Initial area flow distance =   766.000(Ft.)
Top (of initial area) elevation =  1119.100(Ft.)
Bottom (of initial area) elevation =  1109.700(Ft.)
Difference in elevation =     9.400(Ft.)
Slope =    0.01227  s(percent)=       1.23
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.709 min.
Rainfall intensity =      2.016(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.843
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.635(CFS)
Total initial stream area =        1.550(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      105.000 to Point/Station      106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1105.700(Ft.)
Downstream point/station elevation =  1105.000(Ft.)
Pipe length  =   137.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.635(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.635(CFS)
Normal flow depth in pipe =    8.12(In.)
Flow top width inside pipe =   14.95(In.)
Critical Depth =    7.82(In.)
Pipe flow velocity =      3.89(Ft/s)
Travel time through pipe =    0.59 min.
Time of concentration (TC) =    13.30 min.


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Process from Point/Station      105.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.550(Ac.)
Runoff from this stream =      2.635(CFS)
Time of concentration =   13.30 min.
Rainfall intensity =     1.967(In/Hr)
Summary of stream data:

Stream    Flow rate       TC            Rainfall Intensity
 No.        (CFS)        (min)                  (In/Hr)


1         7.661      14.61                1.867
2         2.635      13.30                1.967
Largest stream flow has longer time of concentration
Qp =       7.661 + sum of
           Qb          Ia/Ib
            2.635 *     0.950 =       2.502
Qp =      10.163

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.661       2.635
Area of streams before confluence:
        4.610        1.550
```

```
Results of confluence:
Total flow rate =      10.163(CFS)
Time of concentration =     14.610 min.
Effective stream area after confluence  =       6.160(Ac.)


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Process from Point/Station      106.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1105.000(Ft.)
Downstream point/station elevation =  1104.000(Ft.)
Pipe length  =    55.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.163(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.163(CFS)
Normal flow depth in pipe =   11.29(In.)
Flow top width inside pipe =   17.41(In.)
Critical Depth =   14.72(In.)
Pipe flow velocity =      8.72(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    14.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      108.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.160(Ac.)
Runoff from this stream =     10.163(CFS)
Time of concentration =   14.71 min.
Rainfall intensity =     1.860(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      107.100 to Point/Station      107.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   421.000(Ft.)
Top (of initial area) elevation =  1128.000(Ft.)
Bottom (of initial area) elevation =  1107.000(Ft.)
Difference in elevation =    21.000(Ft.)
Slope =    0.04988  s(percent)=       4.99
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.557 min.
Rainfall intensity =      2.683(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.318(CFS)
Total initial stream area =        1.010(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.200 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1104.500(Ft.)
Downstream point/station elevation =  1104.000(Ft.)
Pipe length  =    21.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.318(CFS)
Nearest computed pipe diameter  =      9.00(In.)
```

```
Calculated individual pipe flow  =     2.318(CFS)
Normal flow depth in pipe =    6.73(In.)
Flow top width inside pipe =    7.82(In.)
Critical Depth =    8.13(In.)
Pipe flow velocity =      6.55(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     7.61 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.200 to Point/Station      108.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.010(Ac.)
Runoff from this stream =      2.318(CFS)
Time of concentration =    7.61 min.
Rainfall intensity =     2.673(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1       10.163     14.71                1.860
2        2.318      7.61                2.673
Largest stream flow has longer time of concentration
Qp =     10.163 + sum of
          Qb          Ia/Ib
           2.318 *     0.696 =      1.613
Qp =     11.776

Total of 2 main streams to confluence:
Flow rates before confluence point:
      10.163       2.318
Area of streams before confluence:
        6.160        1.010


Results of confluence:
Total flow rate =     11.776(CFS)
Time of concentration =    14.715 min.
Effective stream area after confluence  =      7.170(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      113.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1104.000(Ft.)
Downstream point/station elevation =  1103.500(Ft.)
Pipe length  =   239.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.776(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    11.776(CFS)
Normal flow depth in pipe =   18.80(In.)
Flow top width inside pipe =   24.83(In.)
Critical Depth =   14.26(In.)
Pipe flow velocity =      3.98(Ft/s)
Travel time through pipe =    1.00 min.
Time of concentration (TC) =    15.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      113.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.170(Ac.)
```

```
Runoff from this stream =      11.776(CFS)
Time of concentration =    15.71 min.
Rainfall intensity =      1.794(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      110.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =    748.000(Ft.)
Top (of initial area) elevation =  1120.000(Ft.)
Bottom (of initial area) elevation =  1107.200(Ft.)
Difference in elevation =     12.800(Ft.)
Slope =     0.01711  s(percent)=       1.71
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    11.779 min.
Rainfall intensity =       2.102(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)   =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =       3.641(CFS)
Total initial stream area =         2.050(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      113.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1104.500(Ft.)
Downstream point/station elevation =  1103.500(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.641(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.641(CFS)
Normal flow depth in pipe =    6.48(In.)
Flow top width inside pipe =   11.96(In.)
Critical Depth =    9.76(In.)
Pipe flow velocity =      8.41(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    11.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      113.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.050(Ac.)
Runoff from this stream =      3.641(CFS)
Time of concentration =   11.84 min.
Rainfall intensity =     2.096(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      112.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =    779.000(Ft.)
Top (of initial area) elevation =  1120.000(Ft.)
Bottom (of initial area) elevation =  1107.200(Ft.)
Difference in elevation =     12.800(Ft.)
Slope =     0.01643  s(percent)=       1.64
```

```
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.069 min.
Rainfall intensity =      2.074(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.378(CFS)
Total initial stream area =        2.500(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1104.500(Ft.)
Downstream point/station elevation =  1103.500(Ft.)
Pipe length  =    17.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.378(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.378(CFS)
Normal flow depth in pipe =    6.05(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =   10.53(In.)
Pipe flow velocity =     11.04(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    12.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      2.500(Ac.)
Runoff from this stream =      4.378(CFS)
Time of concentration =   12.09 min.
Rainfall intensity =     2.072(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       11.776     15.71                1.794
2        3.641     11.84                2.096
3        4.378     12.09                2.072
Largest stream flow has longer time of concentration
Qp =     11.776 + sum of
          Qb         Ia/Ib
           3.641 *    0.856 =      3.116
          Qb         Ia/Ib
           4.378 *    0.866 =      3.791
Qp =     18.683

Total of 3 main streams to confluence:
Flow rates before confluence point:
      11.776       3.641       4.378
Area of streams before confluence:
        7.170       2.050       2.500


Results of confluence:
Total flow rate =     18.683(CFS)
Time of concentration =    15.714 min.
```

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Effective stream area after confluence  =     11.720(Ac.)


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Process from Point/Station      113.000 to Point/Station      114.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1103.500(Ft.)
Downstream point/station elevation =  1103.000(Ft.)
Pipe length  =    98.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.683(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    18.683(CFS)
Normal flow depth in pipe =   19.03(In.)
Flow top width inside pipe =   24.63(In.)
Critical Depth =   18.14(In.)
Pipe flow velocity =      6.24(Ft/s)
Travel time through pipe =    0.26 min.
Time of concentration (TC) =    15.98 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      114.000 to Point/Station      114.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.792
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.600; Impervious fraction =  0.400
Time of concentration =    15.98 min.
Rainfall intensity =      1.778(In/Hr) for a    10.0 year storm
Subarea runoff =      2.985(CFS) for      2.120(Ac.)
Total runoff =     21.668(CFS)        Total area =      13.840(Ac.)
End of computations, total study area =           13.84 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.388
Area averaged RI index number =  75.0
```

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                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study         Date: 05/16/19  File:ARA210.out
------------------------------------------------------------------------
108.30.13
10-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA A
ARA210.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6279

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.859(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      116.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   707.000(Ft.)
Top (of initial area) elevation =  1119.500(Ft.)
Bottom (of initial area) elevation =  1106.000(Ft.)
Difference in elevation =    13.500(Ft.)
Slope =    0.01909  s(percent)=       1.91
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.266 min.
Rainfall intensity =      2.154(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.572(CFS)
Total initial stream area =        1.960(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      116.000 to Point/Station      119.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1103.500(Ft.)
Downstream point/station elevation =  1101.800(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =     3.572(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.572(CFS)
Normal flow depth in pipe =    6.70(In.)
Flow top width inside pipe =   11.92(In.)
Critical Depth =    9.68(In.)
Pipe flow velocity =      7.92(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    11.39 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      116.000 to Point/Station      119.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.960(Ac.)
Runoff from this stream =      3.572(CFS)
Time of concentration =   11.39 min.
Rainfall intensity =     2.141(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      117.000 to Point/Station      118.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   433.000(Ft.)
Top (of initial area) elevation =  1110.000(Ft.)
Bottom (of initial area) elevation =  1106.000(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.00924  s(percent)=       0.92
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.707 min.
Rainfall intensity =      2.215(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.440(CFS)
Total initial stream area =        1.300(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      119.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1103.500(Ft.)
Downstream point/station elevation =  1101.800(Ft.)
Pipe length  =   145.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.440(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.440(CFS)
Normal flow depth in pipe =    6.93(In.)
Flow top width inside pipe =   11.86(In.)
Critical Depth =    8.03(In.)
Pipe flow velocity =      5.20(Ft/s)
Travel time through pipe =    0.47 min.
Time of concentration (TC) =    11.17 min.


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Process from Point/Station      118.000 to Point/Station      119.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.300(Ac.)
Runoff from this stream =      2.440(CFS)
Time of concentration =   11.17 min.
Rainfall intensity =     2.164(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                 (In/Hr)


1         3.572      11.39                2.141
2         2.440      11.17                2.164
Largest stream flow has longer time of concentration
Qp =       3.572 + sum of
          Qb          Ia/Ib
           2.440 *     0.989 =       2.414
Qp =       5.986

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.572       2.440
Area of streams before confluence:
        1.960        1.300


Results of confluence:
Total flow rate =       5.986(CFS)
Time of concentration =     11.395 min.
Effective stream area after confluence  =       3.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      122.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1101.800(Ft.)
Downstream point/station elevation =  1101.600(Ft.)
Pipe length  =   145.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.986(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     5.986(CFS)
Normal flow depth in pipe =   17.58(In.)
Flow top width inside pipe =   15.51(In.)
Critical Depth =   10.81(In.)
Pipe flow velocity =       2.79(Ft/s)
Travel time through pipe =    0.87 min.
Time of concentration (TC) =    12.26 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      122.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.260(Ac.)
Runoff from this stream =      5.986(CFS)
Time of concentration =   12.26 min.
Rainfall intensity =     2.056(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      121.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   565.000(Ft.)
Top (of initial area) elevation =  1123.700(Ft.)
Bottom (of initial area) elevation =  1110.200(Ft.)
```

```
Difference in elevation =    13.500(Ft.)
Slope =    0.02389  s(percent)=       2.39
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.848 min.
Rainfall intensity =      2.320(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.849
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.389(CFS)
Total initial stream area =        1.720(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      121.000 to Point/Station      122.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1106.200(Ft.)
Downstream point/station elevation =  1101.600(Ft.)
Pipe length  =    61.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.389(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.389(CFS)
Normal flow depth in pipe =    5.79(In.)
Flow top width inside pipe =    8.62(In.)
Critical depth could not be calculated.
Pipe flow velocity =     11.27(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =     9.94 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      121.000 to Point/Station      122.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.720(Ac.)
Runoff from this stream =      3.389(CFS)
Time of concentration =    9.94 min.
Rainfall intensity =     2.308(In/Hr)
Summary of stream data:

Stream    Flow rate       TC             Rainfall Intensity
 No.        (CFS)        (min)                  (In/Hr)


1         5.986      12.26                2.056
2         3.389       9.94                2.308
Largest stream flow has longer time of concentration
Qp =       5.986 + sum of
          Qb          Ia/Ib
           3.389 *     0.891 =       3.019
Qp =       9.005

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.986       3.389
Area of streams before confluence:
        3.260        1.720


Results of confluence:
Total flow rate =       9.005(CFS)
Time of concentration =    12.262 min.
Effective stream area after confluence  =       4.980(Ac.)
```

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Process from Point/Station      122.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1101.600(Ft.)
Downstream point/station elevation =  1100.800(Ft.)
Pipe length  =   244.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.005(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.005(CFS)
Normal flow depth in pipe =   17.06(In.)
Flow top width inside pipe =   16.39(In.)
Critical Depth =   13.39(In.)
Pipe flow velocity =      4.30(Ft/s)
Travel time through pipe =    0.95 min.
Time of concentration (TC) =    13.21 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      122.000 to Point/Station      128.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.980(Ac.)
Runoff from this stream =      9.005(CFS)
Time of concentration =   13.21 min.
Rainfall intensity =     1.974(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      123.000 to Point/Station      124.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   750.000(Ft.)
Top (of initial area) elevation =  1125.500(Ft.)
Bottom (of initial area) elevation =  1109.000(Ft.)
Difference in elevation =    16.500(Ft.)
Slope =    0.02200  s(percent)=       2.20
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.214 min.
Rainfall intensity =      2.160(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.679(CFS)
Total initial stream area =        2.560(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      124.000 to Point/Station      127.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1105.000(Ft.)
Downstream point/station elevation =  1102.000(Ft.)
Pipe length  =    35.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.679(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     4.679(CFS)
Normal flow depth in pipe =    7.11(In.)
Flow top width inside pipe =    7.33(In.)
Critical depth could not be calculated.
```

```
Pipe flow velocity =     12.49(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    11.26 min.


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Process from Point/Station      124.000 to Point/Station      127.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      2.560(Ac.)
Runoff from this stream =      4.679(CFS)
Time of concentration =   11.26 min.
Rainfall intensity =     2.155(In/Hr)


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Process from Point/Station      125.000 to Point/Station      126.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   608.000(Ft.)
Top (of initial area) elevation =  1123.700(Ft.)
Bottom (of initial area) elevation =  1109.000(Ft.)
Difference in elevation =    14.700(Ft.)
Slope =    0.02418  s(percent)=       2.42
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.118 min.
Rainfall intensity =      2.285(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.849
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      3.220(CFS)
Total initial stream area =        1.660(Ac.)
Pervious area fraction = 0.350


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Process from Point/Station      126.000 to Point/Station      127.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1105.000(Ft.)
Downstream point/station elevation =  1102.000(Ft.)
Pipe length  =    36.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.220(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     3.220(CFS)
Normal flow depth in pipe =    5.41(In.)
Flow top width inside pipe =    8.81(In.)
Critical depth could not be calculated.
Pipe flow velocity =     11.60(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    10.17 min.


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Process from Point/Station      126.000 to Point/Station      127.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      1.660(Ac.)
Runoff from this stream =      3.220(CFS)
Time of concentration =   10.17 min.
Rainfall intensity =     2.279(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

```
 No.       (CFS)        (min)                  (In/Hr)


1        4.679      11.26                  2.155
2        3.220      10.17                  2.279
Largest stream flow has longer time of concentration
Qp =      4.679 + sum of
          Qb          Ia/Ib
           3.220 *     0.945 =      3.044
Qp =      7.723

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.679       3.220
Area of streams before confluence:
        2.560        1.660
Results of confluence:
Total flow rate =      7.723(CFS)
Time of concentration =    11.260 min.
Effective stream area after confluence =      4.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      127.000 to Point/Station      128.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1102.000(Ft.)
Downstream point/station elevation =  1100.800(Ft.)
Pipe length  =    40.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.723(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.723(CFS)
Normal flow depth in pipe =    9.16(In.)
Flow top width inside pipe =   14.63(In.)
Critical Depth =   13.21(In.)
Pipe flow velocity =      9.84(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    11.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      127.000 to Point/Station      128.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.220(Ac.)
Runoff from this stream =      7.723(CFS)
Time of concentration =   11.33 min.
Rainfall intensity =     2.148(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        9.005      13.21                  1.974
2        7.723      11.33                  2.148
Largest stream flow has longer time of concentration
Qp =      9.005 + sum of
          Qb          Ia/Ib
           7.723 *     0.919 =      7.098
Qp =     16.103

Total of 2 main streams to confluence:
Flow rates before confluence point:
       9.005       7.723
Area of streams before confluence:
        4.980        4.220
```

```
Results of confluence:
Total flow rate =     16.103(CFS)
Time of concentration =    13.208 min.
Effective stream area after confluence  =      9.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      131.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1100.800(Ft.)
Downstream point/station elevation =  1100.300(Ft.)
Pipe length  =   160.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.103(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    16.103(CFS)
Normal flow depth in pipe =   20.60(In.)
Flow top width inside pipe =   22.96(In.)
Critical Depth =   16.81(In.)
Pipe flow velocity =      4.95(Ft/s)
Travel time through pipe =    0.54 min.
Time of concentration (TC) =    13.75 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      128.000 to Point/Station      131.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.200(Ac.)
Runoff from this stream =     16.103(CFS)
Time of concentration =   13.75 min.
Rainfall intensity =     1.931(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      129.000 to Point/Station      130.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   242.000(Ft.)
Top (of initial area) elevation =  1110.000(Ft.)
Bottom (of initial area) elevation =  1107.000(Ft.)
Difference in elevation =     3.000(Ft.)
Slope =    0.01240  s(percent)=       1.24
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.000 min.
Rainfall intensity =      2.601(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      1.555(CFS)
Total initial stream area =        0.700(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      131.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  1103.000(Ft.)
Downstream point/station elevation =  1100.300(Ft.)
Pipe length  =    14.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.555(CFS)
Nearest computed pipe diameter  =      6.00(In.)
```

```
Calculated individual pipe flow  =     1.555(CFS)
Normal flow depth in pipe =    3.46(In.)
Flow top width inside pipe =    5.93(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.27(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      131.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.700(Ac.)
Runoff from this stream =      1.555(CFS)
Time of concentration =    8.02 min.
Rainfall intensity =     2.597(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                  (In/Hr)


1       16.103     13.75                1.931
2        1.555      8.02                2.597
Largest stream flow has longer time of concentration
Qp =     16.103 + sum of
          Qb          Ia/Ib
           1.555 *     0.743 =      1.156
Qp =     17.258

Total of 2 main streams to confluence:
Flow rates before confluence point:
      16.103       1.555
Area of streams before confluence:
        9.200        0.700


Results of confluence:
Total flow rate =     17.258(CFS)
Time of concentration =    13.747 min.
Effective stream area after confluence  =      9.900(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      131.000 to Point/Station      137.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1100.300(Ft.)
Downstream point/station elevation =  1100.200(Ft.)
Pipe length  =    17.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.258(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    17.258(CFS)
Normal flow depth in pipe =   19.55(In.)
Flow top width inside pipe =   18.66(In.)
Critical Depth =   17.96(In.)
Pipe flow velocity =      6.30(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    13.79 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      131.000 to Point/Station      137.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.900(Ac.)
```

```
Runoff from this stream =      17.258(CFS)
Time of concentration =    13.79 min.
Rainfall intensity =      1.927(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      132.000 to Point/Station      133.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =    826.000(Ft.)
Top (of initial area) elevation =  1146.300(Ft.)
Bottom (of initial area) elevation =  1106.300(Ft.)
Difference in elevation =     40.000(Ft.)
Slope =     0.04843  s(percent)=       4.84
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =     9.954 min.
Rainfall intensity =       2.306(In/Hr) for a     10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.420
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.580
RI index for soil(AMC 2)   =  56.94
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =       8.809(CFS)
Total initial stream area =        4.750(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      133.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1102.300(Ft.)
Downstream point/station elevation =  1101.000(Ft.)
Pipe length  =    67.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.809(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     8.809(CFS)
Normal flow depth in pipe =   12.02(In.)
Flow top width inside pipe =   11.96(In.)
Critical Depth =   13.79(In.)
Pipe flow velocity =      8.36(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    10.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      133.000 to Point/Station      136.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 1
Stream flow area =      4.750(Ac.)
Runoff from this stream =      8.809(CFS)
Time of concentration =   10.09 min.
Rainfall intensity =     2.289(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      135.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   258.000(Ft.)
Top (of initial area) elevation =  1110.700(Ft.)
Bottom (of initial area) elevation =  1107.200(Ft.)
Difference in elevation =     3.500(Ft.)
Slope =    0.01357  s(percent)=       1.36
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.060 min.
```

```
Rainfall intensity =      2.590(In/Hr) for a    10.0 year storm
CONDOMINIUM subarea type
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.056(CFS)
Total initial stream area =        0.930(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      135.000 to Point/Station      136.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1103.200(Ft.)
Downstream point/station elevation =  1101.000(Ft.)
Pipe length  =    12.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.056(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     2.056(CFS)
Normal flow depth in pipe =    4.27(In.)
Flow top width inside pipe =    5.43(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.75(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     8.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      135.000 to Point/Station      136.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      0.930(Ac.)
Runoff from this stream =      2.056(CFS)
Time of concentration =    8.08 min.
Rainfall intensity =     2.587(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1        8.809     10.09                 2.289
2        2.056      8.08                 2.587
Largest stream flow has longer time of concentration
Qp =      8.809 + sum of
          Qb         Ia/Ib
           2.056 *    0.885 =      1.820
Qp =     10.628

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.809       2.056
Area of streams before confluence:
        4.750        0.930
Results of confluence:
Total flow rate =     10.628(CFS)
Time of concentration =    10.087 min.
Effective stream area after confluence =      5.680(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      136.000 to Point/Station      137.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1101.000(Ft.)
```

```
Downstream point/station elevation =  1100.200(Ft.)
Pipe length  =   115.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.628(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    10.628(CFS)
Normal flow depth in pipe =   14.27(In.)
Flow top width inside pipe =   19.60(In.)
Critical Depth =   14.59(In.)
Pipe flow velocity =      6.11(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    10.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      136.000 to Point/Station      137.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.680(Ac.)
Runoff from this stream =     10.628(CFS)
Time of concentration =   10.40 min.
Rainfall intensity =     2.251(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       17.258     13.79               1.927
2       10.628     10.40               2.251
Largest stream flow has longer time of concentration
Qp =     17.258 + sum of
          Qb          Ia/Ib
          10.628 *    0.856 =      9.100
Qp =     26.359

Total of 2 main streams to confluence:
Flow rates before confluence point:
      17.258      10.628
Area of streams before confluence:
        9.900        5.680


Results of confluence:
Total flow rate =     26.359(CFS)
Time of concentration =    13.792 min.
Effective stream area after confluence  =     15.580(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      137.000 to Point/Station      137.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.748
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.900; Impervious fraction =  0.100
Time of concentration =    13.79 min.
Rainfall intensity =      1.927(In/Hr) for a    10.0 year storm
Subarea runoff =      1.327(CFS) for      0.920(Ac.)
Total runoff =     27.685(CFS)       Total area =      16.500(Ac.)
End of computations, total study area =           16.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.381
```

Area averaged RI index number = 69.8

# APPENDIX A.2: AREA B

## 100-YEAR

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 05/15/19 File:ARB100.out

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108.30.13
100-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA B
ARB100.RRV

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********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

---

Program License Serial Number 6279

---

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.550(In.)
100 year, 1 hour precipitation = 1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5500

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 201.000 to Point/Station 202.000
**** INITIAL AREA EVALUATION ****

---

Initial area flow distance = 497.000(Ft.)
Top (of initial area) elevation = 1125.500(Ft.)
Bottom (of initial area) elevation = 1117.100(Ft.)
Difference in elevation = 8.400(Ft.)
Slope = 0.01690 s(percent)= 1.69
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.027 min.
Rainfall intensity = 3.478(In/Hr) for a 100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.864
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 75.00
Pervious area fraction = 0.350; Impervious fraction = 0.650
Initial subarea runoff = 7.845(CFS)
Total initial stream area = 2.610(Ac.)
Pervious area fraction = 0.350

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Process from Point/Station 202.000 to Point/Station 205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

---

Upstream point/station elevation = 1113.100(Ft.)
Downstream point/station elevation = 1112.100(Ft.)
Pipe length = 33.00(Ft.) Manning's N = 0.013

```
No. of pipes = 1  Required pipe flow  =     7.845(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.845(CFS)
Normal flow depth in pipe =    9.22(In.)
Flow top width inside pipe =   14.60(In.)
Critical Depth =   13.29(In.)
Pipe flow velocity =      9.91(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    10.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      205.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.610(Ac.)
Runoff from this stream =      7.845(CFS)
Time of concentration =   10.08 min.
Rainfall intensity =     3.467(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   407.000(Ft.)
Top (of initial area) elevation =  1130.000(Ft.)
Bottom (of initial area) elevation =  1117.100(Ft.)
Difference in elevation =    12.900(Ft.)
Slope =    0.03170  s(percent)=       3.17
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.163 min.
Rainfall intensity =      3.894(In/Hr) for a   100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      4.427(CFS)
Total initial stream area =        1.310(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1113.100(Ft.)
Downstream point/station elevation =  1112.100(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.427(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.427(CFS)
Normal flow depth in pipe =    6.76(In.)
Flow top width inside pipe =   11.90(In.)
Critical Depth =   10.58(In.)
Pipe flow velocity =      9.71(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     8.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.310(Ac.)
Runoff from this stream =      4.427(CFS)
Time of concentration =    8.20 min.
Rainfall intensity =     3.883(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                 (In/Hr)


1         7.845     10.08                3.467
2         4.427      8.20                3.883
Largest stream flow has longer time of concentration
Qp =      7.845 + sum of
          Qb          Ia/Ib
           4.427 *    0.893 =      3.952
Qp =     11.797

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.845       4.427
Area of streams before confluence:
        2.610        1.310


Results of confluence:
Total flow rate =     11.797(CFS)
Time of concentration =    10.082 min.
Effective stream area after confluence  =      3.920(Ac.)
End of computations, total study area =            3.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  75.0
```

## 10-YEAR

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
       Rational Hydrology Study        Date: 05/15/19  File:ARB10.out
------------------------------------------------------------------------
108.30.13
10-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA B
ARB10.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6279

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.859(In/Hr)
Slope of intensity duration curve = 0.5500



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   497.000(Ft.)
Top (of initial area) elevation =  1125.500(Ft.)
Bottom (of initial area) elevation =  1117.100(Ft.)
Difference in elevation =     8.400(Ft.)
Slope =    0.01690  s(percent)=       1.69
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.027 min.
Rainfall intensity =      2.297(In/Hr) for a    10.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.849
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      5.089(CFS)
Total initial stream area =        2.610(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1113.100(Ft.)
Downstream point/station elevation =  1112.100(Ft.)
Pipe length  =    33.00(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =     5.089(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     5.089(CFS)
Normal flow depth in pipe =    8.27(In.)
Flow top width inside pipe =   11.11(In.)
Critical Depth =   11.05(In.)
Pipe flow velocity =      8.81(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    10.09 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      205.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.610(Ac.)
Runoff from this stream =      5.089(CFS)
Time of concentration =   10.09 min.
Rainfall intensity =     2.289(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   407.000(Ft.)
Top (of initial area) elevation =  1130.000(Ft.)
Bottom (of initial area) elevation =  1117.100(Ft.)
Difference in elevation =    12.900(Ft.)
Slope =    0.03170  s(percent)=       3.17
TC = k(0.370)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.163 min.
Rainfall intensity =      2.572(In/Hr) for a    10.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =      2.898(CFS)
Total initial stream area =        1.320(Ac.)
Pervious area fraction = 0.350


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1113.100(Ft.)
Downstream point/station elevation =  1112.100(Ft.)
Pipe length  =    24.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.898(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.898(CFS)
Normal flow depth in pipe =    6.42(In.)
Flow top width inside pipe =    8.14(In.)
Critical depth could not be calculated.
Pipe flow velocity =      8.59(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     8.21 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
```

```
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.320(Ac.)
Runoff from this stream =      2.898(CFS)
Time of concentration =    8.21 min.
Rainfall intensity =     2.564(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)       (min)                 (In/Hr)


1         5.089     10.09                2.289
2         2.898      8.21                2.564
Largest stream flow has longer time of concentration
Qp =      5.089 + sum of
          Qb         Ia/Ib
           2.898 *    0.893 =      2.587
Qp =      7.676

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.089       2.898
Area of streams before confluence:
        2.610       1.320


Results of confluence:
Total flow rate =      7.676(CFS)
Time of concentration =    10.089 min.
Effective stream area after confluence  =      3.930(Ac.)
End of computations, total study area =            3.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  75.0
```

# APPENDIX A.4: AREA D

## 100-YEAR

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study         Date: 05/16/19  File:ARD100.out
------------------------------------------------------------------------
108.30.13
100-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA D
ARD100.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------
TRI-8 Builders - S/N   615
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.300(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =   431.000(Ft.)
Top (of initial area) elevation =  1119.400(Ft.)
Bottom (of initial area) elevation =  1117.000(Ft.)
Difference in elevation =     2.400(Ft.)
Slope =    0.00557  s(percent)=       0.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.589 min.
Rainfall intensity =      3.564(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.347(CFS)
Total initial stream area =        0.740(Ac.)
Pervious area fraction = 0.100
End of computations, total study area =            0.74 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study         Date: 05/16/19  File:ARD10.out
------------------------------------------------------------------------
108.30.13
10-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA D
ARD10.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------
TRI-8 Builders - S/N   615
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.859(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   431.000(Ft.)
Top (of initial area) elevation =  1119.400(Ft.)
Bottom (of initial area) elevation =  1117.000(Ft.)
Difference in elevation =     2.400(Ft.)
Slope =    0.00557  s(percent)=       0.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.589 min.
Rainfall intensity =      2.354(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.543(CFS)
Total initial stream area =        0.740(Ac.)
Pervious area fraction = 0.100
End of computations, total study area =            0.74 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

## APPENDIX A.5: AREA E

## 100-YEAR

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study        Date: 05/16/19  File:ARE100.out
------------------------------------------------------------------------
108.30.13
100-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA E
ARE100.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------
TRI-8 Builders - S/N   615
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.300(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =   699.000(Ft.)
Top (of initial area) elevation =  1119.400(Ft.)
Bottom (of initial area) elevation =  1115.300(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.00587  s(percent)=       0.59
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.515 min.
Rainfall intensity =      3.223(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.467(CFS)
Total initial stream area =        1.210(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  1115.300(Ft.)
End of street segment elevation =  1112.500(Ft.)
Length of street segment  =   564.000(Ft.)
Height of curb above gutter flowline  =     8.0(In.)
Width of half street (curb to crown)  =  75.000(Ft.)
Distance from crown to crossfall grade break  =  41.000(Ft.)
```

```
Slope from gutter to grade break (v/hz) =    0.083
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  32.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =    2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      4.871(CFS)
Depth of flow =   0.542(Ft.), Average velocity =   2.763(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   6.517(Ft.)
Flow velocity =   2.76(Ft/s)
Travel time =    3.40 min.     TC =   14.92  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.795(In/Hr) for a   100.0 year storm
Subarea runoff =      2.431(CFS) for      0.980(Ac.)
Total runoff =      5.899(CFS)       Total area =       2.190(Ac.)
Street flow at end of street =      5.899(CFS)
Half street flow at end of street =      5.899(CFS)
Depth of flow =   0.582(Ft.), Average velocity =   2.898(Ft/s)
Flow width (from curb towards crown)=   7.002(Ft.)
End of computations, total study area =            2.19 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

## 10-YEAR

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study        Date: 05/16/19  File:ARE10.out
------------------------------------------------------------------------
108.30.13
10-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA E
ARE10.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------
TRI-8 Builders - S/N   615
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.859(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   699.000(Ft.)
Top (of initial area) elevation =  1119.400(Ft.)
Bottom (of initial area) elevation =  1115.300(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.00587  s(percent)=       0.59
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.515 min.
Rainfall intensity =      2.128(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.278(CFS)
Total initial stream area =        1.210(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1115.300(Ft.)
End of street segment elevation =  1112.500(Ft.)
Length of street segment  =   564.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  75.000(Ft.)
Distance from crown to crossfall grade break  =  41.000(Ft.)
```

```
Slope from gutter to grade break (v/hz) =    0.083
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  32.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =    2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.200(CFS)
Depth of flow =   0.463(Ft.), Average velocity =   2.487(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   5.567(Ft.)
Flow velocity =   2.49(Ft/s)
Travel time =    3.78 min.     TC =   15.29  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.821(In/Hr) for a    10.0 year storm
Subarea runoff =      1.574(CFS) for      0.980(Ac.)
Total runoff =      3.852(CFS)       Total area =       2.190(Ac.)
Street flow at end of street =      3.852(CFS)
Half street flow at end of street =      3.852(CFS)
Depth of flow =   0.496(Ft.), Average velocity =   2.605(Ft/s)
Flow width (from curb towards crown)=   5.968(Ft.)
End of computations, total study area =            2.19 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

# APPENDIX A.6: AREA F

## 100-YEAR

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study        Date: 05/16/19  File:ARF100.out
------------------------------------------------------------------------
108.30.13
100-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA F
ARF100.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------
TRI-8 Builders - S/N   615
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.300(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   833.000(Ft.)
Top (of initial area) elevation =  1113.000(Ft.)
Bottom (of initial area) elevation =  1105.700(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.00876  s(percent)=       0.88
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.398 min.
Rainfall intensity =      3.241(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.870(CFS)
Total initial stream area =        1.690(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1105.700(Ft.)
End of street segment elevation =  1100.000(Ft.)
Length of street segment  =   969.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
```

```
Slope from gutter to grade break (v/hz) =    0.083
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =    2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      7.550(CFS)
Depth of flow =   0.475(Ft.), Average velocity =   2.390(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  17.411(Ft.)
Flow velocity =   2.39(Ft/s)
Travel time =    6.76 min.     TC =   18.15  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.509(In/Hr) for a   100.0 year storm
Subarea runoff =      4.137(CFS) for      1.860(Ac.)
Total runoff =      9.007(CFS)       Total area =       3.550(Ac.)
Street flow at end of street =      9.007(CFS)
Half street flow at end of street =      9.007(CFS)
Depth of flow =   0.497(Ft.), Average velocity =   2.531(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  18.000(Ft.)
End of computations, total study area =            3.55 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

## 10-YEAR

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
        Rational Hydrology Study         Date: 05/16/19  File:ARF10.out
------------------------------------------------------------------------
108.30.13
10-YEAR RATIONAL TABLING METHOD
POST PROJECT CONDITION FOR AREA F
ARF10.RRV
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------
TRI-8 Builders - S/N   615
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.859(In/Hr)
Slope of intensity duration curve = 0.5500




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   833.000(Ft.)
Top (of initial area) elevation =  1113.000(Ft.)
Bottom (of initial area) elevation =  1105.700(Ft.)
Difference in elevation =     7.300(Ft.)
Slope =    0.00876  s(percent)=       0.88
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.398 min.
Rainfall intensity =      2.140(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.200(CFS)
Total initial stream area =        1.690(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1105.700(Ft.)
End of street segment elevation =  1100.000(Ft.)
Length of street segment  =   969.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
```

```
Slope from gutter to grade break (v/hz) =    0.083
Slope from grade break to crown (v/hz)  =    0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =    0.020
Gutter width =    2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      4.960(CFS)
Depth of flow =   0.421(Ft.), Average velocity =   2.159(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.733(Ft.)
Flow velocity =   2.16(Ft/s)
Travel time =    7.48 min.     TC =   18.88  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.622(In/Hr) for a    10.0 year storm
Subarea runoff =      2.656(CFS) for      1.860(Ac.)
Total runoff =      5.856(CFS)       Total area =       3.550(Ac.)
Street flow at end of street =      5.856(CFS)
Half street flow at end of street =      5.856(CFS)
Depth of flow =   0.442(Ft.), Average velocity =   2.247(Ft/s)
Flow width (from curb towards crown)=  15.744(Ft.)
End of computations, total study area =            3.55 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number =  75.0
```

# APPENDIX B: HYDRAULIC STORM DRAIN ANALYSIS

# APPENDIX B.1: STREET CAPACITY CALCULATIONS

# Rating Table for 60' Street-ROW

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.04350 | ft/ft |
| Normal Depth | 0.70 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.000 | 0.70 |
| 0+10.000 | 0.50 |
| 0+10.125 | 0.00 |
| 0+12.125 | 0.17 |
| 0+12.125 | 0.20 |
| 0+30.000 | 0.56 |
| 0+47.875 | 0.20 |
| 0+47.875 | 0.17 |
| 0+50.000 | 0.00 |
| 0+50.000 | 0.50 |
| 0+60.000 | 0.70 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.000, 0.70) | (0+60.000, 0.70) | 0.015 |

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00300 | 36.19 | 2.24 | 16.16 | 60.98 | 60.00 |
| 0.00400 | 41.79 | 2.59 | 16.16 | 60.98 | 60.00 |
| 0.00500 | 46.72 | 2.89 | 16.16 | 60.98 | 60.00 |

# Rating Table for 60' Street-ROW

Input Data

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00600 | 51.18 | 3.17 | 16.16 | 60.98 | 60.00 |
| 0.00700 | 55.29 | 3.42 | 16.16 | 60.98 | 60.00 |
| 0.00800 | 59.10 | 3.66 | 16.16 | 60.98 | 60.00 |
| 0.00900 | 62.69 | 3.88 | 16.16 | 60.98 | 60.00 |
| 0.01000 | 66.08 | 4.09 | 16.16 | 60.98 | 60.00 |
| 0.01100 | 69.30 | 4.29 | 16.16 | 60.98 | 60.00 |
| 0.01200 | 72.39 | 4.48 | 16.16 | 60.98 | 60.00 |
| 0.01300 | 75.34 | 4.66 | 16.16 | 60.98 | 60.00 |
| 0.01400 | 78.19 | 4.84 | 16.16 | 60.98 | 60.00 |
| 0.01500 | 80.93 | 5.01 | 16.16 | 60.98 | 60.00 |
| 0.01600 | 83.58 | 5.17 | 16.16 | 60.98 | 60.00 |
| 0.01700 | 86.16 | 5.33 | 16.16 | 60.98 | 60.00 |
| 0.01800 | 88.65 | 5.48 | 16.16 | 60.98 | 60.00 |
| 0.01900 | 91.08 | 5.63 | 16.16 | 60.98 | 60.00 |
| 0.02000 | 93.45 | 5.78 | 16.16 | 60.98 | 60.00 |
| 0.02100 | 95.76 | 5.92 | 16.16 | 60.98 | 60.00 |
| 0.02200 | 98.01 | 6.06 | 16.16 | 60.98 | 60.00 |
| 0.02300 | 100.21 | 6.20 | 16.16 | 60.98 | 60.00 |
| 0.02400 | 102.37 | 6.33 | 16.16 | 60.98 | 60.00 |
| 0.02500 | 104.48 | 6.46 | 16.16 | 60.98 | 60.00 |
| 0.02600 | 106.55 | 6.59 | 16.16 | 60.98 | 60.00 |
| 0.02700 | 108.58 | 6.72 | 16.16 | 60.98 | 60.00 |
| 0.02800 | 110.57 | 6.84 | 16.16 | 60.98 | 60.00 |
| 0.02900 | 112.53 | 6.96 | 16.16 | 60.98 | 60.00 |
| 0.03000 | 114.45 | 7.08 | 16.16 | 60.98 | 60.00 |
| 0.03100 | 116.34 | 7.20 | 16.16 | 60.98 | 60.00 |
| 0.03200 | 118.20 | 7.31 | 16.16 | 60.98 | 60.00 |
| 0.03300 | 120.04 | 7.43 | 16.16 | 60.98 | 60.00 |
| 0.03400 | 121.84 | 7.54 | 16.16 | 60.98 | 60.00 |
| 0.03500 | 123.62 | 7.65 | 16.16 | 60.98 | 60.00 |
| 0.03600 | 125.38 | 7.76 | 16.16 | 60.98 | 60.00 |
| 0.03700 | 127.10 | 7.86 | 16.16 | 60.98 | 60.00 |
| 0.03800 | 128.81 | 7.97 | 16.16 | 60.98 | 60.00 |
| 0.03900 | 130.49 | 8.07 | 16.16 | 60.98 | 60.00 |
| 0.04000 | 132.16 | 8.18 | 16.16 | 60.98 | 60.00 |
| 0.04100 | 133.80 | 8.28 | 16.16 | 60.98 | 60.00 |
| 0.04200 | 135.42 | 8.38 | 16.16 | 60.98 | 60.00 |

# Rating Table for 60' Street-ROW

## Input Data

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.04300 | 137.02 | 8.48 | 16.16 | 60.98 | 60.00 |
| 0.04400 | 138.61 | 8.57 | 16.16 | 60.98 | 60.00 |
| 0.04500 | 140.17 | 8.67 | 16.16 | 60.98 | 60.00 |
| 0.04600 | 141.72 | 8.77 | 16.16 | 60.98 | 60.00 |
| 0.04700 | 143.25 | 8.86 | 16.16 | 60.98 | 60.00 |
| 0.04800 | 144.77 | 8.96 | 16.16 | 60.98 | 60.00 |
| 0.04900 | 146.27 | 9.05 | 16.16 | 60.98 | 60.00 |
| 0.05000 | 147.76 | 9.14 | 16.16 | 60.98 | 60.00 |

# Rating Table for 60' Street-Half Street

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.00600 | ft/ft |
| Normal Depth | 0.56 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.000 | 0.70 |
| 0+10.000 | 0.50 |
| 0+10.125 | 0.00 |
| 0+12.125 | 0.17 |
| 0+12.125 | 0.20 |
| 0+30.000 | 0.56 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.000, 0.70) | (0+30.000, 0.56) | 0.015 |

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00300 | 7.43 | 1.75 | 4.25 | 23.18 | 22.75 |
| 0.00400 | 8.58 | 2.02 | 4.25 | 23.18 | 22.75 |
| 0.00500 | 9.60 | 2.26 | 4.25 | 23.18 | 22.75 |
| 0.00600 | 10.51 | 2.48 | 4.25 | 23.18 | 22.75 |
| 0.00700 | 11.36 | 2.67 | 4.25 | 23.18 | 22.75 |
| 0.00800 | 12.14 | 2.86 | 4.25 | 23.18 | 22.75 |
| 0.00900 | 12.88 | 3.03 | 4.25 | 23.18 | 22.75 |
| 0.01000 | 13.57 | 3.20 | 4.25 | 23.18 | 22.75 |

# Rating Table for 60' Street-Half Street

Input Data

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.01100 | 14.24 | 3.35 | 4.25 | 23.18 | 22.75 |
| 0.01200 | 14.87 | 3.50 | 4.25 | 23.18 | 22.75 |
| 0.01300 | 15.48 | 3.64 | 4.25 | 23.18 | 22.75 |
| 0.01400 | 16.06 | 3.78 | 4.25 | 23.18 | 22.75 |
| 0.01500 | 16.62 | 3.91 | 4.25 | 23.18 | 22.75 |
| 0.01600 | 17.17 | 4.04 | 4.25 | 23.18 | 22.75 |
| 0.01700 | 17.70 | 4.17 | 4.25 | 23.18 | 22.75 |
| 0.01800 | 18.21 | 4.29 | 4.25 | 23.18 | 22.75 |
| 0.01900 | 18.71 | 4.40 | 4.25 | 23.18 | 22.75 |
| 0.02000 | 19.20 | 4.52 | 4.25 | 23.18 | 22.75 |
| 0.02100 | 19.67 | 4.63 | 4.25 | 23.18 | 22.75 |
| 0.02200 | 20.13 | 4.74 | 4.25 | 23.18 | 22.75 |
| 0.02300 | 20.58 | 4.85 | 4.25 | 23.18 | 22.75 |
| 0.02400 | 21.03 | 4.95 | 4.25 | 23.18 | 22.75 |
| 0.02500 | 21.46 | 5.05 | 4.25 | 23.18 | 22.75 |
| 0.02600 | 21.89 | 5.15 | 4.25 | 23.18 | 22.75 |
| 0.02700 | 22.30 | 5.25 | 4.25 | 23.18 | 22.75 |
| 0.02800 | 22.71 | 5.35 | 4.25 | 23.18 | 22.75 |
| 0.02900 | 23.11 | 5.44 | 4.25 | 23.18 | 22.75 |
| 0.03000 | 23.51 | 5.53 | 4.25 | 23.18 | 22.75 |
| 0.03100 | 23.90 | 5.63 | 4.25 | 23.18 | 22.75 |
| 0.03200 | 24.28 | 5.72 | 4.25 | 23.18 | 22.75 |
| 0.03300 | 24.66 | 5.81 | 4.25 | 23.18 | 22.75 |
| 0.03400 | 25.03 | 5.89 | 4.25 | 23.18 | 22.75 |
| 0.03500 | 25.39 | 5.98 | 4.25 | 23.18 | 22.75 |
| 0.03600 | 25.75 | 6.06 | 4.25 | 23.18 | 22.75 |
| 0.03700 | 26.11 | 6.15 | 4.25 | 23.18 | 22.75 |
| 0.03800 | 26.46 | 6.23 | 4.25 | 23.18 | 22.75 |
| 0.03900 | 26.80 | 6.31 | 4.25 | 23.18 | 22.75 |
| 0.04000 | 27.15 | 6.39 | 4.25 | 23.18 | 22.75 |
| 0.04100 | 27.48 | 6.47 | 4.25 | 23.18 | 22.75 |
| 0.04200 | 27.82 | 6.55 | 4.25 | 23.18 | 22.75 |
| 0.04300 | 28.15 | 6.63 | 4.25 | 23.18 | 22.75 |
| 0.04400 | 28.47 | 6.70 | 4.25 | 23.18 | 22.75 |
| 0.04500 | 28.79 | 6.78 | 4.25 | 23.18 | 22.75 |
| 0.04600 | 29.11 | 6.85 | 4.25 | 23.18 | 22.75 |
| 0.04700 | 29.43 | 6.93 | 4.25 | 23.18 | 22.75 |

# Rating Table for 60' Street-Half Street

Input Data

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.04800 | 29.74 | 7.00 | 4.25 | 23.18 | 22.75 |
| 0.04900 | 30.05 | 7.07 | 4.25 | 23.18 | 22.75 |
| 0.05000 | 30.35 | 7.15 | 4.25 | 23.18 | 22.75 |

# Rating Table for 60' Street-TC (one side)

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.04350 | ft/ft |
| Normal Depth | 0.50 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.000 | 0.70 |
| 0+10.000 | 0.50 |
| 0+10.125 | 0.00 |
| 0+12.125 | 0.17 |
| 0+12.125 | 0.20 |
| 0+30.000 | 0.56 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.000, 0.70) | (0+30.000, 0.56) | 0.015 |

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.00300 | 5.41 | 1.72 | 3.15 | 17.68 | 17.25 |
| 0.00400 | 6.24 | 1.98 | 3.15 | 17.68 | 17.25 |
| 0.00500 | 6.98 | 2.22 | 3.15 | 17.68 | 17.25 |
| 0.00600 | 7.64 | 2.43 | 3.15 | 17.68 | 17.25 |
| 0.00700 | 8.26 | 2.62 | 3.15 | 17.68 | 17.25 |
| 0.00800 | 8.83 | 2.80 | 3.15 | 17.68 | 17.25 |
| 0.00900 | 9.36 | 2.97 | 3.15 | 17.68 | 17.25 |
| 0.01000 | 9.87 | 3.14 | 3.15 | 17.68 | 17.25 |

# Rating Table for 60' Street-TC (one side)

Input Data

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.01100 | 10.35 | 3.29 | 3.15 | 17.68 | 17.25 |
| 0.01200 | 10.81 | 3.43 | 3.15 | 17.68 | 17.25 |
| 0.01300 | 11.25 | 3.57 | 3.15 | 17.68 | 17.25 |
| 0.01400 | 11.68 | 3.71 | 3.15 | 17.68 | 17.25 |
| 0.01500 | 12.09 | 3.84 | 3.15 | 17.68 | 17.25 |
| 0.01600 | 12.48 | 3.97 | 3.15 | 17.68 | 17.25 |
| 0.01700 | 12.87 | 4.09 | 3.15 | 17.68 | 17.25 |
| 0.01800 | 13.24 | 4.21 | 3.15 | 17.68 | 17.25 |
| 0.01900 | 13.60 | 4.32 | 3.15 | 17.68 | 17.25 |
| 0.02000 | 13.96 | 4.43 | 3.15 | 17.68 | 17.25 |
| 0.02100 | 14.30 | 4.54 | 3.15 | 17.68 | 17.25 |
| 0.02200 | 14.64 | 4.65 | 3.15 | 17.68 | 17.25 |
| 0.02300 | 14.97 | 4.75 | 3.15 | 17.68 | 17.25 |
| 0.02400 | 15.29 | 4.86 | 3.15 | 17.68 | 17.25 |
| 0.02500 | 15.60 | 4.96 | 3.15 | 17.68 | 17.25 |
| 0.02600 | 15.91 | 5.06 | 3.15 | 17.68 | 17.25 |
| 0.02700 | 16.22 | 5.15 | 3.15 | 17.68 | 17.25 |
| 0.02800 | 16.51 | 5.25 | 3.15 | 17.68 | 17.25 |
| 0.02900 | 16.81 | 5.34 | 3.15 | 17.68 | 17.25 |
| 0.03000 | 17.09 | 5.43 | 3.15 | 17.68 | 17.25 |
| 0.03100 | 17.37 | 5.52 | 3.15 | 17.68 | 17.25 |
| 0.03200 | 17.65 | 5.61 | 3.15 | 17.68 | 17.25 |
| 0.03300 | 17.93 | 5.70 | 3.15 | 17.68 | 17.25 |
| 0.03400 | 18.20 | 5.78 | 3.15 | 17.68 | 17.25 |
| 0.03500 | 18.46 | 5.87 | 3.15 | 17.68 | 17.25 |
| 0.03600 | 18.72 | 5.95 | 3.15 | 17.68 | 17.25 |
| 0.03700 | 18.98 | 6.03 | 3.15 | 17.68 | 17.25 |
| 0.03800 | 19.24 | 6.11 | 3.15 | 17.68 | 17.25 |
| 0.03900 | 19.49 | 6.19 | 3.15 | 17.68 | 17.25 |
| 0.04000 | 19.74 | 6.27 | 3.15 | 17.68 | 17.25 |
| 0.04100 | 19.98 | 6.35 | 3.15 | 17.68 | 17.25 |
| 0.04200 | 20.22 | 6.43 | 3.15 | 17.68 | 17.25 |
| 0.04300 | 20.46 | 6.50 | 3.15 | 17.68 | 17.25 |
| 0.04400 | 20.70 | 6.58 | 3.15 | 17.68 | 17.25 |
| 0.04500 | 20.93 | 6.65 | 3.15 | 17.68 | 17.25 |
| 0.04600 | 21.17 | 6.72 | 3.15 | 17.68 | 17.25 |
| 0.04700 | 21.39 | 6.80 | 3.15 | 17.68 | 17.25 |

# Rating Table for 60' Street-TC (one side)

Input Data

| Channel Slope (ft/ft) | Discharge (ft³/s) | Velocity (ft/s) | Flow Area (ft²) | Wetted Perimeter (ft) | Top Width (ft) |
|---|---|---|---|---|---|
| 0.04800 | 21.62 | 6.87 | 3.15 | 17.68 | 17.25 |
| 0.04900 | 21.84 | 6.94 | 3.15 | 17.68 | 17.25 |
| 0.05000 | 22.07 | 7.01 | 3.15 | 17.68 | 17.25 |

## APPENDIX B.2: CATCH BASIN FLOW-BY SUMMARY TABLE

CATCH BASIN FLOW-BY SUMMARY TABLE

| | | CB | | | STREET | CAPACITY | | US Q10 | US Q100 | US | FOR INTERCEPTION[2] | | INTERCEPTED[3] | | BY PASS[4] | | CB | DS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CB | NODE | TYPE | Q10[1] | Q100[1] | SLOPE | 10 YR | 100 YR | BYPASS | BYPASS | CB | Q10 | Q100 | Q10 | Q100 | Q10 | Q100 | WIDTH | CB |
| **15** | **105** | **ON GRADE** | **2.64** | **4.07** | **0.0149** | **12.05** | **80.66** | **0.00** | **0.00** | **N/A** | **2.64** | **4.07** | **2.64** | **3.93** | **0** | **0.14** | **14'** | **1** |
| 1[6] | 103 | ON GRADE | 7.66 | 11.87 | 0.006 | 7.64 | 51.18 | 0.00 | 0.14 | 15 | 7.66 | 10.51 | 7.66 | 10.27 | 0 | 0.24 | 21' | 3 |
| **2[6]** | **107.2** | **ON GRADE** | **2.32** | **3.57** | **0.006** | **7.64** | **51.18** | **0.00** | **0.00** | **N/A** | **2.32** | **4.93** | **2.32** | **4.87** | **0** | **0.06** | **14'** | **3** |
| 3 | 110 | ON GRADE | 3.64 | 5.62 | 0.005 | 6.98 | 46.72 | 0 | 0.3 | 1, 2 | 3.64 | 5.92 | 3.64 | 5.73 | 0 | 0.19 | 14' | 5 |
| **4** | **112** | **ON GRADE** | **4.38** | **6.76** | **0.005** | **6.98** | **46.72** | **0.00** | **0.00** | **N/A** | **4.38** | **6.76** | **4.38** | **6.35** | **0.00** | **0.41** | **14'** | **6** |
| 5 | 116 | SUMP[5] | 3.57 | 5.51 | 0.0031 | 5.67 | 37.96 | 0.11 | 0.96 | 3, 7 | 3.68 | 6.47 | 3.65 | 6.42 | 0.03 | 0.05 | 7' | N/A |
| **6** | **118** | **SUMP[5]** | **2.44** | **3.76** | **0.0031** | **5.67** | **37.96** | **0.00** | **0.00** | **N/A** | **2.44** | **3.76** | **2.44** | **3.76** | **0.00** | **0.00** | **4'** | **N/A** |
| 7 | 121 | ON GRADE | 3.39 | 5.22 | 0.0246 | 15.48 | 103.64 | 0.00 | 0.00 | N/A | 3.39 | 5.22 | 3.28 | 4.45 | 0.11 | 0.77 | 14' | 5 |
| **8** | **126** | **ON GRADE** | **3.22** | **4.96** | **0.0096** | **9.67** | **64.74** | **0.00** | **0.00** | **N/A** | **3.22** | **4.96** | **2.98** | **3.96** | **0.24** | **1.00** | **10'** | **10** |
| 9 | 124 | ON GRADE | 4.68 | 7.22 | 0.0096 | 9.67 | 64.74 | 0.00 | 0.00 | N/A | 4.68 | 7.22 | 4.53 | 6.18 | 0.15 | 1.04 | 14' | 10 |
| **10** | **130** | **SUMP[5]** | **1.56** | **2.39** | **0.008** | **8.83** | **59.1** | **0.39** | **2.04** | **8, 9** | **1.95** | **4.43** | **1.95** | **4.43** | **0.00** | **0.00** | **4'** | **N/A** |
| 11 | 133 | ON GRADE | 8.81 | 13.76 | 0.0435 | 20.58 | 137.82 | 0.00 | 0.00 | N/A | 8.81 | 13.76 | 8.52 | 11.69 | 0.29 | 2.07 | 28' | Offsite |
| **12** | **135** | **ON GRADE** | **2.06** | **3.16** | **0.0273** | **16.31** | **109.18** | **0.00** | **0.00** | **N/A** | **2.06** | **3.16** | **2.06** | **3.07** | **0.00** | **0.09** | **14'** | **Offsite** |
| 13 | 202 | SUMP[5] | 5.09 | 7.85 | 0.0052 | 7.12 | 47.65 | 0.00 | 0.00 | N/A | 5.09 | 7.85 | 5.09 | 7.85 | 0.00 | 0.00 | 4' | N/A |
| **14** | **204** | **SUMP[5]** | **2.90** | **4.43** | **0.0052** | **7.12** | **47.65** | **0.00** | **0.00** | **N/A** | **2.90** | **4.43** | **2.90** | **4.43** | **0.00** | **0.00** | **4'** | **N/A** |

1. Appendix A Q10 and Q100 Values
2. Q100 + "Upstream Q100 Bypass" = For Interception (same for Q10)
3. Intercepted from Catch Basin Sizing Calculations
4. "By pass" = "For Interception" - "Intercepted"
5. Street slope and capacities for sump conditions untilize the smallest adjacent street slope.
6. Half Street Capacity is 10.51 cft, therefore 4.16 cfs will overtop to CB 2 for the 100-year.

## APPENDIX B.3: CATCH BASIN SIZING CALCULATIONS

# Worksheet for Catch Basin #1-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 7.66 | ft³/s |
| Slope | 0.00600 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 21.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 100.00 | % |
| Intercepted Flow | 7.66 | ft³/s |
| Bypass Flow | 0.00 | ft³/s |
| Spread | 15.96 | ft |
| Depth | 0.45 | ft |
| Flow Area | 2.67 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 2.86 | ft/s |
| Equivalent Cross Slope | 0.06284 | ft/ft |
| Length Factor | 1.06 | |
| Total Interception Length | 19.88 | ft |

# Worksheet for Catch Basin #1-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 10.51 | ft³/s |
| Slope | 0.00600 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 21.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 97.75 | % |
| Intercepted Flow | 10.27 | ft³/s |
| Bypass Flow | 0.24 | ft³/s |
| Spread | 18.14 | ft |
| Depth | 0.49 | ft |
| Flow Area | 3.42 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 3.08 | ft/s |
| Equivalent Cross Slope | 0.05765 | ft/ft |
| Length Factor | 0.88 | |
| Total Interception Length | 23.91 | ft |

# Worksheet for Catch Basin #2-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 2.32 | ft³/s |
| Slope | 0.00600 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 100.00 | % |
| Intercepted Flow | 2.32 | ft³/s |
| Bypass Flow | 0.00 | ft³/s |
| Spread | 9.54 | ft |
| Depth | 0.32 | ft |
| Flow Area | 1.04 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 2.24 | ft/s |
| Equivalent Cross Slope | 0.08898 | ft/ft |
| Length Factor | 1.43 | |
| Total Interception Length | 9.77 | ft |

# Worksheet for Catch Basin #2-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 4.93 | ft³/s |
| Slope | 0.00600 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 98.78 | % |
| Intercepted Flow | 4.87 | ft³/s |
| Bypass Flow | 0.06 | ft³/s |
| Spread | 13.30 | ft |
| Depth | 0.39 | ft |
| Flow Area | 1.90 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 2.60 | ft/s |
| Equivalent Cross Slope | 0.07123 | ft/ft |
| Length Factor | 0.91 | |
| Total Interception Length | 15.32 | ft |

# Worksheet for Catch Basin #3-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 3.64 | ft³/s |
| Slope | 0.00500 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 100.00 | % |
| Intercepted Flow | 3.64 | ft³/s |
| Bypass Flow | 0.00 | ft³/s |
| Spread | 12.15 | ft |
| Depth | 0.37 | ft |
| Flow Area | 1.60 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 2.27 | ft/s |
| Equivalent Cross Slope | 0.07578 | ft/ft |
| Length Factor | 1.14 | |
| Total Interception Length | 12.31 | ft |

# Worksheet for Catch Basin #3-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 5.92 | ft³/s |
| Slope | 0.00500 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 96.81 | % |
| Intercepted Flow | 5.73 | ft³/s |
| Bypass Flow | 0.19 | ft³/s |
| Spread | 14.91 | ft |
| Depth | 0.42 | ft |
| Flow Area | 2.35 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 2.52 | ft/s |
| Equivalent Cross Slope | 0.06584 | ft/ft |
| Length Factor | 0.85 | |
| Total Interception Length | 16.42 | ft |

# Worksheet for Catch Basin #4-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 4.38 | ft³/s |
| Slope | 0.00500 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 100.00 | % |
| Intercepted Flow | 4.38 | ft³/s |
| Bypass Flow | 0.00 | ft³/s |
| Spread | 13.15 | ft |
| Depth | 0.39 | ft |
| Flow Area | 1.86 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 2.36 | ft/s |
| Equivalent Cross Slope | 0.07179 | ft/ft |
| Length Factor | 1.02 | |
| Total Interception Length | 13.74 | ft |

# Worksheet for Catch Basin #4-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 6.76 | ft³/s |
| Slope | 0.00500 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 93.89 | % |
| Intercepted Flow | 6.35 | ft³/s |
| Bypass Flow | 0.41 | ft³/s |
| Spread | 15.75 | ft |
| Depth | 0.44 | ft |
| Flow Area | 2.61 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 2.59 | ft/s |
| Equivalent Cross Slope | 0.06343 | ft/ft |
| Length Factor | 0.79 | |
| Total Interception Length | 17.76 | ft |

# Worksheet for Catch Basin #5-10yr

## Project Description

| | |
|---|---|
| Solve For | Spread |

## Input Data

| | | | |
|---|---|---|---|
| Discharge | | 3.65 | ft³/s |
| Gutter Width | | 2.00 | ft |
| Gutter Cross Slope | | 0.08 | ft/ft |
| Road Cross Slope | | 0.02 | ft/ft |
| Curb Opening Length | | 7.00 | ft |
| Opening Height | | 0.83 | ft |
| Curb Throat Type | Horizontal | | |
| Local Depression | | 4.00 | in |
| Local Depression Width | | 4.00 | ft |
| Throat Incline Angle | | 90.00 | degrees |

## Results

| | | |
|---|---|---|
| Spread | 11.60 | ft |
| Depth | 0.36 | ft |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |

# Worksheet for Catch Basin #5-100yr

## Project Description

| | |
|---|---|
| Solve For | Spread |

## Input Data

| | | | |
|---|---|---|---|
| Discharge | | 6.42 | ft³/s |
| Gutter Width | | 2.00 | ft |
| Gutter Cross Slope | | 0.08 | ft/ft |
| Road Cross Slope | | 0.02 | ft/ft |
| Curb Opening Length | | 7.00 | ft |
| Opening Height | | 0.83 | ft |
| Curb Throat Type | Horizontal | | |
| Local Depression | | 4.00 | in |
| Local Depression Width | | 4.00 | ft |
| Throat Incline Angle | | 90.00 | degrees |

## Results

| | | |
|---|---|---|
| Spread | 16.90 | ft |
| Depth | 0.46 | ft |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |

# Worksheet for Catch Basin #6-10yr

## Project Description

| | |
|---|---|
| Solve For | Spread |

## Input Data

| | | | |
|---|---|---|---|
| Discharge | | 2.44 | $ft^3/s$ |
| Gutter Width | | 2.00 | ft |
| Gutter Cross Slope | | 0.08 | ft/ft |
| Road Cross Slope | | 0.02 | ft/ft |
| Curb Opening Length | | 4.00 | ft |
| Opening Height | | 0.83 | ft |
| Curb Throat Type | Horizontal | | |
| Local Depression | | 4.00 | in |
| Local Depression Width | | 4.00 | ft |
| Throat Incline Angle | | 90.00 | degrees |

## Results

| | | |
|---|---|---|
| Spread | 10.39 | ft |
| Depth | 0.33 | ft |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |

# Worksheet for Catch Basin #6-100yr

## Project Description

| | |
|---|---|
| Solve For | Spread |

## Input Data

| | | | |
|---|---|---|---|
| Discharge | | 3.76 | ft³/s |
| Gutter Width | | 2.00 | ft |
| Gutter Cross Slope | | 0.08 | ft/ft |
| Road Cross Slope | | 0.02 | ft/ft |
| Curb Opening Length | | 4.00 | ft |
| Opening Height | | 0.83 | ft |
| Curb Throat Type | Horizontal | | |
| Local Depression | | 4.00 | in |
| Local Depression Width | | 4.00 | ft |
| Throat Incline Angle | | 90.00 | degrees |

## Results

| | | |
|---|---|---|
| Spread | 13.86 | ft |
| Depth | 0.40 | ft |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |

# Worksheet for Catch Basin #7-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 3.39 | ft³/s |
| Slope | 0.02460 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 96.62 | % |
| Intercepted Flow | 3.28 | ft³/s |
| Bypass Flow | 0.11 | ft³/s |
| Spread | 8.15 | ft |
| Depth | 0.29 | ft |
| Flow Area | 0.79 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 4.29 | ft/s |
| Equivalent Cross Slope | 0.09792 | ft/ft |
| Length Factor | 0.85 | |
| Total Interception Length | 16.52 | ft |

# Worksheet for Catch Basin #7-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 5.22 | ft³/s |
| Slope | 0.02460 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 85.29 | % |
| Intercepted Flow | 4.45 | ft³/s |
| Bypass Flow | 0.77 | ft³/s |
| Spread | 10.01 | ft |
| Depth | 0.33 | ft |
| Flow Area | 1.13 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 4.62 | ft/s |
| Equivalent Cross Slope | 0.08624 | ft/ft |
| Length Factor | 0.66 | |
| Total Interception Length | 21.37 | ft |

# Worksheet for Catch Basin #8-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 3.22 | ft³/s |
| Slope | 0.00960 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 10.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 92.45 | % |
| Intercepted Flow | 2.98 | ft³/s |
| Bypass Flow | 0.24 | ft³/s |
| Spread | 9.96 | ft |
| Depth | 0.33 | ft |
| Flow Area | 1.12 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 2.88 | ft/s |
| Equivalent Cross Slope | 0.08656 | ft/ft |
| Length Factor | 0.76 | |
| Total Interception Length | 13.12 | ft |

# Worksheet for Catch Basin #8-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 4.96 | ft³/s |
| Slope | 0.00960 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 10.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 79.78 | % |
| Intercepted Flow | 3.96 | ft³/s |
| Bypass Flow | 1.00 | ft³/s |
| Spread | 12.06 | ft |
| Depth | 0.37 | ft |
| Flow Area | 1.58 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 3.14 | ft/s |
| Equivalent Cross Slope | 0.07616 | ft/ft |
| Length Factor | 0.59 | |
| Total Interception Length | 16.99 | ft |

# Worksheet for Catch Basin #9-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 4.68 | ft³/s |
| Slope | 0.00960 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 96.83 | % |
| Intercepted Flow | 4.53 | ft³/s |
| Bypass Flow | 0.15 | ft³/s |
| Spread | 11.76 | ft |
| Depth | 0.36 | ft |
| Flow Area | 1.51 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 3.10 | ft/s |
| Equivalent Cross Slope | 0.07748 | ft/ft |
| Length Factor | 0.85 | |
| Total Interception Length | 16.41 | ft |

# Worksheet for Catch Basin #9-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 7.22 | ft³/s |
| Slope | 0.00960 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 85.59 | % |
| Intercepted Flow | 6.18 | ft³/s |
| Bypass Flow | 1.04 | ft³/s |
| Spread | 14.14 | ft |
| Depth | 0.41 | ft |
| Flow Area | 2.13 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 3.40 | ft/s |
| Equivalent Cross Slope | 0.06828 | ft/ft |
| Length Factor | 0.66 | |
| Total Interception Length | 21.24 | ft |

# Worksheet for Catch Basin #10-10yr

## Project Description

| | |
|---|---|
| Solve For | Spread |

## Input Data

| | | | |
|---|---|---|---|
| Discharge | | 1.95 | ft³/s |
| Gutter Width | | 2.00 | ft |
| Gutter Cross Slope | | 0.08 | ft/ft |
| Road Cross Slope | | 0.02 | ft/ft |
| Curb Opening Length | | 4.00 | ft |
| Opening Height | | 0.83 | ft |
| Curb Throat Type | Horizontal | | |
| Local Depression | | 4.00 | in |
| Local Depression Width | | 4.00 | ft |
| Throat Incline Angle | | 90.00 | degrees |

## Results

| | | |
|---|---|---|
| Spread | 3.83 | ft |
| Depth | 0.31 | ft |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |

# Worksheet for Catch Basin #10-100yr

## Project Description

| | |
|---|---|
| Solve For | Spread |

## Input Data

| | | | |
|---|---|---|---|
| Discharge | | 4.43 | ft³/s |
| Gutter Width | | 2.00 | ft |
| Gutter Cross Slope | | 0.08 | ft/ft |
| Road Cross Slope | | 0.02 | ft/ft |
| Curb Opening Length | | 4.00 | ft |
| Opening Height | | 0.83 | ft |
| Curb Throat Type | Horizontal | | |
| Local Depression | | 4.00 | in |
| Local Depression Width | | 4.00 | ft |
| Throat Incline Angle | | 90.00 | degrees |

## Results

| | | |
|---|---|---|
| Spread | 15.46 | ft |
| Depth | 0.44 | ft |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |

# Worksheet for Catch Basin #11-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 8.81 | ft³/s |
| Slope | 0.04350 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 28.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 96.69 | % |
| Intercepted Flow | 8.52 | ft³/s |
| Bypass Flow | 0.29 | ft³/s |
| Spread | 11.15 | ft |
| Depth | 0.35 | ft |
| Flow Area | 1.37 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 6.44 | ft/s |
| Equivalent Cross Slope | 0.08034 | ft/ft |
| Length Factor | 0.85 | |
| Total Interception Length | 32.96 | ft |

# Worksheet for Catch Basin #11-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 13.76 | ft³/s |
| Slope | 0.04350 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 28.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 84.99 | % |
| Intercepted Flow | 11.69 | ft³/s |
| Bypass Flow | 2.07 | ft³/s |
| Spread | 13.50 | ft |
| Depth | 0.40 | ft |
| Flow Area | 1.95 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 7.06 | ft/s |
| Equivalent Cross Slope | 0.07049 | ft/ft |
| Length Factor | 0.65 | |
| Total Interception Length | 42.99 | ft |

# Worksheet for Catch Basin #12-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 2.06 | ft³/s |
| Slope | 0.02730 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 100.00 | % |
| Intercepted Flow | 2.06 | ft³/s |
| Bypass Flow | 0.00 | ft³/s |
| Spread | 6.05 | ft |
| Depth | 0.25 | ft |
| Flow Area | 0.49 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 4.19 | ft/s |
| Equivalent Cross Slope | 0.11387 | ft/ft |
| Length Factor | 1.11 | |
| Total Interception Length | 12.63 | ft |

# Worksheet for Catch Basin #12-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 3.16 | ft³/s |
| Slope | 0.02730 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 97.25 | % |
| Intercepted Flow | 3.07 | ft³/s |
| Bypass Flow | 0.09 | ft³/s |
| Spread | 7.66 | ft |
| Depth | 0.28 | ft |
| Flow Area | 0.71 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 4.43 | ft/s |
| Equivalent Cross Slope | 0.10141 | ft/ft |
| Length Factor | 0.86 | |
| Total Interception Length | 16.20 | ft |

# Worksheet for Catch Basin #13-10yr

## Project Description

| | |
|---|---|
| Solve For | Spread |

## Input Data

| | | | |
|---|---|---|---|
| Discharge | | 5.09 | ft³/s |
| Gutter Width | | 2.00 | ft |
| Gutter Cross Slope | | 0.08 | ft/ft |
| Road Cross Slope | | 0.02 | ft/ft |
| Curb Opening Length | | 4.00 | ft |
| Opening Height | | 0.83 | ft |
| Curb Throat Type | Horizontal | | |
| Local Depression | | 4.00 | in |
| Local Depression Width | | 4.00 | ft |
| Throat Incline Angle | | 90.00 | degrees |

## Results

| | | |
|---|---|---|
| Spread | 16.96 | ft |
| Depth | 0.47 | ft |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |

# Worksheet for Catch Basin #14-10yr

## Project Description

| | |
|---|---|
| Solve For | Spread |

## Input Data

| | | | |
|---|---|---|---|
| Discharge | | 2.90 | ft³/s |
| Gutter Width | | 2.00 | ft |
| Gutter Cross Slope | | 0.08 | ft/ft |
| Road Cross Slope | | 0.02 | ft/ft |
| Curb Opening Length | | 4.00 | ft |
| Opening Height | | 0.83 | ft |
| Curb Throat Type | Horizontal | | |
| Local Depression | | 4.00 | in |
| Local Depression Width | | 4.00 | ft |
| Throat Incline Angle | | 90.00 | degrees |

## Results

| | | |
|---|---|---|
| Spread | 11.66 | ft |
| Depth | 0.36 | ft |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |

# Worksheet for Catch Basin #15-10yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 2.64 | ft³/s |
| Slope | 0.01490 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 100.00 | % |
| Intercepted Flow | 2.64 | ft³/s |
| Bypass Flow | 0.00 | ft³/s |
| Spread | 8.15 | ft |
| Depth | 0.29 | ft |
| Flow Area | 0.79 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 3.34 | ft/s |
| Equivalent Cross Slope | 0.09790 | ft/ft |
| Length Factor | 1.09 | |
| Total Interception Length | 12.80 | ft |

# Worksheet for Catch Basin #15-100yr

## Project Description

| | |
|---|---|
| Solve For | Efficiency |

## Input Data

| | | |
|---|---|---|
| Discharge | 4.07 | ft³/s |
| Slope | 0.01490 | ft/ft |
| Gutter Width | 2.00 | ft |
| Gutter Cross Slope | 0.08 | ft/ft |
| Road Cross Slope | 0.02 | ft/ft |
| Roughness Coefficient | 0.015 | |
| Curb Opening Length | 14.00 | ft |
| Local Depression | 4.00 | in |
| Local Depression Width | 4.00 | ft |

## Results

| | | |
|---|---|---|
| Efficiency | 96.52 | % |
| Intercepted Flow | 3.93 | ft³/s |
| Bypass Flow | 0.14 | ft³/s |
| Spread | 10.02 | ft |
| Depth | 0.33 | ft |
| Flow Area | 1.13 | ft² |
| Gutter Depression | 0.13 | ft |
| Total Depression | 0.46 | ft |
| Velocity | 3.60 | ft/s |
| Equivalent Cross Slope | 0.08619 | ft/ft |
| Length Factor | 0.85 | |
| Total Interception Length | 16.57 | ft |

## APPENDIX B.4: DROP INLET CALCULATIONS

**WEIR EQUATION:** $Q = CLH^{(3/2)}$

**SOLVING FOR L:** $L = \frac{Q}{CH^{(3/2)}}$

$C = 2.8$

Atrium Diameter = 6"

Atrium Weir Lengths = $\pi$ d

Equivalent Atrium Weir = 1.57 ft

| Inlet | Line/Lateral | Q100 | H | Min. L | Total Opening Length | Inlet Type |
|---|---|---|---|---|---|---|
| 16 | Lateral A1-6 | 4.75 | 0.75 | 2.61 | 3 | Modified CB 110 |
| | | | | | | |

## APPENDIX B.5: STORM DRAIN SIZING FRICTION SLOPE CALCULATIONS

## LINE A1

### PIPE SIZING (SOFFIT CONTROL)

| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1105.24 | LINE A1 | 54 | 7.69 | 49.76 | 1966.48 | 0.0030 | 1100.25 | 1100.27 | 0.0006 | 3.1328 | 0.1521 | 1.5000 | 0.2282 | 1105.47 |
| 1105.47 | LINE A1 | 54 | 157.84 | 47.96 | 1966.48 | 0.0030 | 1100.27 | 1100.75 | 0.0006 | 3.0195 | 0.1413 | 1.5000 | 0.2120 | 1105.78 |
| 1105.78 | LINE A1 | 48 | 268.14 | 36.91 | 1436.42 | 0.0030 | 1100.75 | 1101.55 | 0.0007 | 2.9410 | 0.1341 | 1.5000 | 0.2011 | 1106.16 |
| 1106.16 | LINE A1 | 48 | 119.43 | 32.23 | 1436.42 | 0.0030 | 1101.55 | 1101.91 | 0.0005 | 2.5681 | 0.1022 | 1.5000 | 0.1533 | 1106.37 |
| 1106.37 | LINE A1 | 24 | 51.80 | 11.50 | 226.22 | 0.0030 | 1101.91 | 1102.06 | 0.0026 | 3.6654 | 0.2082 | 1.5000 | 0.3124 | 1106.82 |
| 1106.82 | LINE A1 | 36 | 93.29 | 14.51 | 666.97 | 0.0030 | 1102.06 | 1102.34 | 0.0005 | 2.0547 | 0.0654 | 1.5000 | 0.0982 | 1106.96 |
| 1106.96 | LINE A1 | 36 | 231.79 | 18.25 | 666.97 | 0.0050 | 1102.34 | 1103.50 | 0.0007 | 2.5852 | 0.1036 | 1.5000 | 0.1554 | 1107.29 |
| 1107.29 | LINE A1 | 30 | 61.64 | 15.75 | 410.16 | 0.0150 | 1103.50 | 1104.43 | 0.0015 | 3.2128 | 0.1600 | 1.5000 | 0.2400 | 1107.62 |
| 1107.62 | LINE A1 | 18 | 140.03 | 4.07 | 105.04 | 0.0150 | 1104.43 | 1106.53 | 0.0015 | 2.3062 | 0.0824 | 1.5000 | 0.1237 | 1107.95 |

| LOSS | | |
|---|---|---|
| TRANSITION STRUCTURE | 0.25 | 0.25 |
| WALL ENTRANCE | 0.25 | 0.25 |
| JUNCTION STRUCTURE | 0.50 | 1.00 |
| | | 2.50 |

## LAT A1-1

### PIPE SIZING (SOFFIT CONTROL)

| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1105.47 | A1-1 | 18 | 13.28 | 4.45 | 105.04 | 0.0050 | 1100.27 | 1100.34 | 0.0018 | 2.5215 | 0.0985 | 1.5000 | 0.1478 | 1105.64 |

## LAT A1-2

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1105.78 | LAT A1-2 | 18 | 36.07 | 11.91 | 105.04 | 0.0050 | 1100.75 | 1100.93 | 0.0129 | 6.7485 | 0.7059 | 1.5000 | 1.0589 | 1107.30 |
| 1107.30 | LAT A1-2 | 18 | 38.64 | 7.22 | 105.04 | 0.0050 | 1100.93 | 1101.12 | 0.0047 | 4.0910 | 0.2594 | 1.5000 | 0.3891 | 1107.87 |

## CP A1-2

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1107.30 | LAT A1-3 | 18 | 38.05 | 3.96 | 105.04 | 0.0050 | 1100.93 | 1101.12 | 0.0014 | 2.2438 | 0.0780 | 1.5000 | 0.1171 | 1107.47 |

## LAT A1-3

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1106.16 | LAT A1-3 | 18 | 69.53 | 4.45 | 105.04 | 0.0050 | 1101.55 | 1101.90 | 0.0018 | 2.5215 | 0.0985 | 1.5000 | 0.1478 | 1106.43 |

## LAT A1-4

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1106.37 | LAT A1-4 | 18 | 27.80 | 6.42 | 105.04 | 0.0050 | 1101.91 | 1102.05 | 0.0037 | 3.6377 | 0.2051 | 1.5000 | 0.3077 | 1106.78 |

## LAT A1-5

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1106.37 | LAT A1-5 | 18 | 16.53 | 3.76 | 105.04 | 0.0050 | 1101.91 | 1101.99 | 0.0013 | 2.1305 | 0.0704 | 1.5000 | 0.1055 | 1106.50 |

LAT A1-6

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1106.82 | LAT A1-6 | 30 | 39.73 | 4.75 | 410.16 | 0.0050 | 1102.06 | 1102.26 | 0.0001 | 0.9689 | 0.0146 | 1.5000 | 0.0218 | 1106.84 |

LAT A1-7

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1106.96 | LAT A1-7 | 30 | 30.26 | 5.73 | 410.16 | 0.0050 | 1102.34 | 1102.50 | 0.0002 | 1.1688 | 0.0212 | 1.5000 | 0.0318 | 1107.00 |

LAT A1-8

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1106.96 | LAT A1-8 | 30 | 16.84 | 6.35 | 410.16 | 0.0050 | 1102.34 | 1102.43 | 0.0002 | 1.2953 | 0.0260 | 1.5000 | 0.0390 | 1107.00 |

LAT A1-9

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1107.29 | LAT A1-9 | 24 | 33.66 | 4.87 | 226.22 | 0.0050 | 1103.50 | 1103.67 | 0.0005 | 1.5522 | 0.0373 | 1.5000 | 0.0560 | 1107.36 |

LAT A1-10

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1107.62 | LAT A1-10 | 24 | 30.60 | 10.27 | 226.22 | 0.0050 | 1104.43 | 1104.58 | 0.0021 | 3.2733 | 0.1661 | 1.5000 | 0.2491 | 1107.93 |

## LINE A2

### PIPE SIZING (SOFFIT CONTROL)

| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1105.24 | LINE A2 | 42 | 114.70 | 16.56 | 1006.08 | 0.0050 | 1100.25 | 1100.82 | 0.0003 | 1.7235 | 0.0460 | 1.5000 | 0.0691 | 1105.34 |
| 1105.34 | LINE A2 | 42 | 60.38 | 13.76 | 1006.08 | 0.0050 | 1100.82 | 1101.13 | 0.0002 | 1.4321 | 0.0318 | 1.5000 | 0.0477 | 1105.40 |

| LOSS | | |
|---|---|---|
| TRANSITION STRUCTURE | 0.25 | 0.25 |
| WALL ENTRANCE | 0.25 | 0.25 |
| JUNCTION STRUCTURE | 0.50 | 1.00 |
| | | 2.50 |

## LAT A2-1

### PIPE SIZING (SOFFIT CONTROL)

| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1105.34 | LAT A2-1 | 18 | 10.96 | 3.16 | 105.04 | 0.0050 | 1100.82 | 1100.88 | 0.0009 | 1.7905 | 0.0497 | 1.5000 | 0.0745 | 1105.42 |

LINE B

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1106.50 | LINE B | 18 | 66.70 | 11.80 | 105.04 | 0.0100 | 1101.65 | 1102.32 | 0.0126 | 6.6862 | 0.6929 | 1.5000 | 1.0394 | 1108.38 |
| 1108.38 | LINE B | 18 | 32.15 | 7.85 | 105.04 | 0.0100 | 1102.32 | 1102.64 | 0.0056 | 4.4480 | 0.3067 | 1.5000 | 0.4600 | 1109.02 |
| | | | | | | | | | | | | | | |

| LOSS | | |
|---|---|---|
| TRANSITION STRUCTURE | 0.25 | 0.25 |
| WALL ENTRANCE | 0.25 | 0.25 |
| JUNCTION STRUCTURE | 0.50 | 1.00 |
| | | 2.50 |

LAT B1

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1108.38 | LAT B1 | 18 | 4.22 | 4.43 | 105.04 | 0.0030 | 1102.32 | 1102.33 | 0.0018 | 2.5101 | 0.0977 | 1.5000 | 0.1465 | 1108.54 |

## SPLIT FLOW PIPE - LATERAL A

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1104.50 | LAT A | 42 | 28.75 | 10.76 | 1006.08 | 0.0100 | 1098.50 | 1098.79 | 0.0001 | 1.1198 | 0.0194 | 1.5000 | 0.0292 | 1104.53 |
| | | | | | | | | | | | | | | |

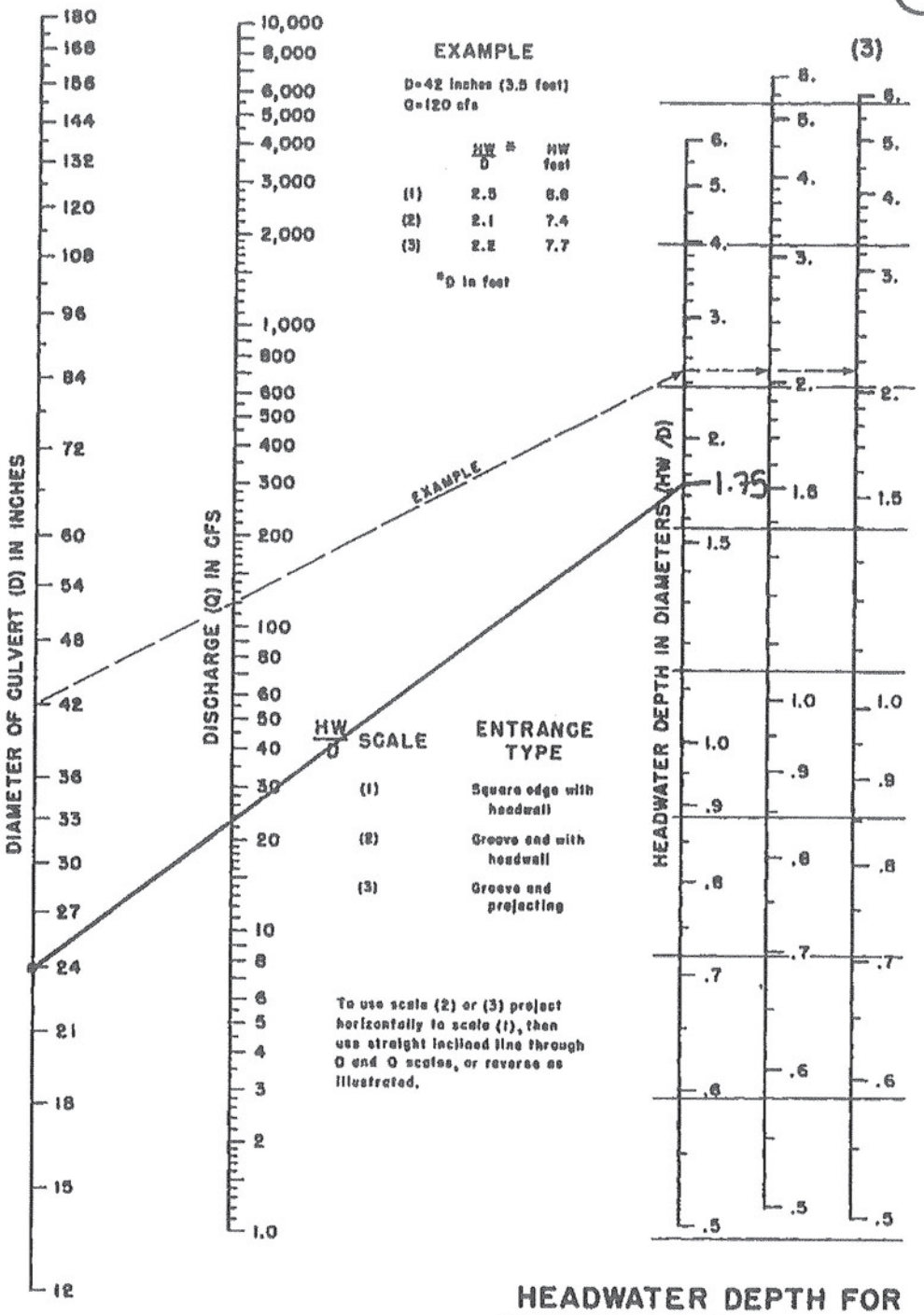
## BASIN OUTLET PIPE - LINE C

| PIPE SIZING (SOFFIT CONTROL) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DS WSE | SYSTEM | PIPE DIA. | PIPE LENGTH | Q (cfs) | K | PIPE SLOPE | DS INVERT | US INVERT | FRICTION SLOPE | VELOCITY | VELOCITY HEAD | LOSS COEFFICIENT | LOSSES | US WSE |
| 1100.02 | LINE C | 36 | 129.50 | 66.32 | 666.97 | 0.0063 | 1097.02 | 1097.84 | 0.0099 | 9.3946 | 1.3680 | 1.5000 | 2.0520 | 1103.35 |

## APPENDIX B.6: SPLITTER STRUCTURE NOMOGRAPH

# Splitter Structure Nomograph

## CHART 1B




$\frac{HW}{D} = 1.75' = \frac{HW}{2'} \Rightarrow HW = 3.50'$ (1101.81 + 3.5 = 1105.31)

Discharge = 23 cfs

## APPENDIX B.7: SPLITTER STRUCTURE WEIR CALCULATION

**DIVERSION STRUCTURE WEIR**

**100-YEAR WSE CALCULATION**

**WEIR EQUATION:** $Q = CLH^{(3/2)}$

**SOLVING FOR H:** $H = \left( \frac{Q}{CL} \right)^{(2/3)}$

| | | |
|---|---|---|
| Q = | 10.76 | $ft^3/s$ |
| L = | 8 | ft |
| C = | 3 | |
| **H =** | 0.59 | ft |

Invert = 1104.56

**100-YEAR WSE = 1105.15**

## APPENDIX B.8: BASIN OUTLET STRUCTURE CALCULATION

**BASIN OUTLET STRUCTURE CALCULATIONS**

**100-YEAR WSE CALCULATION**

**WEIR EQUATION:** $Q = CLH^{(3/2)}$

**SOLVING FOR H:** $H = \left( \frac{Q}{CL} \right)^{(2/3)}$

| | | |
|---|---|---|
| Q = | 66.32 | $ft^3/s$ |
| L = | 16 | ft |
| C = | 3 | |
| **H =** | 1.24 | ft |

Invert = 1104

**100-YEAR WSE = 1105.24**

# EXCERPTS

**EXCERPT A:** PALOMA DEL SOL TEMECULA CREEK CHANNEL – ALCOBA DRIVE STORM DRAIN TRACT NO. 24185 STORM DRAIN PLANS

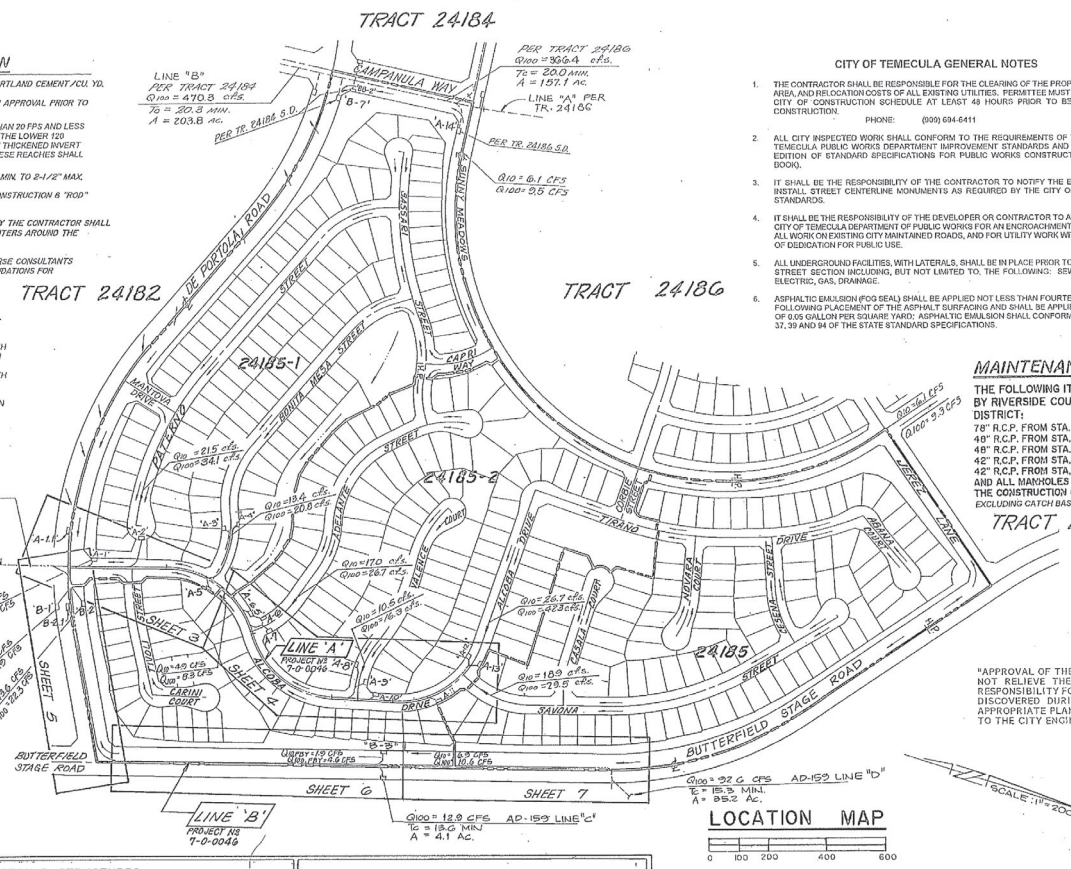
# RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

## CAST-IN-PLACE PIPE RECOMMENDATION

1. CONCRETE MIXES SHALL NOT HAVE LESS THAN SIX (6) SACKS OF PORTLAND CEMENT /CU. YD.
2. CONCRETE MIX DESIGNS SHALL BE SUBMITTED BY CONTRACTOR FOR APPROVAL PRIOR TO START OF CONSTRUCTION.
3. IF CAST-IN-PLACE PIPE IS USED FOR DESIGN VELOCITIES GREATER THAN 20 FPS AND LESS THAN 30 FPS, THE INVERT THICKNESS SHALL BE INCREASED 2" OVER THE LOWER 120 DEGREES OF THE PIPE. FOR VELOCITIES GREATER THAN 30 FPS, A 4" THICKENED INVERT SHALL BE CONSTRUCTED. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'C GREATER THAN OR EQUAL TO 4,000 PSI.
4. MAXIMUM PERMISSIBLE CONCRETE SLUMP SHALL BE 2-1/2", +1/2" MIN. TO 2-1/2" MAX.
5. CONTRACTOR SHALL ALLOW INSPECTOR INTO PIPE WHILE UNDER CONSTRUCTION & "ROD" FOR WALL THICKNESS AT A MIN. OF 25 C.Y. OF THE POUR.
6. AT THE END OF ALL POURS AND AT THE END OF EACH WORKING DAY THE CONTRACTOR SHALL INSTALL #4 DOWELS 24" LONG 12" INTO THE LAST FOUR AT 12" CENTERS AROUND THE CIRCUMFERENCE OF REINFORCED CONCRETE PIPE.
7. REFER TO ADDENDUM TO GEOTECHNICAL INVESTIGATION BY CONVERSE CONSULTANTS INLAND EMPIRE DATED MAY 16, 1996 REF: GEOTECHNICAL RECOMMENDATIONS FOR CAST-IN-PLACE CONCRETE PIPE.
8. JUNCTION STRUCTURES SHOWN ON THE PLANS ARE FOR REINFORCED CONCRETE PIPE. THE FOLLOWING SUBSTITUTIONS SHALL BE MADE FOR JUNCTIONS STRUCTURES FOR USE WITH CAST-IN-PLACE PIPE:
   A. A JUNCTION STRUCTURE NO. 4 (JS 229) SHALL BE REPLACED WITH EITHER A JUNCTION STRUCTURE NO. 2 (JS 227) OR A TRANSITION STRUCTURE NO 3 (TS 303).
   B. A JUNCTION STRUCTURE NO. 2 (JS 227) SHALL BE REPLACED WITH A TRANSITION STRUCTURE NO. 3 (TS 303).
9. STANDARD DRAWING NO. JS 227, JUNCTION STRUCTURE NO. 2 WHEN USED WITH CAST-IN-PLACE PIPE SHALL BE MODIFIED TO INCLUDE CONCRETE BACKFILL 1 FOOT OVER THE CAST-IN-PLACE PIPE.

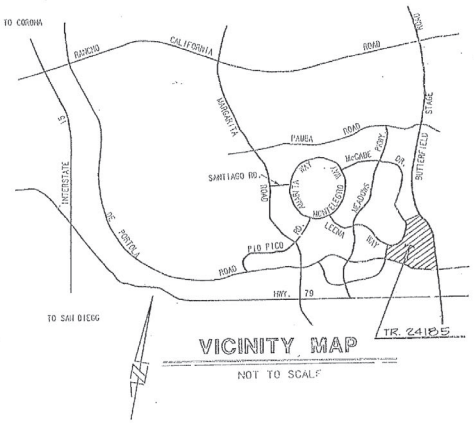
## R.C.F.C.D. STANDARD DRAWINGS

CB 100 CATCH BASIN NO. 1
JS 227 JUNCTION STRUCTURE NO. 2
JS 229 JUNCTION STRUCTURE NO. 4
MH 251 MANHOLE NO. 1
MH 252 MANHOLE NO. 2
MH 254 MANHOLE NO. 4
TS 303 TRANSITION STRUCTURE NO. 3
M 803 CONCRETE COLLAR




## LOCATION MAP

0 100 200 400 600




## CITY OF TEMECULA 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) 694-6411
2. ALL CITY INSPECTED WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF TEMECULA PUBLIC WORKS DEPARTMENT IMPROVEMENT STANDARDS AND THE LATEST EDITION OF STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK).
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER TO INSTALL STREET CENTERLINE MONUMENTS AS REQUIRED BY THE CITY OF TEMECULA STANDARDS.
4. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR TO APPLY TO THE CITY OF TEMECULA DEPARTMENT OF PUBLIC WORKS FOR AN ENCROACHMENT PERMIT FOR ALL WORK ON EXISTING CITY MAINTAINED ROADS, AND FOR UTILITY WORK WITHIN OFFERS OF DEDICATION FOR PUBLIC USE.
5. ALL UNDERGROUND FACILITIES, WITH LATERALS, SHALL BE IN PLACE PRIOR TO PAVING THE STREET SECTION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING: SEWER, WATER, ELECTRIC, GAS, DRAINAGE.
6. ASPHALTIC EMULSION (FOG SEAL) SHALL BE APPLIED NOT LESS THAN FOURTEEN (14) 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 SECTION 37, 39 AND 94 OF THE STATE STANDARD SPECIFICATIONS.

## MAINTENANCE NOTE

**THE FOLLOWING ITEMS ARE TO BE INSPECTED AND MAINTAINED BY RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT:**

78" R.C.P. FROM STA. 24+90.00 TO STA. 25+00.00 SHOWN ON SHEET 3
48" R.C.P. FROM STA. 25+14.16 TO STA. 27+85.00 SHOWN ON SHEET 3
48" R.C.P. FROM STA. 10+14.58 TO STA. 17+97.67 SHOWN ON SHEETS 5 & 6
42" R.C.P. FROM STA. 27+94.16 TO STA.30+15.74 SHOWN ON SHEET 3
42" R.C.P. FROM STA. 18+02.33 TO STA. 25+98.42 SHOWN ON SHEET 6
AND ALL MANHOLES AND OTHER STRUCTURES REQUIRED TO COMPLETE THE CONSTRUCTION OF THE ABOVE MENTIONED MAINLINE PIPE;
*EXCLUDING CATCH BASINS AND CONNECTOR PIPES.*

## SHEET INDEX



"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."

SCALE: 1" = 200'

REGISTERED PROFESSIONAL ENGINEER — DAVID LI-WEN SHEN — NO. 23737 — EXP. 12/31/97 — CIVIL — STATE OF CALIFORNIA

**AS BUILT**
APPROVED BY:
DATE 9/20/96

## CATCH BASIN INLET TABLE

| IDENTIFICATION NUMBER | | DESIGN Q100(cfs) | FLOW Q10(cfs) |
|---|---|---|---|
| LINE 'A' : | A-1 | 13.0 | 7.7 |
| | A-2 | 34.1 | 21.5 |
| | A-3 | 10.4 | 6.1 |
| | A-4 | 10.4 | 6.1 |
| | A-5 | 8.3 | 4.9 |
| | A-6 | 13.4 | 8.5 |
| | A-6.5 | 8.4 | 2.7 |
| | A-7 | 8.2 | 6.6 |
| | A-8 | 8.7 | 5.3 |
| | A-9 | 8.2 | 5.3 |
| | A-10 | 13.4 | 10.5 |
| | A-11 | 13.4 | 10.5 |
| | A-12 | 21.2 | 13.4 |
| | A-13 | 21.2 | 13.4 |
| | A-14 | 1.2 | 0.8 |
| LINE 'B' : | B-1 | 1.9 | 1.3 |
| | B-2 | 22.3 | 13.6 |
| | B-3 | 8.0 | 5.0 |
| | B-4 | 1.3 | 0.9 |

LD 96-055 CO

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### UNDERGROUND STRUCTURES

ALL UNDERGROUND UTILITIES OR STRUCTURES REPORTED BY THE OWNER OR OTHERS AND THOSE SHOWN ON THE RECORDS EXAMINED ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT. THE OWNER BY ACCEPTING THESE PLANS OR PROCEEDING WITH IMPROVEMENTS PURSUANT THERETO AGREES TO ASSUME LIABILITY AND TO HOLD UNDERSIGNED HARMLESS FOR ANY DAMAGE RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED TO THE UNDERSIGNED, NOT INDICATED ON THE PUBLIC RECORDS EXAMINED, LOCATED AT VARIANCE WITH THAT REPORTED OR SHOWN ON RECORDS EXAMINED. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK.

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, AND BY THE RIVERSIDE COUNTY FLOOD CONTROL DISTRICT.

**BASIS OF BEARINGS**
THE BEARINGS SHOWN HEREON ARE BASED ON A PORTION OF THE CENTERLINE OF BUTTERFIELD STAGE ROAD AS SHOWN ON PARCEL MAP NO. 23432 FILED IN BOOK 159, PAGES 38 THROUGH 61 OF PARCEL MAPS IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY, CALIFORNIA BEING N22°50'25"W

**BENCH MARK**
COUNTY OF RIVERSIDE B.M. NO. T-29-81
1 1/2" BRASS DISC IN CONC. CYLINDER LOCATED FROM THE INTERSECTION OF FRONT ST. AND RANCHO CALIFORNIA ROAD, 1.5 MILES N.E. ON RANCHO CALIFORNIA ROAD TO THE INTERSECTION OF RANCHO CALIFORNIA ROAD AND MARGARITA ROAD. IN THE N.W. CORNER OF THE INTERSECTION 1' E. OF A 7' CHAINLINK FENCE, 21' x 16' AROUND SO. CALIF. GAS VALVES, 40' N. OF P.P. (NO.8) 94' N. OF THE CENTERLINE OF RANCHO CALIFORNIA ROAD, FIBERGLASS WITNESS POST SET 1' W. OF MONUMENT.
ADJ. DATE: 9-13-82 ELEV. 1128.410

KEITH INTERNATIONAL, INC.
•Planning • Civil Engineering • Environmental Services•
•Land Surveying • Public Works • Water Resources•
Inland Empire Division
PREPARED UNDER THE SUPERVISION OF:
DAVID LI-WEN SHEN RCE NO. 23737 EXP. 6/30/97
DATE 4-22-96

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REF. | DESCRIPTION | ENGR. | DATE | RCFCD | DATE |

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER — DATE: 8/29/97
APPROVED BY: CHIEF ENGINEER — DATE: 9/3/97

CITY OF TEMECULA
RECOMENDED BY: DATE: 8/12/97
ACCEPTED BY: PRINCIPAL ENGINEER, FOR CITY ENGINEER — DATE: 8/19/97
R.C.E. NO. 13744 — RONALD J. PARKS — EXP. DATE: 9/30/01

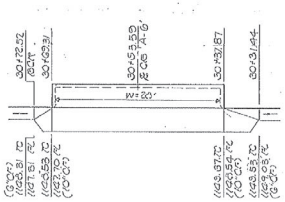
PALOMA DEL SOL
TEMECULA CREEK CHANNEL - ALCOBA DRIVE STORM DRAIN
TRACT NO. 24185
STORM DRAIN PLANS

PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 1 OF 10

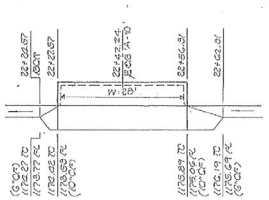
TRACT 24185 STORM DRAIN PLANS

## GENERAL NOTES

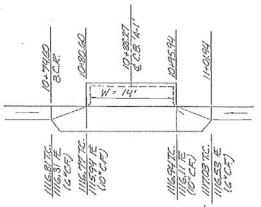
1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S SPECIFICATIONS DATED SEPTEMBER 1984, AND DESIGN MANUAL, STANDARD DRAWINGS, RECENT EDITION.
2. JUNCTION STRUCTURES SHOWN ARE FOR RCP ALTERNATIVE. REFER TO ADDITIONAL INFORMATION IN PLAN VIEW FOR CIPP OPTION STRUCTURES.
3. CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. THE CONTRACTOR SHALL NOTIFY THE DISTRICT IN WRITING A MINIMUM OF TWO WEEKS BEFORE BEGINNING CONSTRUCTION, AND SHALL NOT BEGIN CONSTRUCTION BEFORE OBTAINING AUTHORIZATION TO PROCEED.
4. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE-CENTERLINE INTERSECTION STATION.
6. FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-422-4133.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON U.S.C. & G.S. DATUM.
8. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
9. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
10. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OF SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
11. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO. 4 (JS 229) UNLESS OTHERWISE NOTED.
12. BEDDING PIPE WITH LESS THAN TWO FEET OF COVER SHALL CONFORM TO LOS ANGELES COUNTY FLOOD CONTROL DISTRICT STANDARD DRAWINGS 2-D2113 AND 2-D177 FOR CONCRETE BACKFILL IN TRENCHES. ALL OTHER PIPE SHALL CONFORM TO RCFC&WCD STD. DRAWING M815.
13. "V" IS THE DEPTH OF INLET OF CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
14. CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
15. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
16. A SOILS INVESTIGATION DATED APRIL 26, 1996, PREPARED BY CONVERSE CONSULTANTS SHALL BE INCLUDED AS A PART OF THESE PLANS. ALL WORK SHALL CONFORM TO RECOMMENDATIONS AS OUTLINED IN SAID REPORT.
17. THE CONCRETE COVER ON THE INSIDE OF ALL REINFORCED CONCRETE PIPE SHALL BE INCREASED TO PROVIDE A MINIMUM OF 1-1/2" OVER THE REINFORCING WHEN THE DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE FC=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND FC=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.
18. ALL CONSTRUCTION TO BE IN CONFORMANCE W/ THE REGULATION OF CAL-OSHA.
19. NOTICE TO CONTRACTOR: THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT FOR THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT SHOWN ON THESE PLANS OR NOT RECORDED.



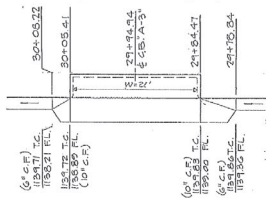
STA. 30+83.59
ADELANTE STREET
LOCAL DEPRESSION NO. A-6
FOR PLAN VIEW SEE SHT. 4



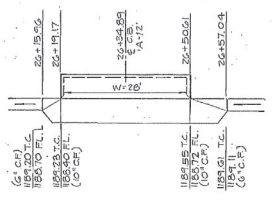
STA. 22+42.24
ALCOBA DRIVE
LOCAL DEPRESSION NO. A-10
FOR PLAN VIEW SEE SHT. 4



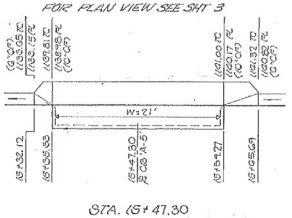
STA. 10+89.27
ALCOBA DRIVE
LOCAL DEPRESSION No. 'A-1'
FOR PLAN VIEW SEE SHT 3



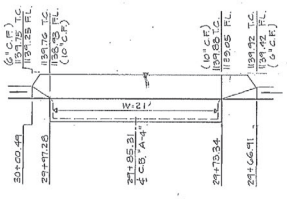
STA. 29+94.94
BONITA MESA STREET
LOCAL DEPRESSION NO. A-3
FOR PLAN VIEW SEE SHT. 3



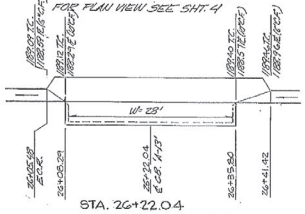
STA. 26+34.89
ALCOBA DRIVE
LOCAL DEPRESSION No. 'A-12'
FOR PLAN VIEW SEE SHT. 4



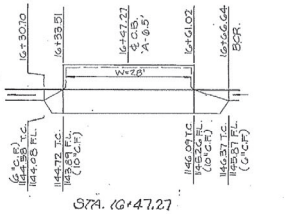
STA. 15+47.30
ALCOBA DRIVE
LOCAL DEPRESSION NO. A-5
FOR PLAN VIEW SEE SHT. 3



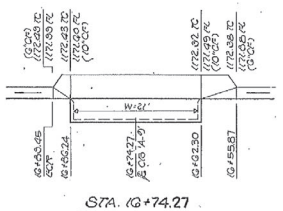
STA. 29+85.31
BONITA MESA STREET
LOCAL DEPRESSION NO. A-4
FOR PLAN VIEW SEE SHT. 3



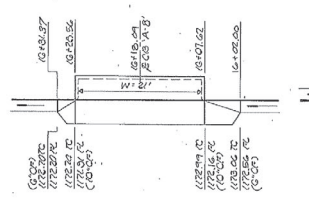
STA. 26+22.04
ALCOBA DRIVE
LOCAL DEPRESSION No. 'A-13'
FOR PLAN VIEW SEE SHT 4



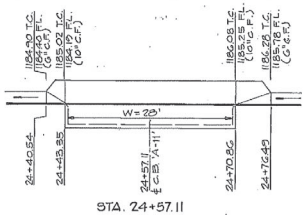
STA. 16+47.27
ALCOBA DRIVE
LOCAL DEPRESSION NO. A-8.5
FOR PLAN VIEW SEE SHT. 4



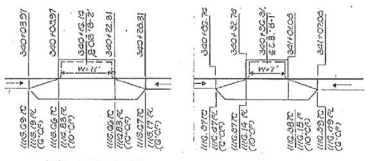
STA. 16+74.27
VALENCE COURT
LOCAL DEPRESSION NO. A-9
FOR PLAN VIEW SEE SHT. 4



STA. 16+18.09
VALENCE COURT
LOCAL DEPRESSION NO. A-8
FOR PLAN VIEW SEE SHT. 4

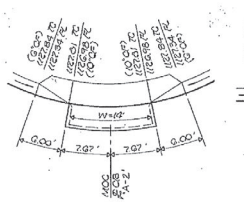


STA. 24+57.11
ALCOBA DRIVE
LOCAL DEPRESSION NO. A-11
FOR PLAN VIEW SEE SHT. 4

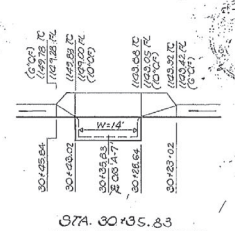


STA. 340+16.14
DE PORTOLA RD.
LOCAL DEPRESSION NO. A-2
FOR PLAN VIEW SEE SHT. 5

STA. 330+92.91
DE PORTOLA RD.
LOCAL DEPRESSION NO. A-1
FOR PLAN VIEW SEE SHT. 5



M.O.C.
PATERNO STREET
LOCAL DEPRESSION NO. A-2
FOR PLAN VIEW SEE SHT. 4



STA. 30+35.83
ADELANTE STREET
LOCAL DEPRESSION NO. A-7
FOR PLAN VIEW SEE SHT. 4

## CONSTRUCTION NOTES & ESTIMATED QUANTITIES

| NO. | ITEM DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|
| 1 | CONSTRUCT 78" R.C.P. OR C.I.P.P. (D-LOAD PER PROFILE) | L.F. | 10.00 |
| 2 | CONSTRUCT 48" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE) | L.F. | 1045.27 |
| 3 | CONSTRUCT 42" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE) | L.F. | 1014.01 |
| 4 | CONSTRUCT 36" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE) | L.F. | 1578.89 |
| 5 | CONSTRUCT 30" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE) | L.F. | 497.64 |
| 6 | CONSTRUCT 24" R.C.P. (CLASS IV) | L.F. | 465.52 |
| 7 | CONSTRUCT 18" R.C.P. (CLASS IV) | L.F. | 423.82 |
| 8 | CONSTRUCT MANHOLE NO.1 PER R.C.F.C.D. STD. MH 251 | EA. | 2 |
| 9 | CONSTRUCT MANHOLE NO.2 PER R.C.F.C.D. STD. MH 252 | EA. | 3 |
| 10 | CONSTRUCT MANHOLE NO.4 PER R.C.F.C.D. STD. MH 254 | EA. | 7 |
| 11 | CONSTRUCT JUNCTION STRUCTURE NO.2 PER R.C.F.C.D. STD. JS 227 | EA. | 5 |
| 12 | CONSTRUCT JUNCTION STRUCTURE NO.4 PER R.C.F.C.D. STD. JS 229 | EA. | 3 |
| 13 | CONSTRUCT TRANSITION STRUCTURE NO.3 PER R.C.F.C.D. STD. TS 303 | EA. | 3 |
| 14 | CONSTRUCT CATCH BASIN NO.1 PER R.C.F.C.D. STD. CB 100 | L.F. | 341 (17 EACH) |
| 15 | CONSTRUCT LOCAL DEPRESSION NO.2 CASE "B" PER R.I.V. CO. STD. NO. 311 | EA. | 13 |
| 16 | CONSTRUCT LOCAL DEPRESSION NO.2 CASE "C" PER R.I.V. CO. STD. NO. 311 | EA. | 5 |
| 17 | CONSTRUCT CONCRETE COLLAR PER R.C.F.C.D. STD. M 803 | EA. | 3 |
| ~~18~~ | ~~CONSTRUCT CANYARY SEWER PROTECTION PER RCFCD STD. M 859~~ | ~~L.F.~~ | ~~60~~ |
| 19 | REMOVE EXIST. 36" R.C.P. HEADWALL & RIP-RAP AND ABANDON OFFSITE | L.F. | 195 |
| 20 | REMOVE EXIST. 66" R.C.P. CULVERT AND ABANDON OFFSITE | L.F. | 280 |
| 21 | SAWCUT, REMOVE & REPLACE EXIST PAVEMENT PER CITY STD. NO 600 (DE PORTOLA: 0.38' AC W/ SEAL COAT - 209 TONS / 0.65' AB CLASS 2 = 178 C.Y.) (BUTTERFIELD: 0.41' AC W/ SEAL COAT = 33 TONS / 0.65' AB CLASS 2 = 26 C.Y.) | S.F. | 8498 |

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3990 Concours, Ste. 310, Ontario, California 91764 (909) 483-2444
PREPARED UNDER THE SUPERVISION OF
DAVID LI-WEN SHEN RCE NO. 44374 EXP. 6/30/97
DATE 4-22-96

BENCH MARK
SEE SHEET NO.1

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REF. | DESCRIPTION | ENGR. | DATE | RCFCD | DATE |

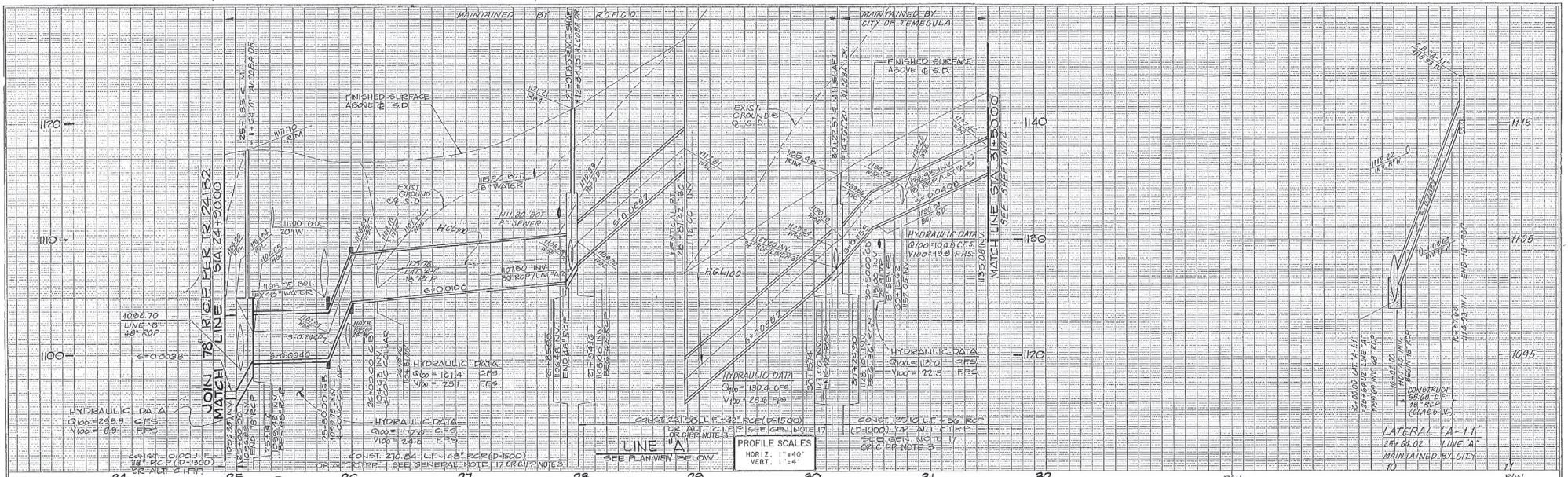
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE: 8/29/97
APPROVED BY: CHIEF ENGINEER DATE: 9/3/97

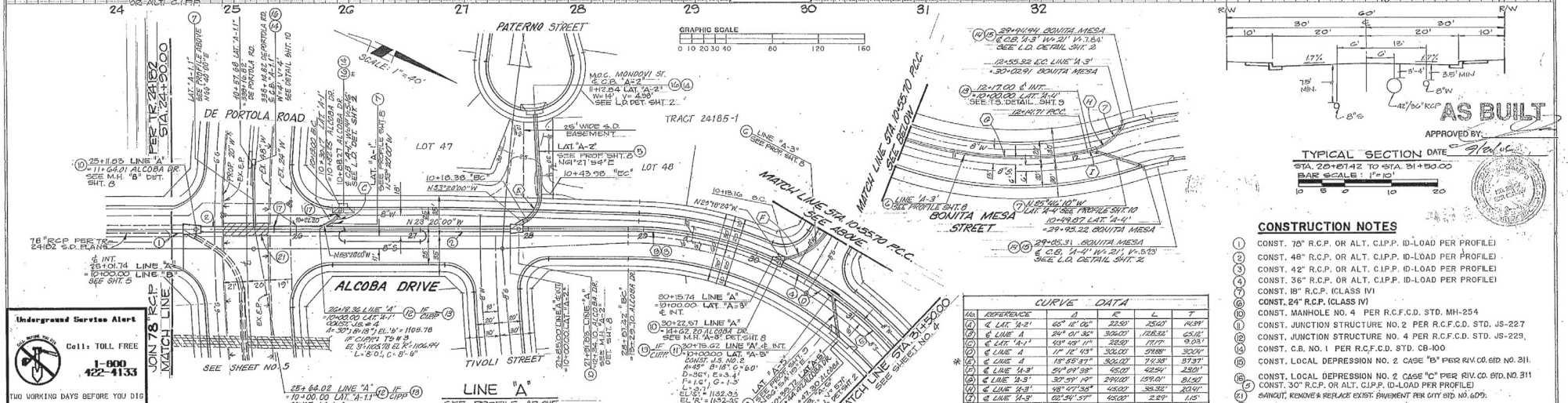
CITY OF TEMECULA
RECOMMENDED BY: DATE: 8/29/97
ACCEPTED BY: PRINCIPAL ENGINEER, FOR CITY ENGINEER RONALD J. PARKS DATE: 9/29/97
R.C.E. NO. 15744 EXP. DATE: 9/30/01

PALOMA DEL SOL
GENERAL NOTES, CONSTRUCTION NOTES AND ESTIMATED QUANTITIES
TRACT NO. 24185

PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 2 OF 10
JOB NO.

AS BUILT
APPROVED BY:
DATE 9/27/06
LD 90-055 CO




## CONSTRUCTION NOTES

1. CONST. 78" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE)
2. CONST. 48" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE)
3. CONST. 42" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE)
4. CONST. 36" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE)
5. CONST. 18" R.C.P. (CLASS IV)
6. **CONST. 24" R.C.P. (CLASS IV)**
7. CONST. MANHOLE NO. 4 PER R.C.F.C.D. STD. MH-254
8. CONST. JUNCTION STRUCTURE NO. 2 PER R.C.F.C.D. STD. JS-227
9. CONST. JUNCTION STRUCTURE NO. 4 PER R.C.F.C.D. STD. JS-229
10. CONST. C.B. NO. 1 PER R.C.F.C.D. STD. CB-100
11. CONST. LOCAL DEPRESSION NO. 2 CASE "B" PER RIV. CO. STD. NO. 311
12. CONST. LOCAL DEPRESSION NO. 2 CASE "C" PER RIV. CO. STD. NO. 311
13. CONST. 30" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE)
14. SAWCUT, REMOVE & REPLACE EXIST. PAVEMENT PER CITY STD. NO. 609
15. CONST. TRANSITION STRUCTURE NO. 3 PER R.C.F.C.D. STD. T.S. 303
16. CONST. CONC. COLLAR PER R.C.F.C.D. STD. M-803

LD 96-055 CO

### CURVE DATA

| No. | REFERENCE | Δ | R | L | T |
|---|---|---|---|---|---|
| A | ℄ LAT. "A-2" | 65° 16' 06" | 22.50' | 25.60' | 14.59' |
| B | ℄ LINE "A" | 24° 01' 36" | 300.00' | 126.32' | 64.12' |
| C | ℄ LAT. "A-1" | 93° 49' 11" | 22.50' | 17.17' | 9.03' |
| D | ℄ LINE "A" | 11° 12' 43" | 300.00' | 58.88' | 30.04' |
| E | ℄ LINE "A" | 15° 55' 37" | 300.00' | 74.38' | 37.37' |
| F | ℄ LINE "A-3" | 54° 09' 38" | 45.00' | 42.54' | 23.01' |
| G | ℄ LINE "A-3" | 37° 51' 19" | 294.00' | 194.01' | 81.62' |
| H | ℄ LINE "A-3" | 98° 47' 56" | 45.00' | 38.32' | 20.91' |
| I | ℄ LINE "A-3" | 62° 54' 57" | 45.00' | 22.9' | 1.15' |

* ONLY PORTION OF TOTAL CURVE SHOWN

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1-800 422-4133
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DAVID LI-WEN SHEN No. 44374 REG. PROFESSIONAL ENGINEER STATE OF CALIFORNIA CIVIL Exp. 6-30-97

**KEITH INTERNATIONAL, INC.**
• Planning • Civil Engineering • Environmental Services • Land Surveying • Public Works • Water Resources
Inland Empire Division
3200 Inland Empire Blvd., Ste. 300, Ontario, CA 91764 (909) 483-2220
PREPARED UNDER THE SUPERVISION OF:
DAVID LI-WEN SHEN RCE NO. 44374 EXP. 6/30/97 DATE 4-22-96

BENCH MARK: SEE SHEET NO. 1

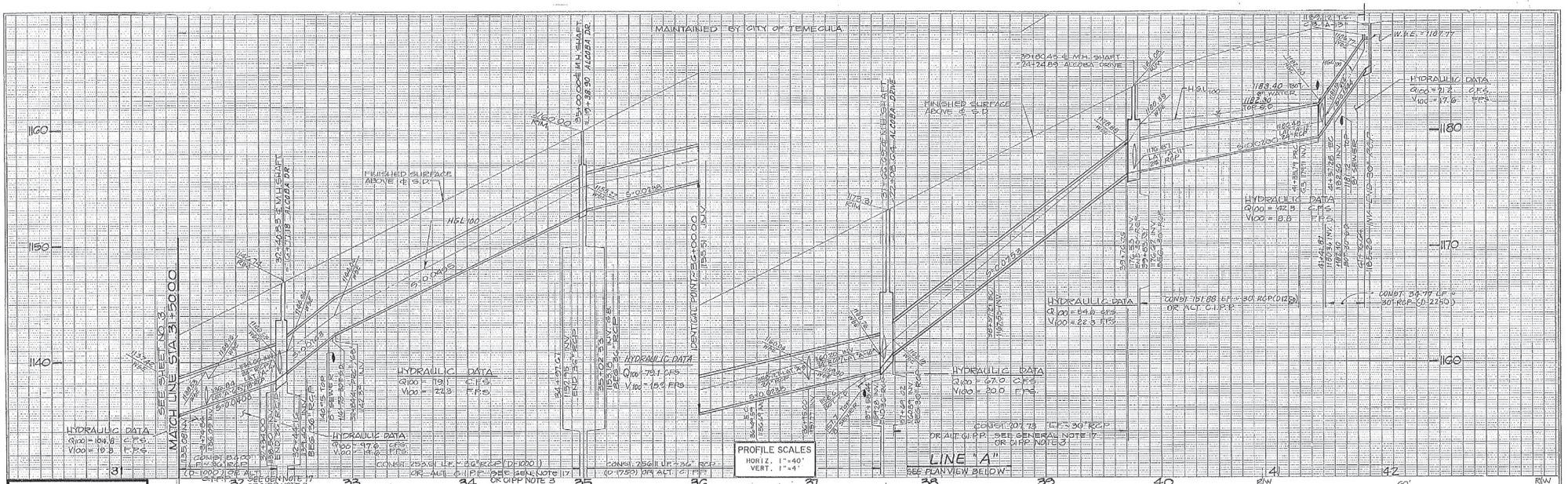
| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REF | DESCRIPTION | ENGR | DATE | RCFCD | DATE |

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE: 8/28/97
APPROVED BY: CHIEF ENGINEER DATE: 9/3/97

CITY OF TEMECULA
RECOMENDED BY: DATE: 8/29/97
ACCEPTED BY: DATE: 8/19/97
PRINCIPAL ENGINEER, FOR CITY ENGINEER
RONALD J. PARKS
R.C.E. NO. 19744 EXP. DATE: 9/30/01

**PALOMA DEL SOL**
**TRACT NO. 24185**
STORM DRAIN PLANS
LINE 'A'
STA. 24+90.00 TO STA. 31+50.00

PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 3 OF 10




| CURVE DATA | | | | |
|---|---|---|---|---|
| NO | REFERENCE | Δ | R | L | T |
| (A) | ℄ LINE "A" | 4°39'04" | 306.00' | 24.84' | 12.43' |
| (B) | ℄ LINE "A" | 11°15'52" | 306.00' | 60.16' | 30.15' |
| (C) | ℄ LINE "A" | 9°15'06" | 306.00' | 49.41' | 24.76' |
| (D) | ℄ LAT. "A-7" | 24°45'21" | 22.50' | 9.72' | 4.94' |
| (E) | ℄ LINE "A" | 71°10'00" | 294.00' | 365.15' | 210.36' |

*ONLY PORTION OF TOTAL CURVE SHOWN (SEE ℄ SHT. 3)

| CURVE DATA | | | | |
|---|---|---|---|---|
| NO | REFERENCE | Δ | R | L | T |
| (F) | ℄ LAT "A-6" | 5°40'29" | 22.50' | 2.23' | 1.24' |
| (G) | ℄ LAT. "A-5" | 10°11'54" | 306.00' | 59.00' | 29.57' |
| (H) | ℄ LAT. "A-3" | 61°21'31" | 22.50' | 24.49' | 14.22' |
| (I) | ℄ LAT. "A-8" | 67°41'02" | 22.50' | 26.62' | 15.11' |
| (J) | ℄ LAT. "A-11" | 86°00'00" | 22.50' | 31.60' | 19.71' |
| (K) | ℄ LINE "A" | 54°17'26" | 294.00' | 218.58' | 150.14' |
| (L) | ℄ LINE "A" | 54°42'45" | 22.50' | 21.49' | 11.64' |

## CONSTRUCTION NOTES

4. CONST. 36" R.C.P. OR ALT. C.I.P.P. ID-LOAD PER PROFILE
5. CONST. 30" R.C.P. OR ALT. C.I.P.P. ID-LOAD PER PROFILE
6. CONST. 24" R.C.P. (CLASS IV)
7. CONST. 18" R.C.P. (CLASS IV)
11. CONST. JUNCTION STRUCTURE NO. 2 PER R.C.F.C.D. STD. JS-227
13. CONST. TRANSITION STRUCTURE NO. 3 PER R.C.F.C.D. STD. TS-303
14. CONST. C.B. NO. 1 PER R.C.F.C.D. STD. CB-100
15. CONST. LOCAL DEPRESSION NO.2 CASE "B" PER RIV. CO. STD. NO 511
16. CONST. MANHOLE NO.4 PER R.C.F.C.D. STD. M.H. 254
8. CONST. MANHOLE NO.1 PER R.C.F.C.D. STD. M.H. 251
17. CONST. CONC. COLLAR PER RCFCD STD M803

LD 96-055 CO

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DAVID LI-WEN SHEN RCE NO. 44374 EXP. 6/30/97
DATE 4-22-96

BENCH MARK
SEE SHEET NO.1

REVISIONS

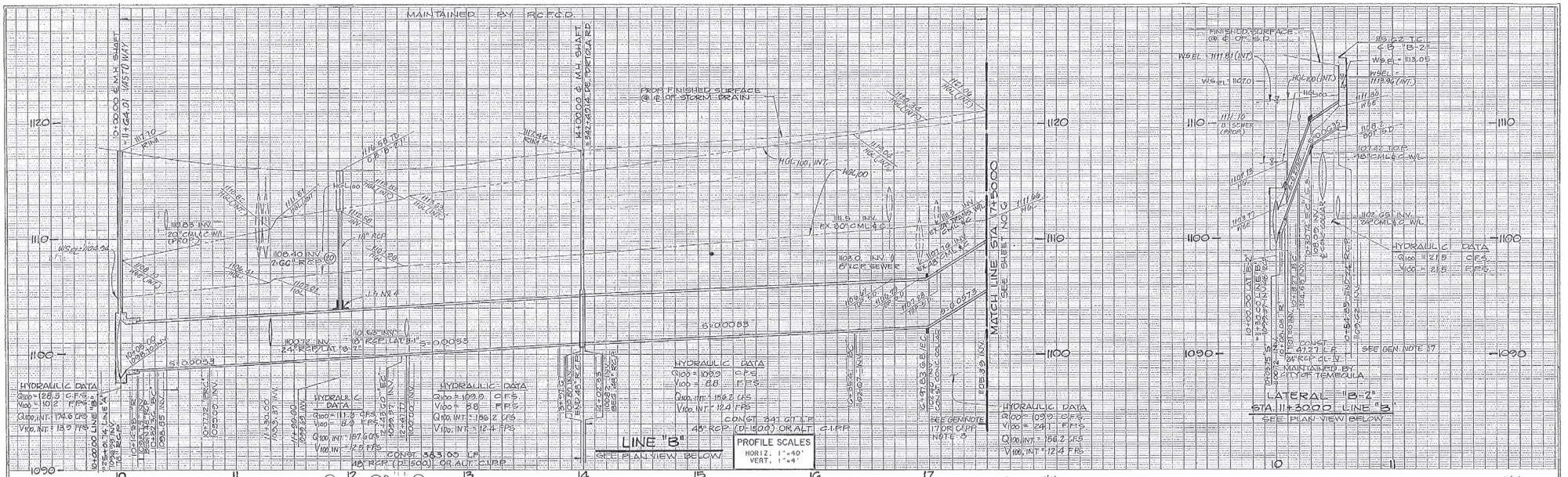
| REF. | DESCRIPTION | ENGR. | DATE | RECD | DATE |
|---|---|---|---|---|---|

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE
APPROVED BY: CHIEF ENGINEER DATE:

CITY OF TEMECULA
RECOMENDED BY: [signature] DATE: 8/23/97
ACCEPTED BY: [signature] DATE: 8/29/97
RONALD L. PARKS PRINCIPAL ENGINEER, FOR CITY ENGINEER
R.C.E. NO. 19744 EXP. DATE: 3/30/01

PALOMA DEL SOL
TRACT NO. 24185
STORM DRAIN PLANS
LINE 'A'
STA. 31+50.00 TO STA. 41+76.64

PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 4 OF 10




DAVID LI-WEN SHEN
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Exp. 6-30-97
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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3880 Cleton Ave., Ste. 200 Moreno Valley, CA 92555 (909) 653-2251
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DAVID LI-WEN SHEN RCE NO. 44374 EXP. 6/30/97 DATE 4-22-96

BENCH MARK
SEE SHEET NO. 1

REVISIONS

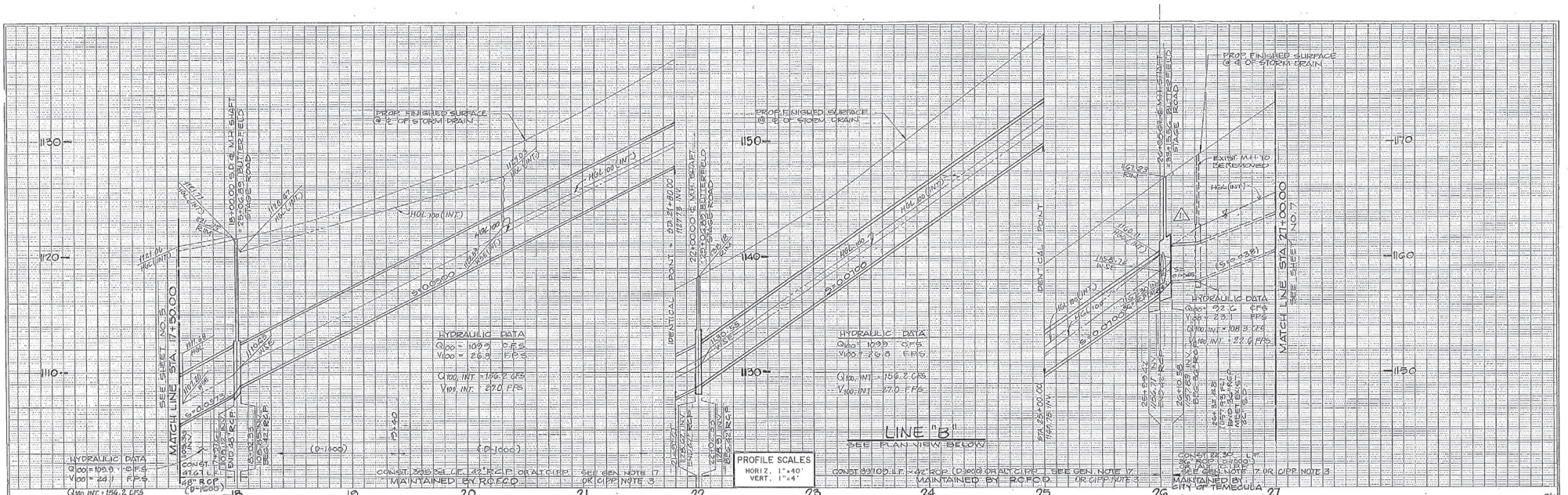
| REF. | DESCRIPTION | ENGR | DATE | RCFCD | DATE |
|---|---|---|---|---|---|

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE: 8/20/97
APPROVED BY: CHIEF ENGINEER DATE: 9/3/97

CITY OF TEMECULA
RECOMENDED BY: DATE: 8/19/97
ACCEPTED BY: DATE: 8/19/97
PRINCIPAL ENGINEER, FOR CITY ENGINEER
RONALD J. PARKS
R.C.E. NO. 19744 EXP. DATE: 9/30/01

**PALOMA DEL SOL**
**TRACT NO. 24185**
**STORM DRAIN PLANS**
**LINE 'B'**
STA. 10+00.00 TO STA. 17+50.00

PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 5 OF 10




## CONSTRUCTION NOTES

GRAPHIC SCALE
0 10 20 30 40 80 120 160

3. CONST. 42" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE)
4. CONST. 36" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE)
7. CONST. 18" R.C.P. (CLASS IV)
9. CONST. MANHOLE NO. 2 PER R.C.F.C.D. STD. MH-252
10. CONST. MANHOLE NO. 4 PER R.C.F.C.D. STD. MH-254
17. CONST. CONC. COLLAR FOR 18" R.C.P. PER R.C.F.C.D. STD. M803
2. CONST. 48" R.C.P. OR ALT. C.I.P.P. (D-LOAD PER PROFILE)
19. REMOVE EXIST. 36" RCP, HEADWALL AND RIP-RAP
21. SAWCUT, REMOVE & REPLACE EXIST. PAVEMENT PER CITY STD. NO. 609.

### CURVE DATA

| NO. | REFERENCE | Δ | R | L | T |
|---|---|---|---|---|---|
| (A) | ℄ LAT. "B-1" | 60°00'00" | 22.50' | 23.56' | 12.99' |

TYPICAL SECTION
STA. 17+50.00 TO STA. 21+00.00
BAR SCALE: 1"=10

EXIST. 12"ϕ 10" P.V.C. SEWER
36"-42" R.C.P. S.D.
EXIST. 30" CM&C WATER
EXIST. M.H. TO BE REMOVED
EXIST. 8" SEWER
EXIST. 36" S.D. PER A.D.-152 S.D. PLANS LINE "C"
EXIST. 30" S.D. PER A.D.-159 S.D. PLANS
REMOVE 315 L.F. OF 30"ϕ R.C.P. PER A.D.-152 RIP RAP HEADWALL STRUCTURE PER BUTTERFIELD STAGE RD. STORM DRAIN PLANS

AS BUILT
APPROVED BY:
DATE 9/24/96

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Inland Empire Division
2880 Dutton Ave., Ste. 200 Newport Beach, CA 92660 (714) 851-0221
PREPARED UNDER THE SUPERVISION OF:
DAVID LI-WEN SHEN RCE NO. 44374 EXP. 6/30/97 DATE 4-22-96

BENCH MARK
SEE SHEET NO. 1

REVISIONS
1 REVISED TO MEET THE EXISTING
REF. DESCRIPTION ENGR DATE RCFCD DATE

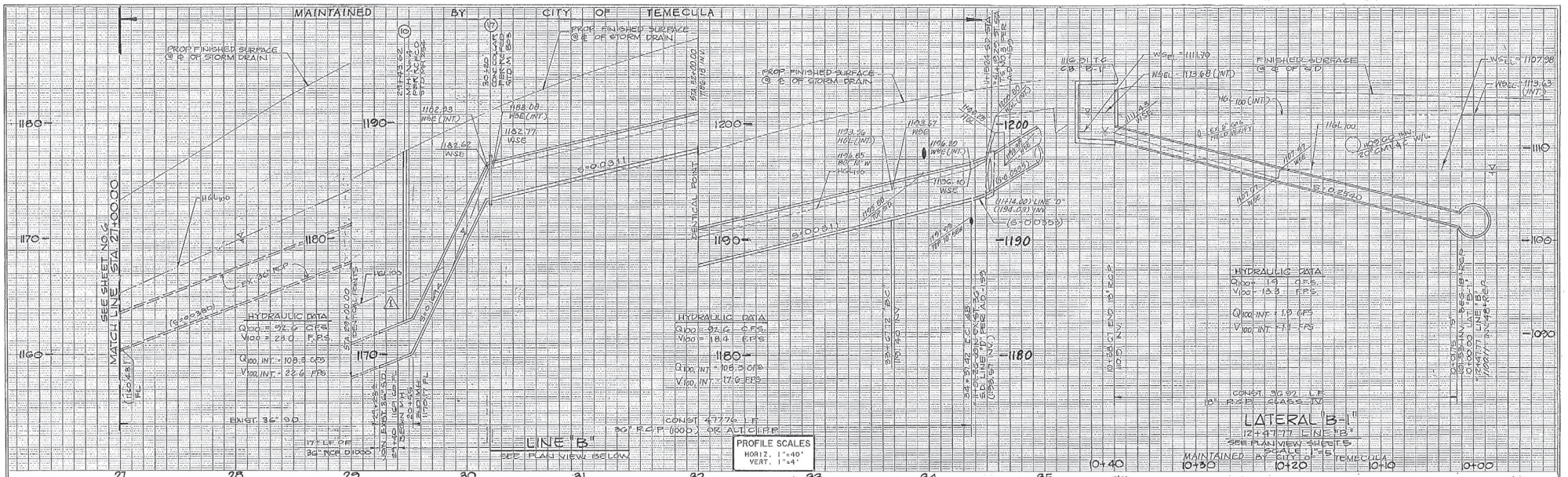
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE: 9/23/97
APPROVED BY: CHIEF ENGINEER DATE: 9/3/97

CITY OF TEMECULA
RECOMENDED BY: DATE: 8/19/97
ACCEPTED BY: DATE: 8/19/97
PRINCIPAL ENGINEER, FOR CITY ENGINEER
RONALD J. PARKS
R.C.E. NO. 19744 EXP. DATE: 9/30/01

# PALOMA DEL SOL
# TRACT NO. 24185
## STORM DRAIN PLANS
## LINE 'B'
STA. 17+50.00 TO STA. 27+00.00

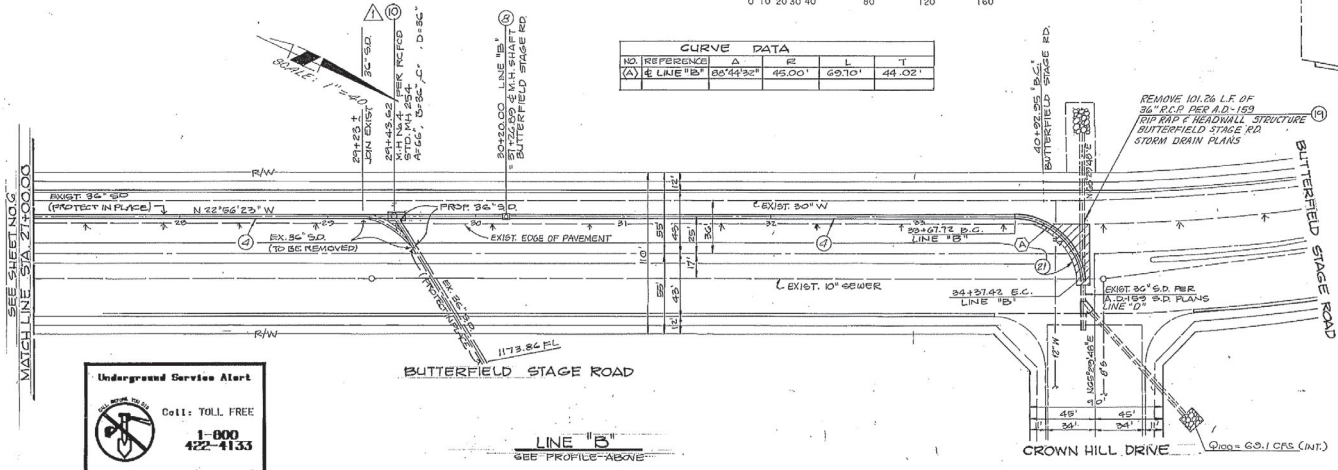
PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 6 OF 10

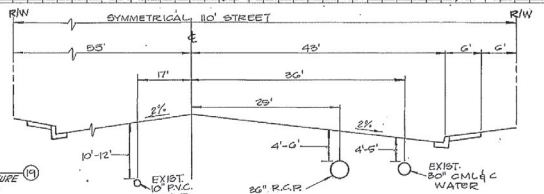
LD 96-055 CO




GRAPHIC SCALE
0 10 20 30 40 80 120 160

| CURVE DATA | | | | | |
|---|---|---|---|---|---|
| NO. | REFERENCE | Δ | R | L | T |
| (A) | ℄ LINE "B" | 86°44'32" | 45.00' | 69.10' | 44.02' |




TYPICAL SECTION
STA. 27+00 TO STA. 33+67.72
BAR SCALE: 1"=10'
10 5 0 10 20

## CONSTRUCTION NOTES

(1) — CONST. 36" R.C.P. OR ALT. C.I.P.P. ID-LOAD PER PROFILE!
(3) — CONST. MANHOLE NO. 1 PER R.C.F.C.D. STD. MH-251
(19) — REMOVE EXIST. 36" RCP, HEADWALL & RIP-RAP
(21) — SAWCUT, REMOVE & REPLACE EXIST. PAVEMENT PER CITY STD. NO. 609.

AS BUILT
APPROVED BY:
DATE 9/24/02

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DATE 4-22-96

BENCH MARK
SEE SHEET NO. 1

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| ⚠ | REVISED TO MEET TRE/EXISTING | | | | |
| REF | DESCRIPTION | ENGR | DATE | RCFCD | DATE |

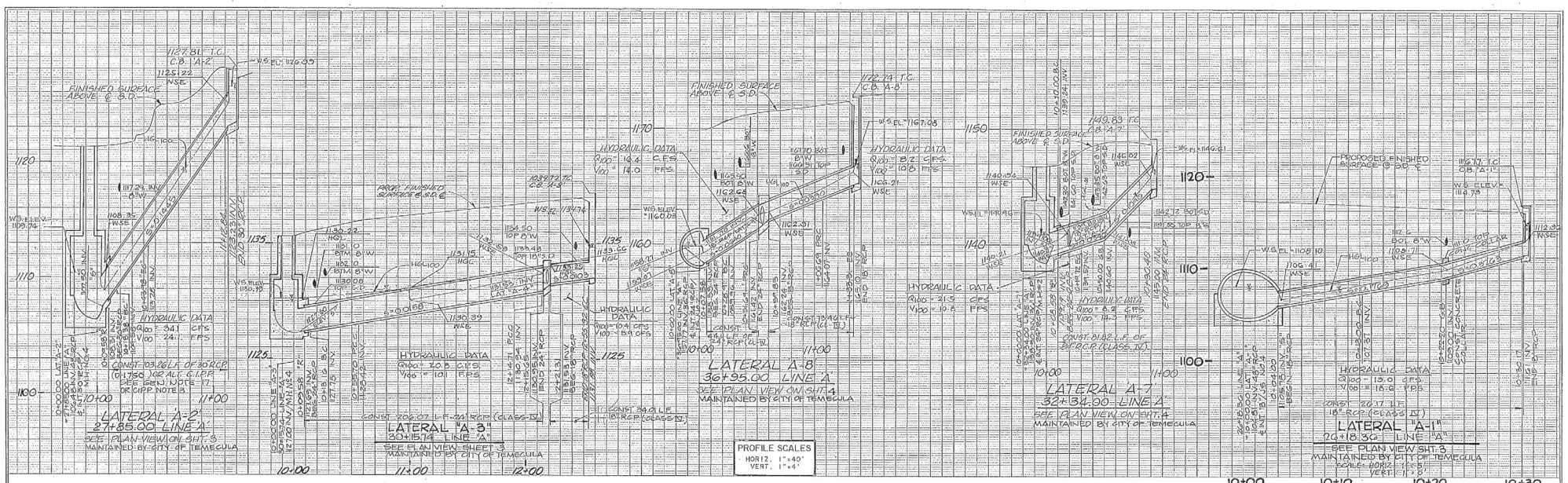
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE:
APPROVED BY: CHIEF ENGINEER DATE:

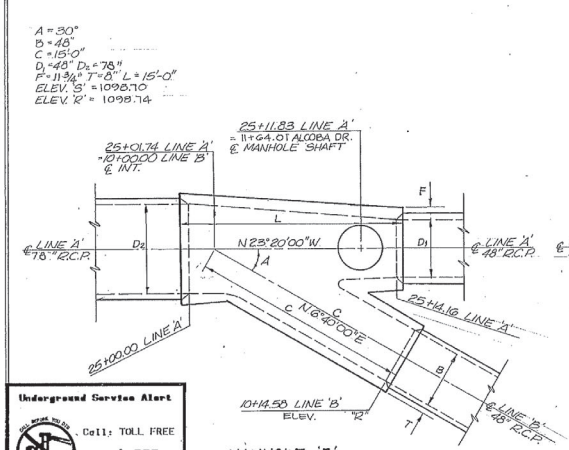
CITY OF TEMECULA
RECOMENDED BY: DATE: 8/28/02
ACCEPTED BY: DATE: 8/29/02
PRINCIPAL ENGINEER FOR CITY ENGINEER
RONALD J. PARKS
R.C.E. NO. 18744 EXP. DATE: 9/30/01

PALOMA DEL SOL
TRACT NO. 24185
STORM DRAIN PLANS
LINE 'B'
STA. 27+00.00 TO STA. 34+37.42

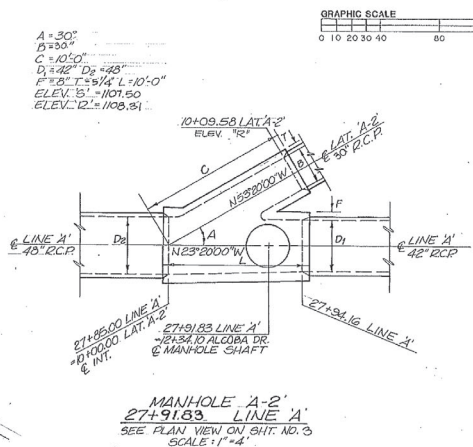
PROJECT NO. 7-0-0040
DRAWING NO. 7-263
SHEET NO. 7 OF 10

LD 96-055 CO

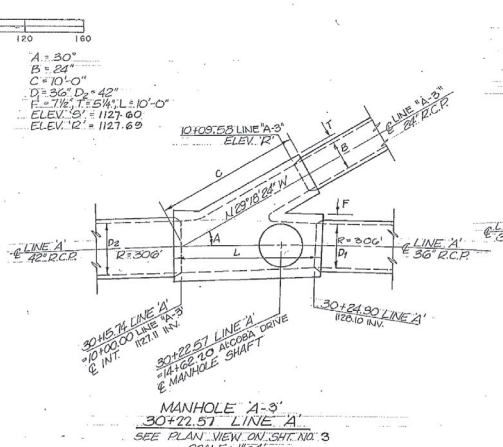


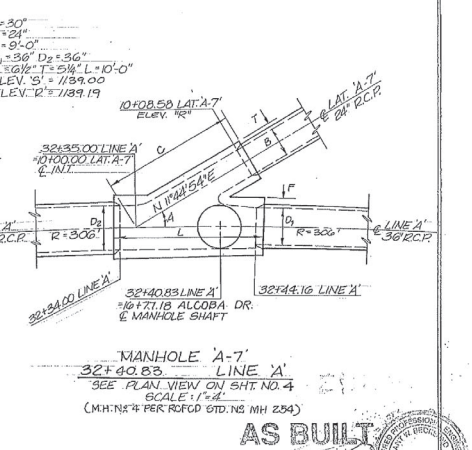

MANHOLE 'B'
25+11.83 LINE 'A'
SEE PLAN VIEW ON SHT. NO. 3
SCALE: 1"=4'
(M.H. Nº 4 PER RCFCD STD. Nº MH 254)




MANHOLE 'A-2'
27+91.83 LINE 'A'
SEE PLAN VIEW ON SHT. NO. 3
SCALE: 1"=4'
(M.H. Nº 4 PER RCFCD STD. Nº MH 254)




MANHOLE 'A-3'
30+22.57 LINE 'A'
SEE PLAN VIEW ON SHT. NO. 3
SCALE: 1"=4'
(M.H. Nº 4 PER RCFCD STD. Nº MH 254)




MANHOLE 'A-7'
32+40.83 LINE 'A'
SEE PLAN VIEW ON SHT. NO. 4
SCALE: 1"=4'
(M.H. Nº 4 PER RCFCD STD. Nº MH 254)

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BENCH MARK
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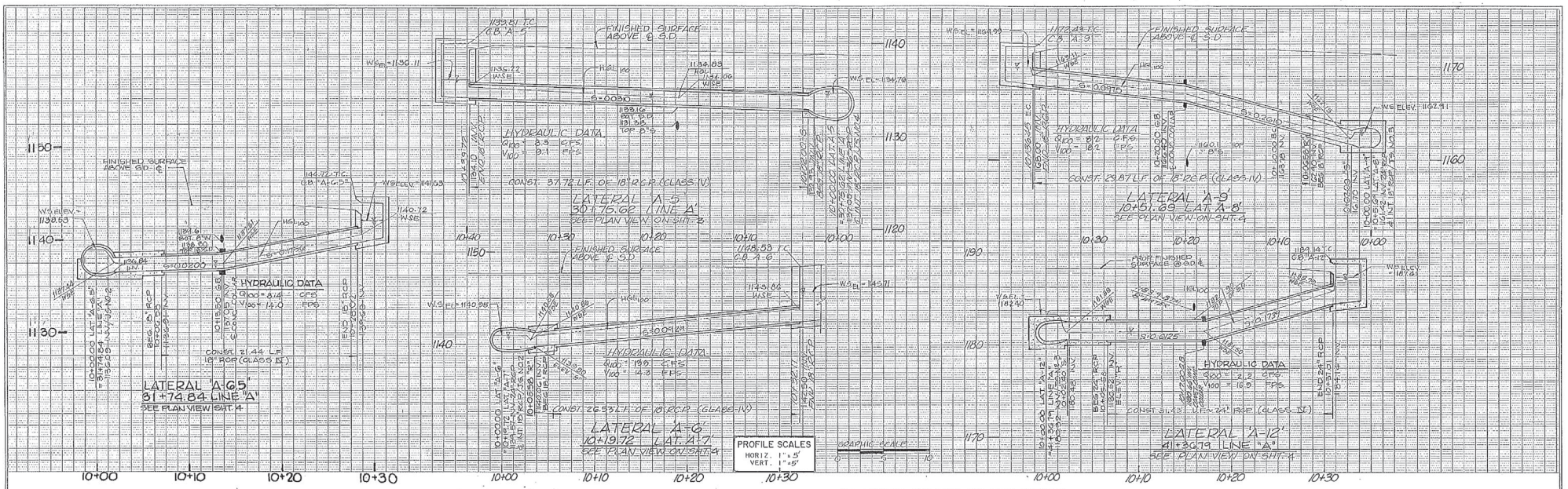
| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REF. | DESCRIPTION | ENGR | DATE | RCFCD | DATE |

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE: 8/29/97
APPROVED BY: CHIEF ENGINEER DATE: 9/3/97

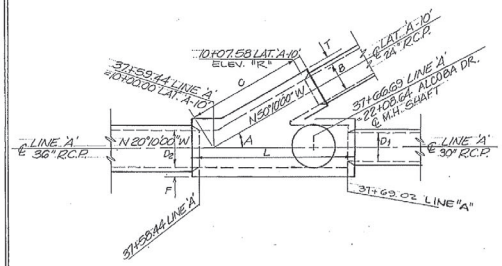
CITY OF TEMECULA
RECOMENDED BY: DATE: 8/29/97
ACCEPTED BY: DATE: 8/19/97
PRINCIPAL ENGINEER, FOR CITY ENGINEER
RONALD J. PARKS
R.C.E. NO. 19744 EXP. DATE: 9/30/98

PALOMA DEL SOL
TRACT NO. 24185
STORM DRAIN PLANS
LATERALS AND DETAILS

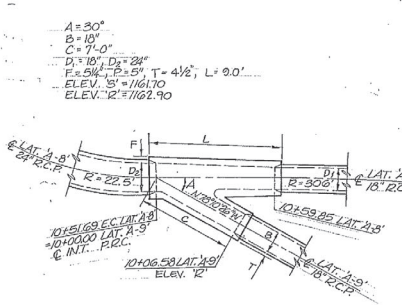
PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 8 OF 10



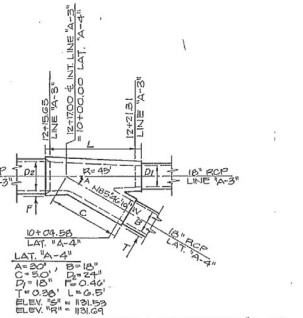

ALL STORM DRAINS ON THIS SHEET TO BE MAINTAINED BY CITY OF TEMECULA




MANHOLE 'A-10'
31+66.69 LINE 'A'
SEE PLAN VIEW ON SHT. NO.4
SCALE : 1" = 4'
(M.H. Nº4 PER RCFCD STD. NO. MH 284)




TRANSITION STRUCTURE 'A-9'
10+51.69 LATERAL 'A-8'
SEE PLAN VIEW ON SHT NO.4
SCALE : 1" = 4'
(T.S. Nº 3 PER RCFCD STD NO. T.S. 303)




TRANSITION STRUCTURE "A-4"
12+17.00 LINE "A-4"
SEE PLAN VIEW SHEET NO. 3
(T.S. Nº 3 PER RCFCD STD NO. 303)
SCALE : 1" = 4'

AS BUILT
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DATE 9/20/02

LD 96-055 CO

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Exp. 6-30-97
CIVIL
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Inland Empire Division
PREPARED UNDER THE SUPERVISION OF:
DAVID LI-WEN SHEN - RCE NO. 44374 EXP. 6/30/97
DATE 4-22-96

BENCH MARK
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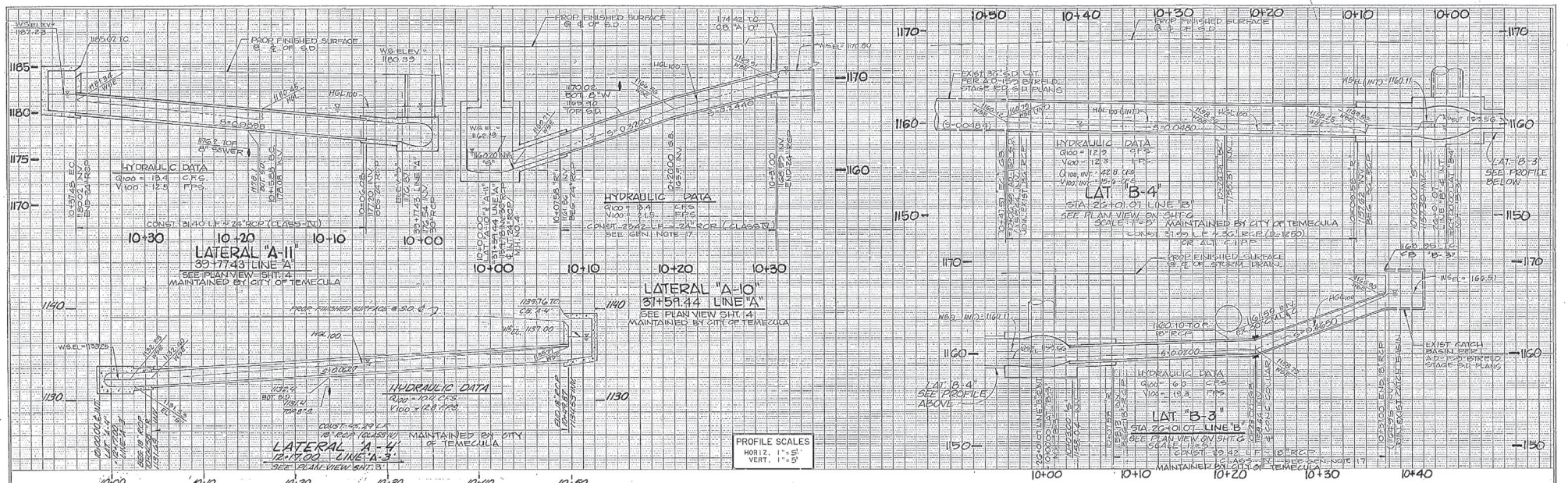
| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REF. | DESCRIPTION | ENGR. | DATE | RCFCD | DATE |

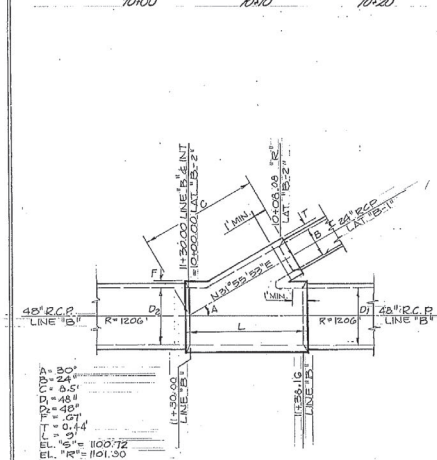
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER — DATE:
APPROVED BY: CHIEF ENGINEER — DATE:

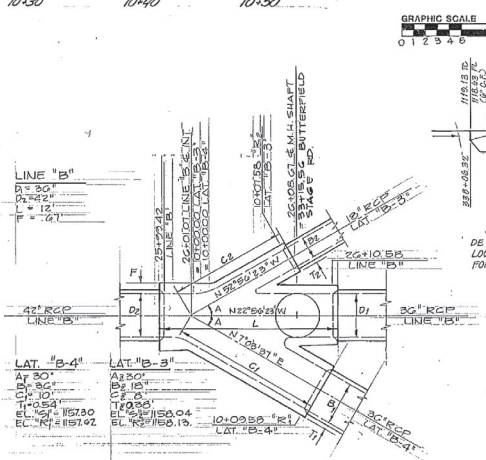
CITY OF TEMECULA
RECOMENDED BY: [signature] DATE: 8/19/97
ACCEPTED BY: [signature] DATE: 8/19/97
PRINCIPAL ENGINEER, PW/ CITY ENGINEER
RONALD J. PARKS
R.C.E. NO. 19744 EXP. DATE: 9/30/01

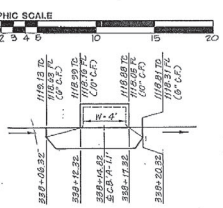
PALOMA DEL SOL
TRACT NO. 24185
STORM DRAIN PLANS
LATERALS AND DETAILS

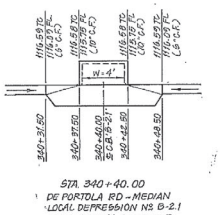
PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 9 OF 10

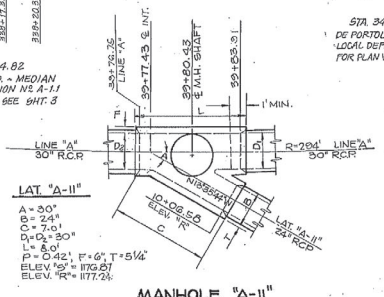


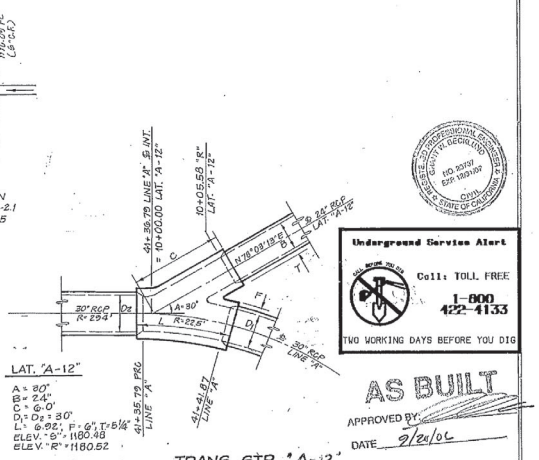

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LD 96-055 CO

DAVID LI-WEN SHEN
No. 44374
Exp. 6-30-97
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

KEITH INTERNATIONAL, INC.
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• Land Surveying • Public Works • Water Resources •
32934 Outer Ave., Ste. 205, Menifee Valley, CA 92563 (951) 658-1524
Inland Empire Division
PREPARED UNDER THE SUPERVISION OF:
DAVID LI-WEN SHEN RCE NO. 44374 EXP. 6/30/97
DATE 4-22-96

BENCH MARK
SEE SHEET NO. 1

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REF. | DESCRIPTION | ENGR | DATE | RCFCD | DATE |

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE: 8/29/97
APPROVED BY: CHIEF ENGINEER DATE: 9/3/97

CITY OF TEMECULA
RECOMENDED BY: DATE: 8/29/97
ACCEPTED BY: DATE: 8/1/97
PRINCIPAL ENGINEER, FOR CITY ENGINEER
RONALD A. PARKS
R.C.E. NO. 19744 EXP. DATE: 3/30/01

PALOMA DEL SOL
TRACT NO. 24185
STORM DRAIN PLANS
LATERALS AND DETAILS

PROJECT NO. 7-0-0046
DRAWING NO. 7-263
SHEET NO. 10 OF 10

**EXCERPT B:** VILLAGES AT PASEO DEL SOL, TRACT 36483, PA 4A PRIVATE STORM DRAIN IMPROVEMENT PLANS

# VILLAGES AT PASEO DEL SOL, TRACT 36483, PA 4
## PRIVATE STORM DRAIN IMPROVEMENT PLAN

### GENERAL NOTES

1. STANDARDS. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT EDITION OF THE CITY'S IMPROVEMENT STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION (AND SUBSEQUENT AMENDMENTS), THE CITY'S ENGINEERING AND CONSTRUCTION MANUAL, CITY CODES AND REQUIREMENTS.
2. EMERGENCY TELEPHONE NUMBERS. (ANSWERING MACHINE IS NOT ACCEPTABLE):

| | | |
|---|---|---|
| MIKE RUST | NEWLAND REAL ESTATE GROUP, LLC | 858-217-2706 |
| (RESPONSIBLE PERSON/DEVELOPER) | (COMPANY) | (24-HR PHONE NUMBER) |
| (RESPONSIBLE PERSON/CONTRACTOR) | (COMPANY) | (24-HR PHONE NUMBER) |

3. LICENSE/PERMIT REQUIREMENT.
   a. PRIOR TO START OF ANY WORK, A BUSINESS LICENSE SHALL BE OBTAINED FROM THE CITY.
   b. A GRADING PERMIT SHALL BE OBTAINED, PRIOR TO ANY WORK ON PRIVATE DEVELOPMENT. THE PERMIT AND AN APPROVED SET OF IMPROVEMENT PLANS MUST BE PRESENT AT THE JOBSITE DURING CONSTRUCTION.
4. ERRORS OR OMISSIONS. APPROVAL OF THESE PLANS BY THE CITY DOES NOT RELIEVE THE APPLICANT AND ENGINEER OF RECORD FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION.
5. WORKING HOURS. CITY ORDINANCE NO. 94-25 STATES THAT NO PERSON SHALL ENGAGE IN OR CONDUCT CONSTRUCTION ACTIVITY, WHEN THE CONSTRUCTION SITE IS WITHIN ONE-QUARTER OF A MILE OF AN OCCUPIED RESIDENCE, BETWEEN THE HOURS OF 6:30 PM AND 6:30 AM, MONDAY THROUGH FRIDAY AND SHALL ONLY ENGAGE IN OR CONDUCT CONSTRUCTION ACTIVITY BETWEEN THE HOURS OF 7:00 AM AND 6:30 PM ON SATURDAY. NO CONSTRUCTION ACTIVITY SHALL BE UNDERTAKEN ON SUNDAY AND NATIONALLY RECOGNIZED HOLIDAYS.
6. REGULATORY AGENCY CLEARANCES. THE ISSUANCE OF A PERMIT BY THE CITY DOES NOT IMPLY OR PROVIDE ANY CLEARANCES FROM STATE OR FEDERAL AGENCIES REGULATING THE PROVISIONS OF STATE OR FEDERAL ENDANGERED SPECIES ACTS OR WATER QUALITY REGULATIONS. THE APPROPRIATE CLEARANCES FROM THESE AGENCIES SHALL BE OBTAINED PRIOR TO ANY SITE DISTURBANCE OR GRADING.
7. CONSTRUCTION CHANGE. ANY CONSTRUCTION CHANGE MUST BE FIRST SUBMITTED TO THE CITY AS A REDLINE REVISION FOR REVIEW AND APPROVAL PRIOR TO IMPLEMENTING THE CHANGE IN THE FIELD. REFER TO THE CITY'S ENGINEERING AND CONSTRUCTION MANUAL.
8. PRE-CONSTRUCTION MEETING. A PRE-CONSTRUCTION MEETING SHALL BE SCHEDULED TWO WORK DAYS PRIOR TO THE START OF CONSTRUCTION. DURING CONSTRUCTION, A DEPENDABLE AND RESPONSIVE CONTRACTOR'S REPRESENTATIVE SHALL BE AT THE JOB SITE AT ALL TIMES.
9. UTILITIES. APPROVAL OF THESE PLANS BY THE CITY DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OR COMPLETENESS OF THE LOCATION, NOR THE EXISTENCE OR NON-EXISTENCE OF ANY UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS. ANY UTILITY DAMAGED DURING THE PERFORMANCE OF THE WORK SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE GOVERNING AGENCY BY THE CONTRACTOR, AT HIS EXPENSE.
10. SURVEY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER OF RECORD AND TO INSTALL STREET CENTERLINE MONUMENTS, AS REQUIRED BY RIVERSIDE COUNTY ORDINANCE NO. 491. CENTERLINE TIES SHALL BE PROVIDED TO THE CITY ENGINEER, UPON COMPLETION OF THE PROJECT AND BEFORE ACCEPTANCE IS GRANTED. ALL EXISTING MONUMENTATION (DISTURBED OR DESTROYED DURING CONSTRUCTION) SHALL BE REPLACED TO CITY STANDARDS IN ACCORDANCE WITH THE LAND SURVEYORS ACT AND THE STREETS AND HIGHWAY CODE, AND AS APPROVED BY THE CITY ENGINEER. UPON REQUEST, SURVEY CUTS SHEETS SHALL BE PROVIDED TO THE CITY ENGINEER.
11. DUST CONTROL. DUST SHALL BE CONTROLLED BY WATERING OR OTHER METHODS, AS APPROVED BY THE CITY ENGINEER AND SHALL COMPLY WITH SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT'S (SCAQMD) RULE 403.
12. CONSTRUCTION FENCING. A SIX FOOT CHAIN LINK FENCE IS REQUIRED ON ALL INDUSTRIAL AND COMMERCIAL PROJECTS UNTIL ROOF SYSTEMS ARE COMPLETED OR AS DEEMED NECESSARY BY THE CITY ENGINEER FOR PUBLIC SAFETY. THE MAINTENANCE OF THE FENCE IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
13. INSPECTIONS. ALL WORK PERFORMED WITHOUT PROPER INSPECTION FROM THE CITY MAY BE SUBJECT TO REJECTION.
14. OTHER CONSTRUCTION NOTES. REFER TO SEPARATE NOTES FOR GRADING, EROSION AND SEDIMENT CONTROL, PAVING AND TRAFFIC REQUIREMENTS, IF APPLICABLE.

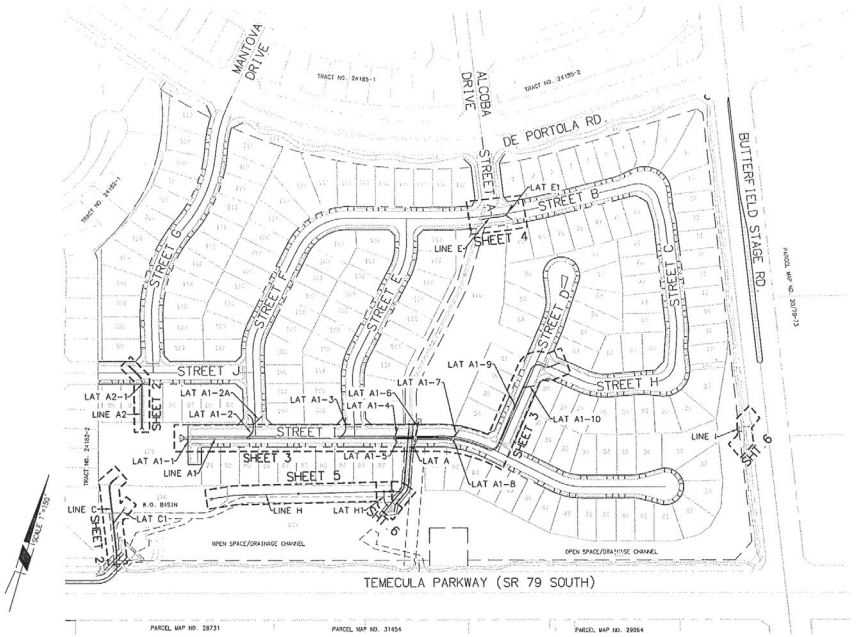
### ENGINEER'S NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY SEARCH OF AVAILABLE RECORDS AND TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THIS PLAN. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN, AND ANY OTHER LINES OR STRUCTURES NOT SHOWN ON THESE PLANS, AND IS RESPONSIBLE FOR PROTECTION OF AND ANY DAMAGE TO THESE LINES OR STRUCTURES.

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTORS WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO, DEFEND, INDEMNIFY, AND HOLD DESIGN PROFESSIONAL AND OWNER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.

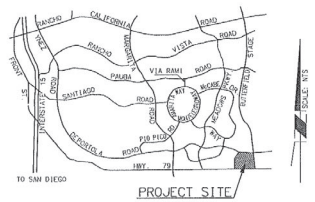
THE CONTRACTOR SHALL BE RESPONSIBLE TO REPORT DISCREPANCIES IN PLANS AND/OR FIELD CONDITIONS IMMEDIATELY TO THE DESIGN ENGINEER FOR RESOLUTION PRIOR TO CONSTRUCTION, AND SHALL BE RESPONSIBLE FOR DISCREPANCIES NOT SO REPORTED AND RESOLVED.

CAUTION. THE ENGINEER PREPARING THESE PLANS WILL NOT RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE "PLANS".




150 75 0 150 300 450
SCALE: 1"=150'

INDEX MAP
SCALE: 1"=150'




VICINITY MAP
N.T.S.

### LEGEND:

| | | | |
|---|---|---|---|
| FINISHED SURFACE | FS | PROPOSED CONTOUR | |
| EXISTING | EX. | EXISTING GRADE | (1234.56) |
| TOP OF CURB | TC | PROPOSED GRADE | 1234.56 |
| MANHOLE | MH | RIGHT OF WAY | |
| STORM DRAIN | SD | CENTERLINE | |
| CATCH BASIN | CB | LOT NUMBER | 106 |
| INVERT | INV. | TOP | |
| TYPICAL | TYP. | | |
| CENTERLINE | ℄ | TOE | |
| GRADE BREAK | GB | STORM DRAIN LINE | |
| BEGIN CURVE | BC | | |
| END CURVE | EC | | |
| BEGIN | BEG | | |
| NUMBER | NO. | | |
| WATER | W OR WTR. | | |
| SANITARY SEWER | SS OR SWR. | | |
| LINEAR FEET | LF | | |
| REINFORCED CONCRETE PIPE | RCP | | |
| LATERAL | LAT. | | |

### CONSTRUCTION NOTES

1. INSTALL 12" RCP
2. INSTALL 18" RCP
3. INSTALL 24" RCP
4. INSTALL 30" RCP
5. INSTALL 36" RCP
6. INSTALL 42" RCP
7. INSTALL 19"x30" ELLIPTICAL PIPE
8. INSTALL 29"x45" ELLIPTICAL PIPE
9. INSTALL 38"x60" ELLIPTICAL PIPE
10. INSTALL 43"x68" ELLIPTICAL PIPE
11. CONSTRUCT CATCH BASIN NO.1 PER RCTD STD. NO. 300 (H & W PER PLAN)
12. CONSTRUCT LOCAL DEPRESSION PERRCTD STD. NO. 311
13. CONSTRUCT JUNCTION STRUCTURE NO.2 PER RCTD & WCD STD. NO. JS227
14. CONSTRUCT MANHOLE NO. 1 PER RCFC & WCD STD. DWG. NO. MH251
15. CONSTRUCT TRANSITION STRUCTURE NO. 3 PER RCFC & WCD STD. DWG. NO. TS303
16. CONSTRUCT PIPE CULVERT HEADWALL PER CALTRANS STD. NO. D89
17. CONSTRUCT MODIFIED CONCRETE DROP INLET (CB110) PER DETAIL ON SHEET 5
18. CONSTRUCT MODIFIED MANHOLE NO. 1 PER RCFC & WCD STD. DWG. NO. MH251 AND DETAIL ON SHEET 2
19. INSTALL BIOCLEAN HYDRODYNAMIC SEPERATOR MODEL NSBB-2.5-4-60 PER BIOCLEAN STD. DETAIL
20. INSTALL BIOCLEAN HYDRODYNAMIC SEPERATOR MODEL NSBB-5-10.5-84 PER BIOCLEAN STD. DETAIL
21. INSTALL BROOKS PRODUCTS 3636 CATCH BASIN

### OWNER/DEVELOPER

CAL-PASEO DEL SOL, LLC
4790 EASTGATE MALL, SUITE 150
SAN DIEGO, CA 92121
(858) 217-2706

### SOILS ENGINEER:

CONVERSE CONSULTANTS
10391 CORPORATE DRIVE
REDLANDS, CA 92374
909-796-0544

### BASIS OF BEARING NOTE:

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CENTERLINE OF BUTTERFIELD STAGE ROAD BEING N22°56'23"W PER PARCEL MAP NO. 23432 FILED IN BOOK 159, PAGES 38 THROUGH 61 OF PARCEL MAPS, RECORDS OF RIVERSIDE COUNTY CALIFORNIA.

### SHEET INDEX




Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM


PW17-XX

| CONSTRUCTION RECORD | DATE | BY | REVISIONS | DATE | ACC'D |
|---|---|---|---|---|---|
| CONTRACTOR | | | | | |
| INSPECTOR | | | | | |
| DATE COMPLETED | | | | | |

BENCH MARK
RIVERSIDE COUNTY B.M. 600-6-81 INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE. 997 721 E)

| SCALE |
|---|
| HORIZONTAL |
| AS NOTED |
| VERTICAL |
| N/A |

REGISTERED PROFESSIONAL ENGINEER — JOHN D. TANNER III — No. 60132 — CIVIL — STATE OF CALIFORNIA

| DESIGNED BY | DRAWN BY | CHECKED BY |
|---|---|---|
| T.BURNSIDE | T.BURNSIDE | K. HAGHIGHI |

PLANS PREPARED UNDER THE SUPERVISION OF

_____ DATE: _____
JOHN D. TANNER III
R.C.E. 60132

RECOMMENDED BY: _____ DATE: _____

ACCEPTED BY: _____ DATE: _____
PATRICK A. THOMAS
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
R.C.E. 44223

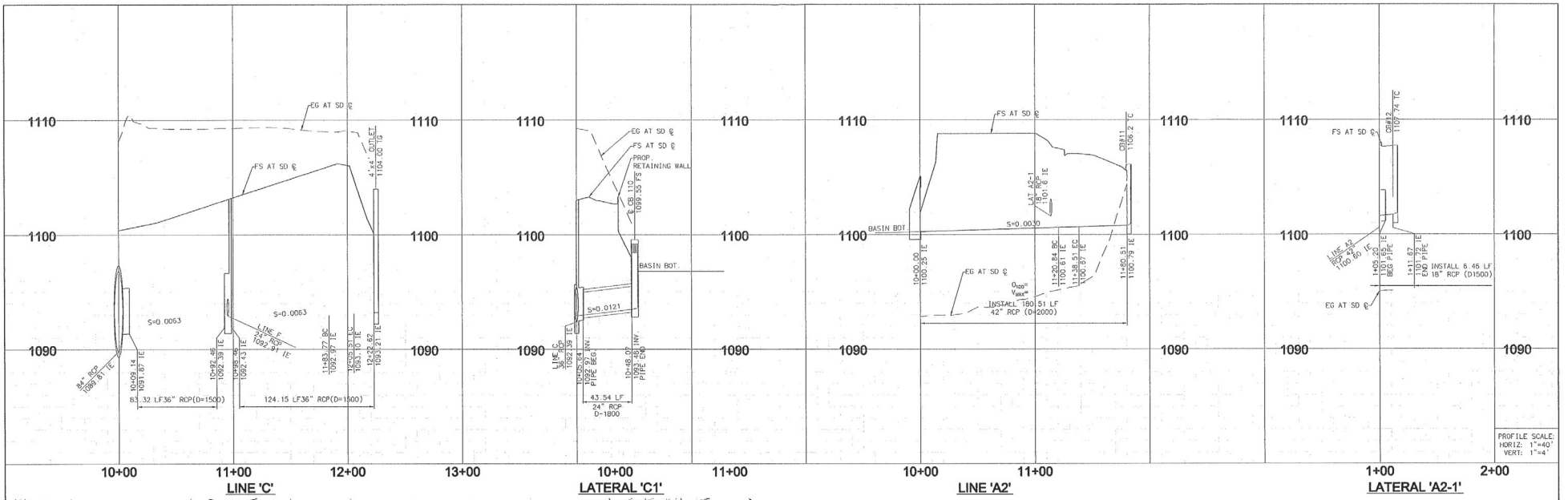
**CITY OF TEMECULA** DEPARTMENT OF PUBLIC WORKS

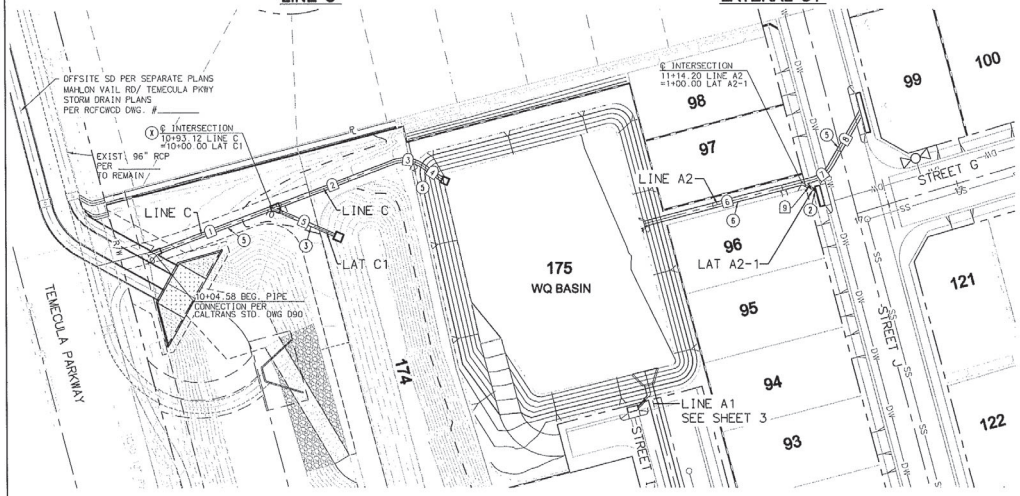
PRIVATE STORM DRAIN IMPROVEMENT PLAN
VILLAGES AT PASEO DEL SOL
TRACT 36483, PA 4

TITLE SHEET

SHEET NO. 1 OF 7 SHEETS

\\TEMECA1FS1\VROOT\PDATA\36600\CADD\LAND\DLV\IMPROVE\SDCONSTE\PRIVATE\36600-SS-001.DWG SHEVCHENKO, OLGA 12/19/2018 10:54 AM



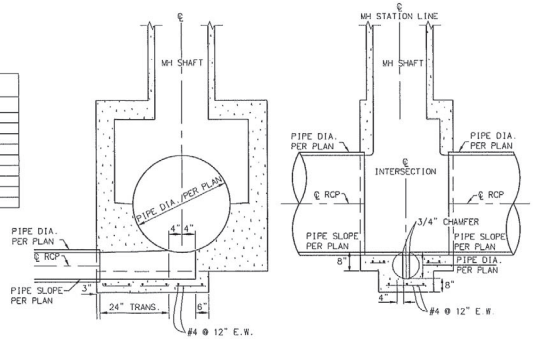




## CONSTRUCTION NOTES

(2) INSTALL 18" RCP
(3) INSTALL 24" RCP
(5) INSTALL 36" RCP
(6) INSTALL 42" RCP

LINE/CURVE DATA TABLE

| NO | BEARING/DELTA | RADIUS | LENGTH | TANGENT | NOTE |
|---|---|---|---|---|---|
| 1 | N22°41'53"W | -- | 93.12' | -- | LINE C |
| 2 | N22°41'53"W | -- | 90.65' | -- | LINE C |
| 3 | 55°21'09" | 22.50' | 21.74' | 11.80' | LINE C |
| 4 | N32°39'16"E | -- | 17.11' | -- | LINE C |
| 5 | N21°24'49"E | -- | 48.07' | -- | LAT C1 |
| 6 | N16°36'40"W | -- | 120.84' | -- | LINE A2 |
| 7 | 45°00'00" | 22.50' | 17.67' | 9.32' | LINE A2 |
| 8 | N61°36'40"W | -- | 42.00' | -- | LINE A2 |
| 9 | N28°23'20"E | -- | 11.67' | -- | LAT A2-1 |




## MODIFIED MANHOLE NO.1 DETAIL

NTS

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

PW17-XX

| CONSTRUCTION RECORD | DATE | BY | REVISIONS | DATE | ACC'D |
|---|---|---|---|---|---|
| CONTRACTOR | | | | | |
| INSPECTOR | | | | | |
| DATE COMPLETED | | | | | |

BENCH MARK
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE S# CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 FI

| SCALE |
|---|
| HORIZONTAL |
| AS NOTED |
| VERTICAL |
| N/A |

| DESIGNED BY | DRAWN BY | CHECKED BY |
|---|---|---|
| T.BURNSIDE | T.BURNSIDE | K. HAGHIGHI |

PLANS PREPARED UNDER THE SUPERVISION OF

_____ DATE: _____
JOHN D. TANNER III
R.C.E. 60132

RECOMMENDED BY: _____ DATE: _____

ACCEPTED BY: _____ DATE: _____
PATRICK A. THOMAS
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
R.C.E. 44223

**CITY OF TEMECULA** DEPARTMENT OF PUBLIC WORKS

PRIVATE STORM DRAIN IMPROVEMENT PLAN
VILLAGES AT PASEO DEL SOL
TRACT 36483, PA 4

SHEET NO. 2
OF 7 SHEETS

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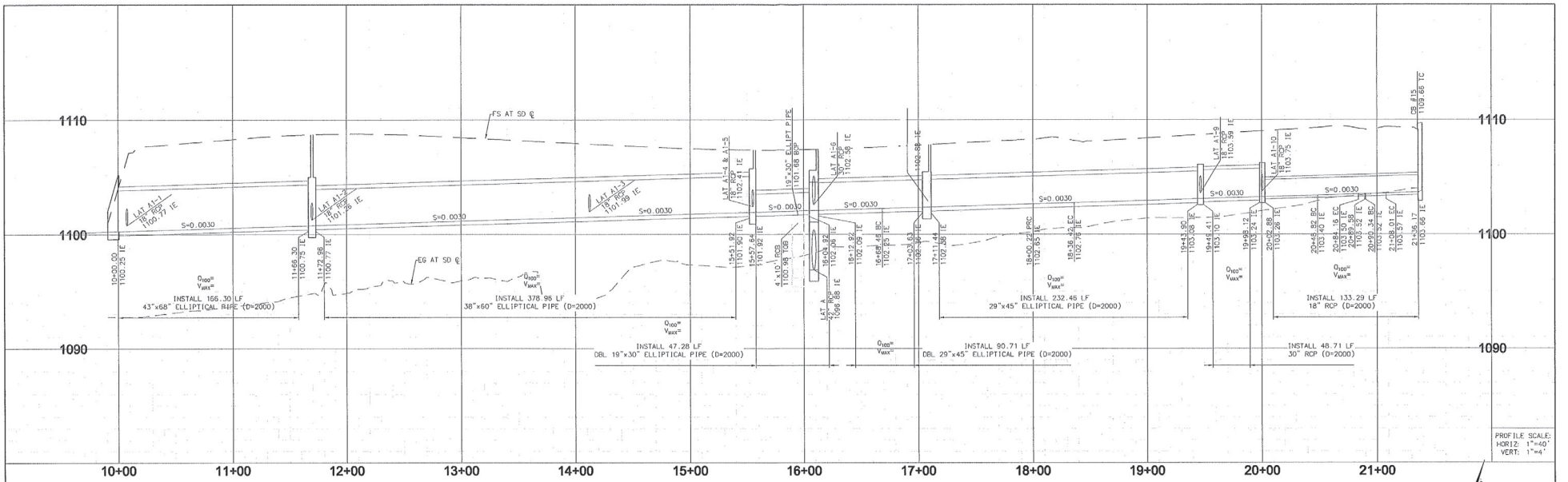
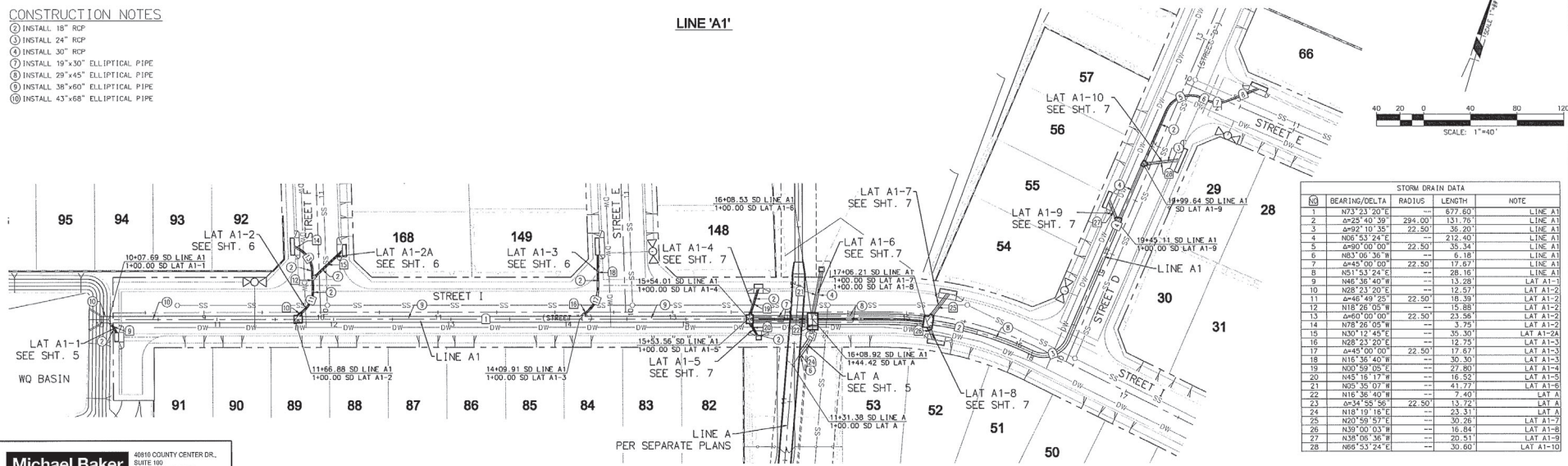



PROFILE SCALE:
HORIZ: 1"=40'
VERT: 1"=4'

## CONSTRUCTION NOTES

(2) INSTALL 18" RCP
(3) INSTALL 24" RCP
(4) INSTALL 30" RCP
(7) INSTALL 19"x30" ELLIPTICAL PIPE
(8) INSTALL 29"x45" ELLIPTICAL PIPE
(9) INSTALL 38"x60" ELLIPTICAL PIPE
(10) INSTALL 43"x68" ELLIPTICAL PIPE

## LINE 'A1'




### STORM DRAIN DATA

| NO | BEARING/DELTA | RADIUS | LENGTH | NOTE |
|---|---|---|---|---|
| 1 | N73°23'20"E | -- | 677.60' | LINE A1 |
| 2 | Δ=25°40'39" | 294.00' | 131.76' | LINE A1 |
| 3 | Δ=92°10'35" | 22.50' | 36.20' | LINE A1 |
| 4 | N06°53'24"E | -- | 212.40' | LINE A1 |
| 5 | Δ=90°00'00" | 22.50' | 35.34' | LINE A1 |
| 6 | N83°06'36"W | -- | 6.18' | LINE A1 |
| 7 | Δ=45°00'00" | 22.50' | 17.67' | LINE A1 |
| 8 | N51°53'24"E | -- | 28.16' | LINE A1 |
| 9 | N46°36'40"W | -- | 13.28' | LAT A1-1 |
| 10 | N28°23'20"E | -- | 12.57' | LAT A1-2 |
| 11 | Δ=46°49'25" | 22.50' | 18.39' | LAT A1-2 |
| 12 | N18°26'05"W | -- | 15.88' | LAT A1-2 |
| 13 | Δ=60°00'00" | 22.50' | 23.56' | LAT A1-2 |
| 14 | N78°26'05"W | -- | 3.75' | LAT A1-2 |
| 15 | N30°12'45"E | -- | 35.30' | LAT A1-2A |
| 16 | N28°23'20"E | -- | 12.75' | LAT A1-3 |
| 17 | Δ=45°00'00" | 22.50' | 17.67' | LAT A1-3 |
| 18 | N16°36'40"W | -- | 30.30' | LAT A1-3 |
| 19 | N00°59'05"E | -- | 27.80' | LAT A1-4 |
| 20 | N45°18'17"W | -- | 16.52' | LAT A1-5 |
| 21 | N05°35'07"W | -- | 41.77' | LAT A1-6 |
| 22 | N16°36'40"W | -- | 7.40' | LAT A |
| 23 | Δ=34°55'56" | 22.50' | 13.72' | LAT A |
| 24 | N18°19'16"E | -- | 23.31' | LAT A |
| 25 | N20°59'57"E | -- | 30.26' | LAT A1-7 |
| 26 | N39°00'03"W | -- | 16.84' | LAT A1-8 |
| 27 | N38°06'36"W | -- | 20.51' | LAT A1-9 |
| 28 | N66°53'24"E | -- | 30.60' | LAT A1-10 |


Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM


PW17-XX

| CONSTRUCTION RECORD | DATE | BY | REVISIONS | DATE | ACC'D |
|---|---|---|---|---|---|
| CONTRACTOR | | | | | |
| INSPECTOR | | | | | |
| DATE COMPLETED | | | | | |

BENCH MARK
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 FL

SCALE
HORIZONTAL
AS NOTED
VERTICAL
N/A

| DESIGNED BY | DRAWN BY | CHECKED BY |
|---|---|---|
| T.BURNSIDE | T.BURNSIDE | K. HAGHIGHI |

PLANS PREPARED UNDER THE SUPERVISION OF

_____ DATE: _____
JOHN D. TANNER III
R.C.E. 60132

RECOMMENDED BY: _____ DATE: _____

ACCEPTED BY: _____ DATE: _____
PATRICK A. THOMAS
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
R.C.E. 44223

**CITY OF TEMECULA** DEPARTMENT OF PUBLIC WORKS

PRIVATE STORM DRAIN IMPROVEMENT PLAN
VILLAGES AT PASEO DEL SOL
TRACT 36483, PA 4

SHEET NO. 3
OF 7 SHEETS

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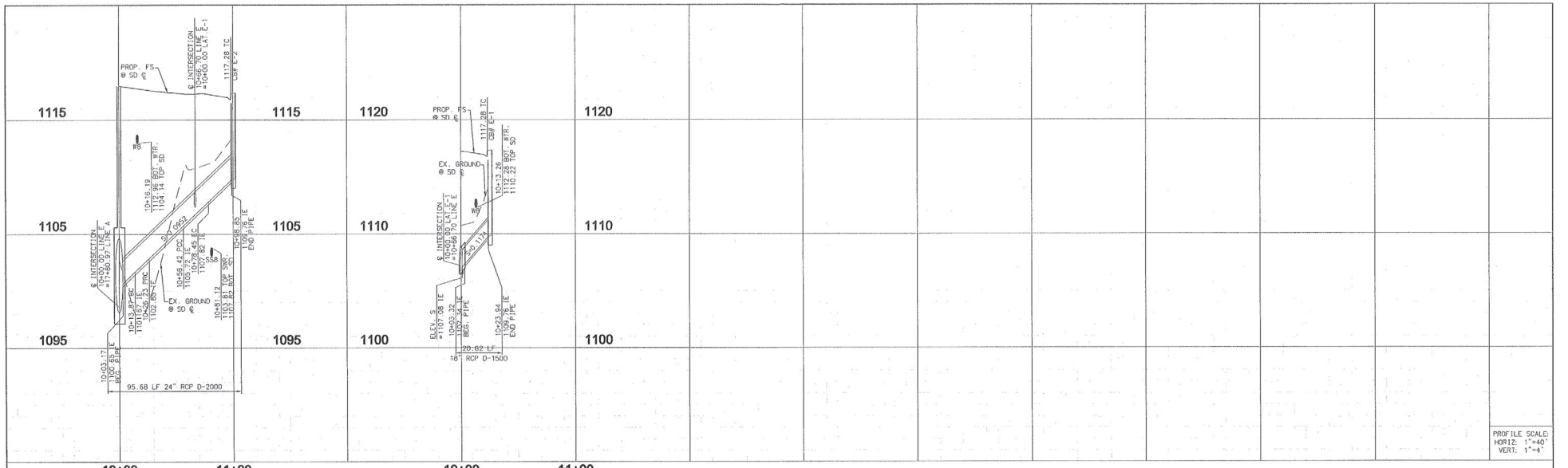
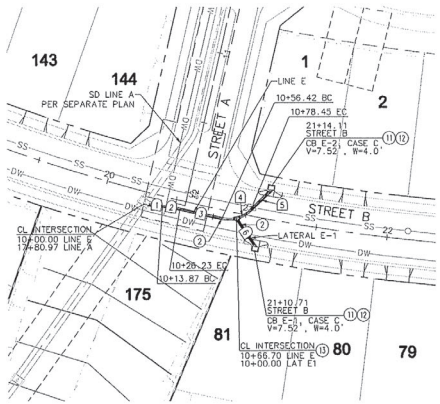



LINE 'E' PLAN

| DIMENSIONS FOR JUNCTION STRUCTURE NO. 2 (STD. DWG. NO. JS227) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MAIN LINE STA. | CONNECTING LAT. | A | B | C | D | E | F | G | L | ELEV. R | ELEV. S |
| 10+66.70 | LATERAL E1 | 69°50' | 18" | 3.74' | 24" | 1.56' | 0.54' | 0.44' | 2.27' | 1107.34 | 1107.08 |

| LINE/CURVE DATA TABLE | | | | | |
|---|---|---|---|---|---|
| NO | BEARING/DELTA | RADIUS | LENGTH | TANGENT | NOTE |
| 1 | N59°10'00"E | -- | 13.87' | -- | ℄ LINE E |
| 2 | 07°52'12" | 90.00' | 12.36' | 6.19' | ℄ LINE E |
| 3 | 01°23'59" | 1236.00' | 30.20' | 15.10' | ℄ LINE E |
| 4 | 56°05'29" | 22.50' | 22.03' | 11.99' | ℄ LINE E |
| 5 | N09°32'44"E | -- | 20.39' | -- | ℄ LINE E |
| 6 | N70°41'54"W | -- | 23.94' | -- | ℄ LAT E1 |

## CONSTRUCTION NOTES

(2) INSTALL 18" RCP
(11) CONSTRUCT CATCH BASIN NO.1 PER RCTD STD. NO. 300 (H & W PER PLAN)
(12) CONSTRUCT LOCAL DEPRESSION PERRCTD STD. NO. 311
(13) CONSTRUCT JUNCTION STRUCTURE NO.2 PER RCTD & WCD STD. NO. JS227

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
M3BAKERINTL.COM

40 20 0 40 80 120
SCALE: 1"=40'

SCALE 1"=40'

PW17-XX

| CONSTRUCTION RECORD | DATE | BY | REVISIONS | DATE | ACC'D | BENCH MARK |
|---|---|---|---|---|---|---|
| CONTRACTOR | | | | | | RIVERSIDE COUNTY B.M. 600-6-81 INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE. 997.721 FI |
| INSPECTOR | | | | | | |
| DATE COMPLETED | | | | | | |

| SCALE |
|---|
| HORIZONTAL |
| AS NOTED |
| VERTICAL |
| N/A |

REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER III No. 60132 CIVIL STATE OF CALIFORNIA

| DESIGNED BY | DRAWN BY | CHECKED BY |
|---|---|---|
| T.BURNSIDE | T.BURNSIDE | K. HAGHIGHI |

PLANS PREPARED UNDER THE SUPERVISION OF

_____ DATE: _____
JOHN D. TANNER III
R.C.E. 60132

RECOMMENDED BY: _____ DATE: _____

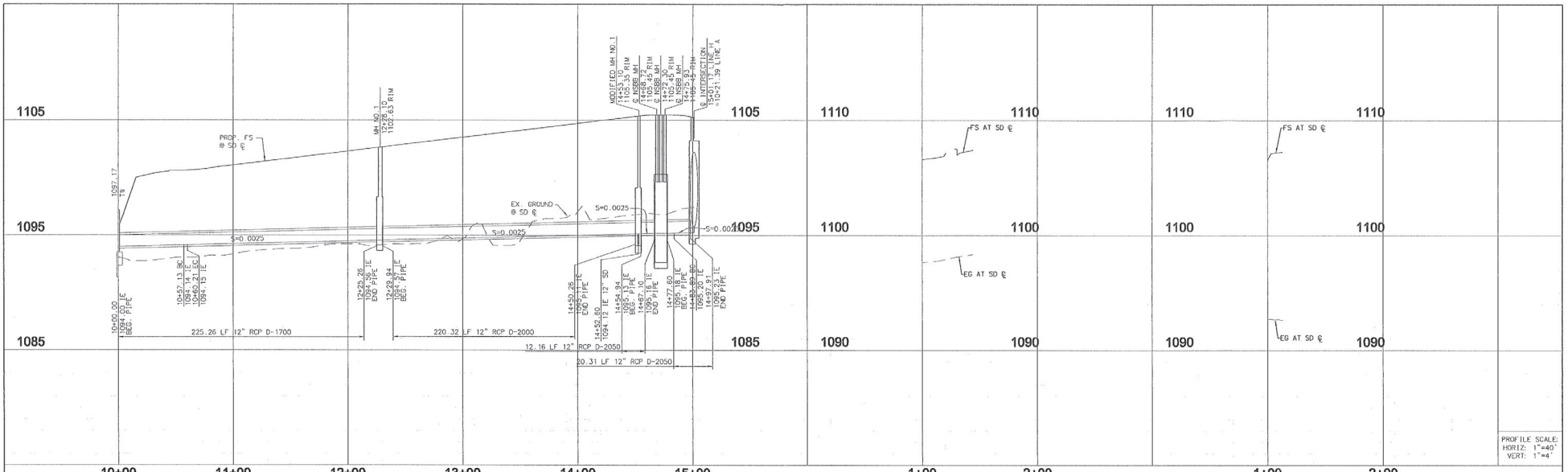
ACCEPTED BY: _____ DATE: _____
PATRICK A. THOMAS
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
R.C.E. 44223

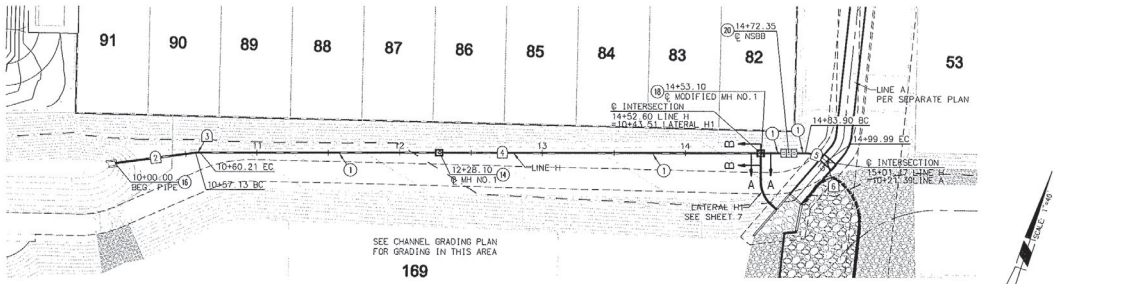
**CITY OF TEMECULA** DEPARTMENT OF PUBLIC WORKS

PRIVATE STORM DRAIN IMPROVEMENT PLAN
VILLAGES AT PASEO DEL SOL
TRACT 36483, PA 4

SHEET NO. 4 OF 7 SHEETS

\\TEMECA1FS1\PROJECTS\PA1\39600\CADD\LAND\DLV\IMPROVE\SD\ONSITE\PRIVATE\39600-SD-004.DWG SHEVCHENKO, OLGA 12/19/2018 10:56 AM




| LINE/CURVE DATA TABLE | | | | | |
|---|---|---|---|---|---|
| NO | BEARING/DELTA | RADIUS | LENGTH | TANGENT | NOTE |
| 1 | N21°24'49"E | -- | 48.07' | -- | ℄ LINE F |
| 2 | N64°34'27"E | -- | 57.13' | -- | ℄ LINE H |
| 3 | 08°48'53" | 20.00' | 3.08' | 1.54' | ℄ LINE H |
| 4 | N72°00'32"E | -- | 423.69' | -- | ℄ LINE H |
| 5 | 40°58'49" | 22.50' | 16.09' | 8.41' | ℄ LINE H |
| 6 | N67°00'43"W | -- | 1.17' | -- | ℄ LINE H |

## CONSTRUCTION NOTES

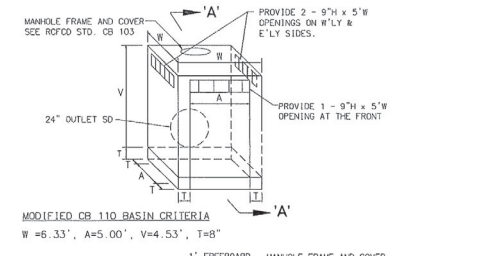
(1) INSTALL 12" RCP

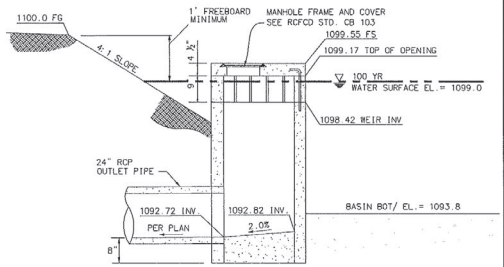
(14) CONSTRUCT MANHOLE NO. 1 PER RCFC & WCD STD. DWG. NO. MH251

(16) CONSTRUCT PIPE CULVERT HEADWALL PER CALTRANS STD. NO. D89

(18) CONSTRUCT MODIFIED MANHOLE NO. 1 PER RCFC & WCD STD. DWG. NO. MH251 AND DETAIL ON SHEET 2

(20) INSTALL BIOCLEAN HYDRODYNAMIC SEPERATOR MODEL NSBB-5-10 5-84 PER BIOCLEAN STD. DETAIL




**SECTION A-A**
N.T.S.

**(X) MODIFIED CB110 DROP INLET STRUCTURE**
*NOT TO SCALE*

PW17-XX


Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM


| CONSTRUCTION RECORD | DATE | BY | REVISIONS | DATE | ACC'D | BENCH MARK |
|---|---|---|---|---|---|---|
| CONTRACTOR | | | | | | RIVERSIDE COUNTY B.M. 600-6-81 INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE. 997.771 FT |
| INSPECTOR | | | | | | |
| DATE COMPLETED | | | | | | |

| SCALE |
|---|
| HORIZONTAL |
| AS NOTED |
| VERTICAL |
| N/A |

| DESIGNED BY | DRAWN BY | CHECKED BY |
|---|---|---|
| T.BURNSIDE | T.BURNSIDE | K. HAGHIGHI |

PLANS PREPARED UNDER THE SUPERVISION OF

_____ DATE: _____

JOHN D. TANNER III
R.C.E. 60132

RECOMMENDED BY: _____ DATE: _____

ACCEPTED BY: _____ DATE: _____

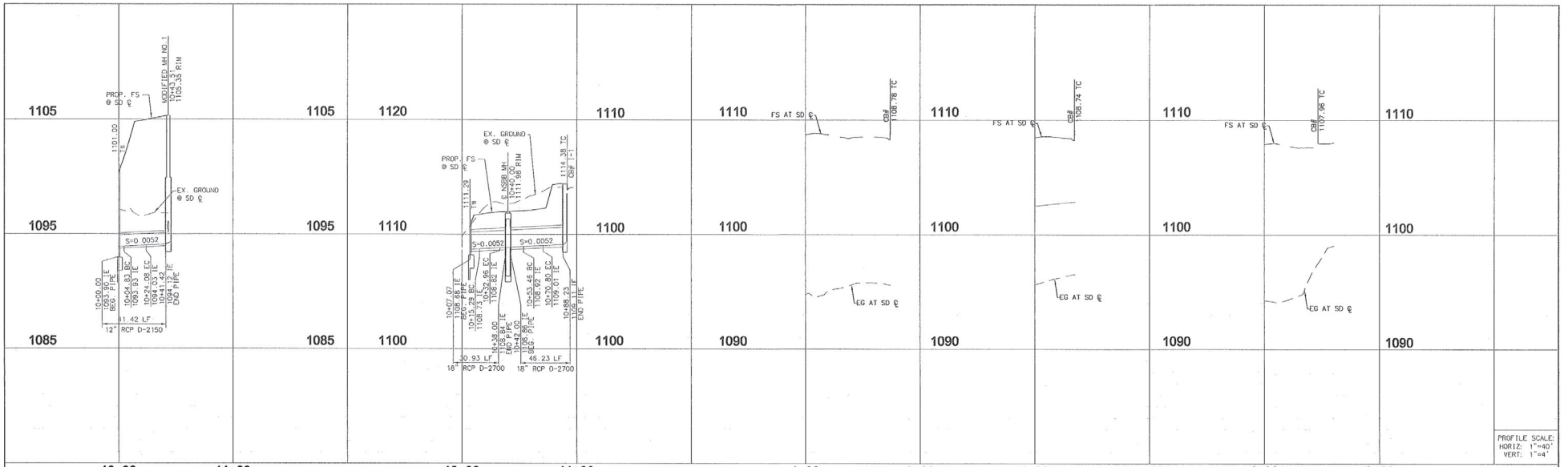
PATRICK A. THOMAS
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
R.C.E. 44223

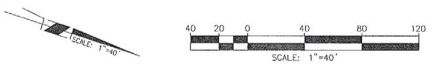
**CITY OF TEMECULA** DEPARTMENT OF PUBLIC WORKS

PRIVATE STORM DRAIN IMPROVEMENT PLAN
VILLAGES AT PASEO DEL SOL
TRACT 36483, PA 4

SHEET NO. 5
OF 7 SHEETS

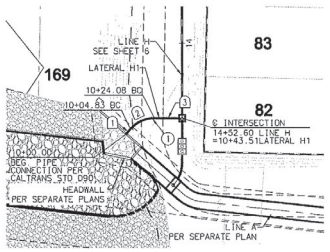
\\TEMECA1FS1\PROJECT\PDATA\38600\CADD\LAND DEV\IMPROVE\SD\ONSITE\PRIVATE\38600-SD-005.DWG SHEVCHENKO, OLGA 12/19/2018 10:56 AM

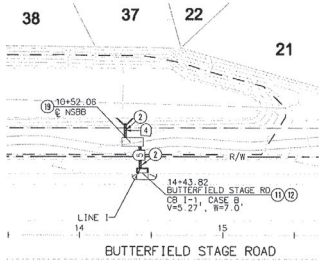







| STORM DRAIN DATA | | | | |
|---|---|---|---|---|
| NO | BEARING/DELTA | RADIUS | LENGTH | NOTE |
| 1 | N67°00'43"W | -- | 4.83' | LAT H1 |
| 2 | Δ=49°01'11" | 22.50' | 19.25' | LAT H1 |
| 3 | N17°59'32"W | -- | 19.43' | LAT H1 |
| 4 | N66°13'25"E | -- | 10.02' | LINE I |
| 5 | N66°13'25"E | -- | 39.60' | LINE I |

## CONSTRUCTION NOTES

(1) INSTALL 12" RCP
(2) INSTALL 18" RCP
(11) CONSTRUCT CATCH BASIN NO.1 PER RCTD STD. NO. 300 (H & W PER PLAN)
(12) CONSTRUCT LOCAL DEPRESSION PERRCTO STD. NO. 311
(19) INSTALL BIOCLEAN HYDRODYNAMIC SEPERATOR MODEL NSBB-2 5-4-60 PER BIOCLEAN STD. DETAIL

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8942
MBAKERINTL.COM

PW17-XX

| CONSTRUCTION RECORD | DATE | BY | REVISIONS | DATE | ACC'D |
|---|---|---|---|---|---|
| CONTRACTOR | | | | | |
| INSPECTOR | | | | | |
| DATE COMPLETED | | | | | |

BENCH MARK
RIVERSIDE COUNTY B.M. 600-6-81 INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE. 992.721 FI

| SCALE | |
|---|---|
| HORIZONTAL | AS NOTED |
| VERTICAL | N/A |

REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER III No. 60132 CIVIL STATE OF CALIFORNIA

| DESIGNED BY | DRAWN BY | CHECKED BY |
|---|---|---|
| T.BURNSIDE | T.BURNSIDE | K. HAGHIGHI |

PLANS PREPARED UNDER THE SUPERVISION OF

DATE:

JOHN D. TANNER III
R.C.E. 60132

RECOMMENDED BY: DATE:

ACCEPTED BY: DATE:

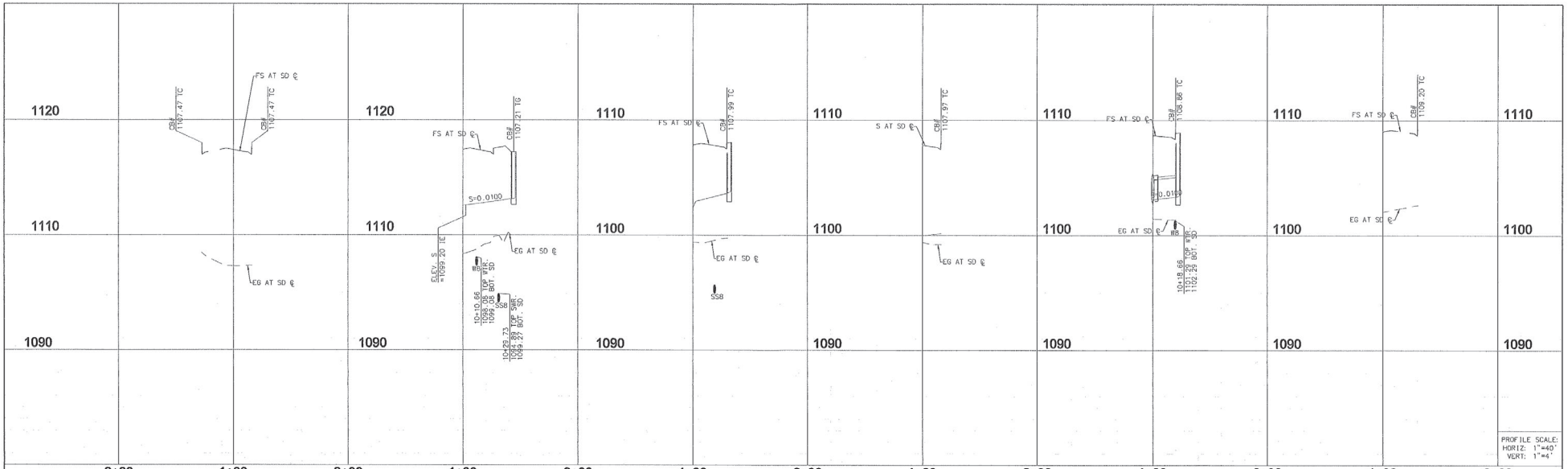
PATRICK A. THOMAS
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
R.C.E. 44223

**CITY OF TEMECULA** DEPARTMENT OF PUBLIC WORKS

# PRIVATE STORM DRAIN IMPROVEMENT PLAN VILLAGES AT PASEO DEL SOL TRACT 36483, PA 4

SHEET NO. 6 OF 7 SHEETS

\\TEMECAFS1\PROJ\PDATA\39600\CADD\LAND DLV\MPROVE\SD CONSTE\PRIVATE\39600-SD-006.DWG SHEVCHENKO, OLGA 12/19/2018 11:02 AM





Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM


PW17-XX

| CONSTRUCTION RECORD | DATE | BY | REVISIONS | DATE | ACC'D | BENCH MARK |
|---|---|---|---|---|---|---|
| CONTRACTOR | | | | | | RIVERSIDE COUNTY B.M. 600-6-81 INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE. 997.721 FL |
| INSPECTOR | | | | | | |
| DATE COMPLETED | | | | | | |

| SCALE |
|---|
| HORIZONTAL |
| AS NOTED |
| VERTICAL |
| N/A |

| DESIGNED BY | DRAWN BY | CHECKED BY |
|---|---|---|
| T.BURNSIDE | T.BURNSIDE | K. HAGHIGHI |

PLANS PREPARED UNDER THE SUPERVISION OF

_____ DATE: _____

JOHN D. TANNER III
R.C.E. 60132

RECOMMENDED BY: _____ DATE: _____

ACCEPTED BY: _____ DATE: _____

PATRICK A. THOMAS
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
R.C.E. 44223

**CITY OF TEMECULA** DEPARTMENT OF PUBLIC WORKS

PRIVATE STORM DRAIN IMPROVEMENT PLAN
VILLAGES AT PASEO DEL SOL
TRACT 36483, PA 4

SHEET NO. **7** OF 7 SHEETS

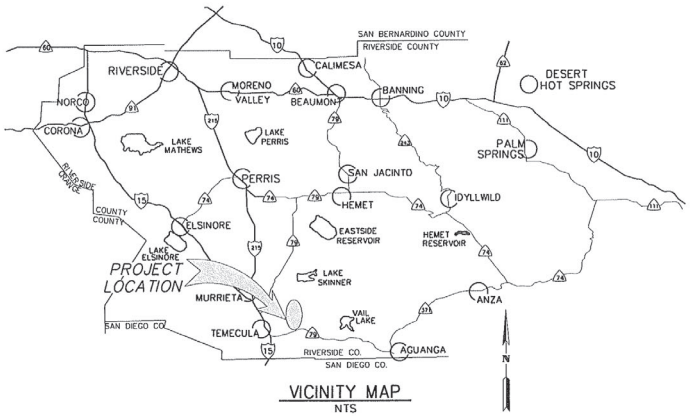
\\TEMECHFS1\PROJ\T\PDATA\36600\CADD\LAND DLV\IMPROVE\SD ONSITE\PRIVATE\36600-SD-007.DWG SHEVCHENKO, OLGA 12/19/2018 10:58 AM

## EXCERPT C: TENTATIVE TRACT MAP 36483 STORM DRAIN PLAN

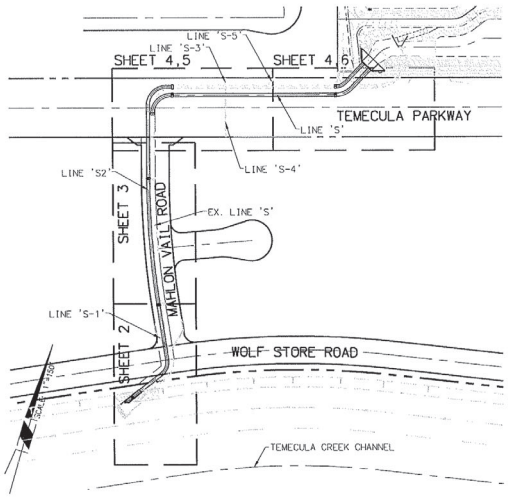
# RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

## GENERAL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S M.O.U. STANDARD SPECIFICATIONS DATED JUNE 24, 2008, AND THE RCFC&WCD STANDARD MANUAL, AND RCFC&WCD STANDARD MANUAL DATED JULY 8, 2010. FOR THE LATEST DRAWINGS OF THE STANDARD MANUAL, PLEASE REFER TO THE "PUBLICATIONS AND RECORDS" PAGE FOUND ON THE DISTRICT'S WEBSITE.
2. (IF) AN ENCROACHMENT PERMIT IS REQUIRED FROM THE RIVERSIDE COUNTY FLOOD CONTROL, CONTACT PERMIT ENGINEER AT 951/955-1266. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
3. CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. CONTACT CONTRACT ADMINISTRATOR AT 951/955-1288. THE DISTRICT MUST BE NOTIFIED TWENTY DAYS (20) PRIOR TO CONSTRUCTION.
4. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE INTERSECTION STATIONS.
6. FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-227-2600.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD 88).
8. ALL COORDINATES ARE SHOWN IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN DATUM (NAD 83), CALIFORNIA COORDINATE SYSTEM (CCS), ZONE 6 AND EPOCH 2007.00.
9. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
10. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
11. UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "B" HOT MIX ASPHALT OVER 6" CLASS 2 AGGREGATE BASE OR AS SPECIFIED BY THE ENGINEER.
12. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
13. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO.4 (JS 229) UNLESS OTHERWISE NOTED.
14. PIPE BEDDING SHALL CONFORM TO RCFC&WCD STD. DWG. NO. M815 EXCEPT FOR COVER<2 FEET. FOR COVER<2 FEET, CONCRETE SLURRY (2000 PSI - 2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF THE PIPE.
15. BH-10 INDICATES SOIL BORING LOCATION BASED ON THE SOILS REPORT DATED JULY 14, 2015. LOCATIONS SHOWN ARE APPROXIMATE.
16. "V" IS THE DEPTH OF CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
17. CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
18. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
19. STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
20. THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS
21. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
22. APPROVAL OF THESE PLANS BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEER OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE THE NECESSARY CORRECTIONS.
23. THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL THE REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK.
24. THE CONCRETE COATING ON THE INSIDE OF ALL REINFORCED CONCRETE PIPES MUST BE INCREASED TO PROVIDE A MINIMUM OF 1-1/2 INCHES OVER THE REINFORCING AND INCREASED TO A MINIMUM OF 3-1/2 INCHES OVER REINFORCING FOR BOX CULVERTS WHEN DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'C=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND F'C=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.
25. CONSTRUCTION JOINT FOR CALTRANS STANDARD REINFORCED CONCRETE BOX SHALL BE ACCORDING TO RCFC&WCD STD. DWG. NO. BX401.




VICINITY MAP
NTS




150 75 0 150 300 450
SCALE: 1"=150'

INDEX MAP
1"=150'

## SHEET INDEX



## R.C.F.C. & W.C.D. STANDARD DRAWINGS

| | |
|---|---|
| MH252 | MANHOLE NO. 2 |
| M803 | CONCRETE COLLAR |
| JS229 | JUNCTION STRUCTURE NO. 4 |
| JS231 | JUNCTION STRUCTURE NO. 6 |

## CALTRANS STANDARD DRAWINGS

| | |
|---|---|
| D-86B | HEADWALL AND WARPED WINGWALL |
| D-90A | HEADWALL AND WINGWALL |

## STORM DRAIN MAINTENANCE RESPONSIBILITIES

RCFC & WCD WILL MAINTAIN ALL LINES LARGER THAN 36" INCLUDING:
SD LINE 'S' AND SD LINE 'S2'

## STORM DRAIN MAINTENANCE RESPONSIBILITIES

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES, CONDUITS, OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN ON THESE DRAWINGS. THE CONTRACTOR FURTHER ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR THE UTILITY PIPES, CONDUITS OR STRUCTURES, SHOWN OR NOT SHOWN ON THESE PLANS.

## CONSTRUCTION NOTES

1. INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD SPECS. (SIZES AS SHOWN ON PROFILE)
2. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STD. DWG. NO. MH252
3. CONSTRUCT MODIFIED CONCRETE COLLAR PER STD. DWG. NO. M803 AND DETAIL ON SHEET 6
4. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STD. DWG. NO. JS229
5. CONSTRUCT JUNCTION STRUCTURE NO. 6 PER RCFC & WCD STD. DWG. NO. JS231
6. CONSTRUCT HEADWALL AND WINGWALLS PER CALTRANS STD. NO. D90
7. INSTALL RIP RAP (SIZES AS SHOWN ON PLANS)
8. VEHICULAR TURN AROUND AREA PER RCFC & WCD STD. DWG. NO. M827

★PRELIMINARY★
SUBJECT TO REVISION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL.

| REF. | DESCRIPTION | APPR. | DATE |
|---|---|---|---|
| | REVISIONS | | |

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: C. MORLOK

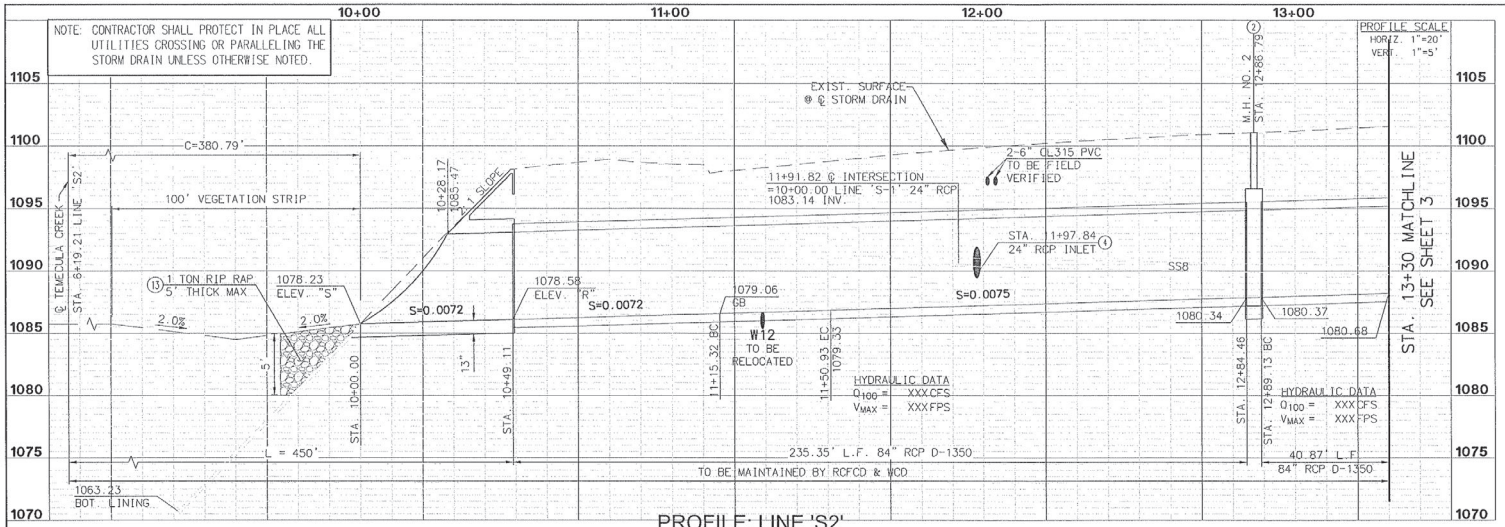

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM
JOHN D. TANNER, III RCE 60132 DATE:


REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER No. 60132 Exp. 06/30/10 CIVIL STATE OF CALIFORNIA

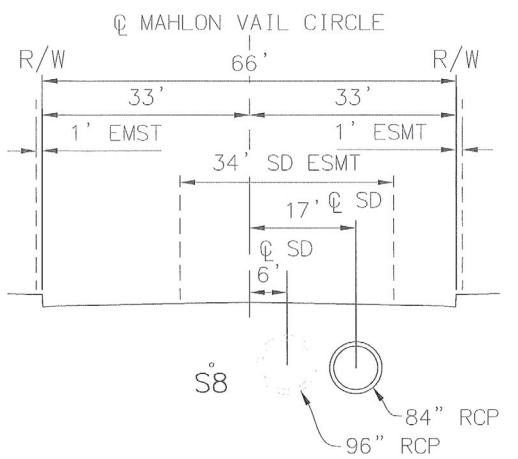
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE:
APPROVED BY: CHIEF ENGINEER DATE:

MAHLON VAIL RD/TEMECULA PKWY STORM DRAIN
TITLE SHEET

PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 1 OF 6

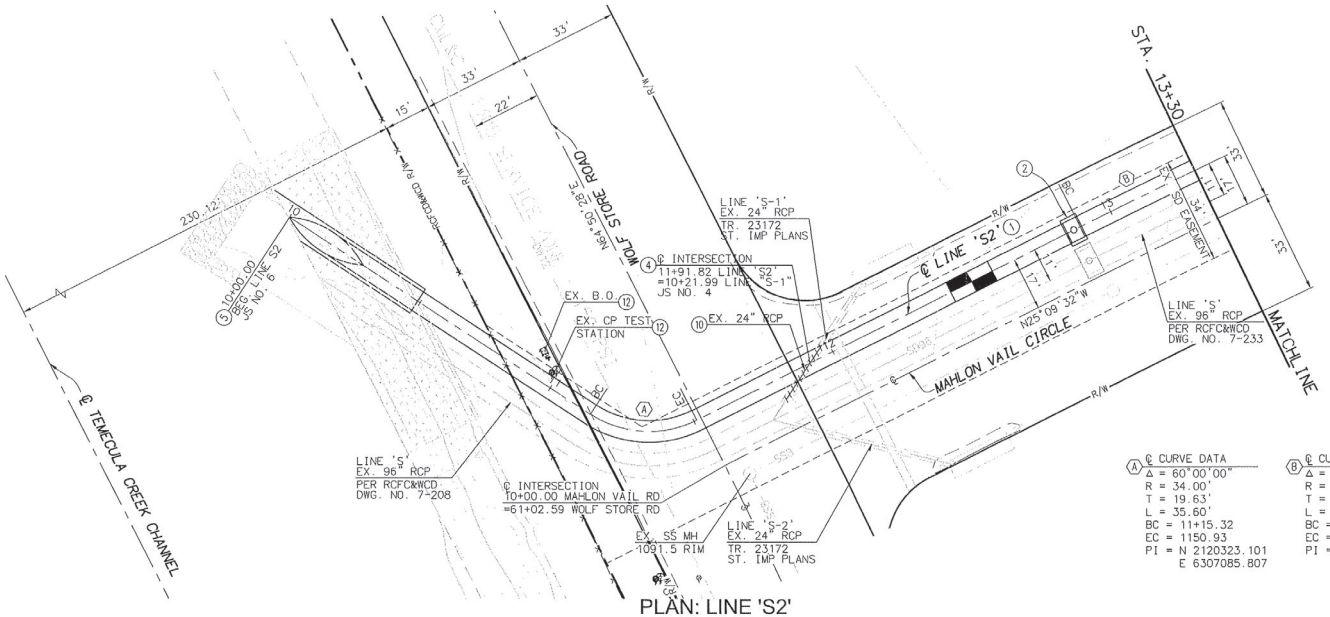



PROFILE: LINE 'S2'




SECTION AT SD STA. 12+50

SCALE: 1"=10'




PLAN: LINE 'S2'

CONSTRUCTION NOTES

1. INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD SPECS. (SIZES AS SHOWN ON PROFILE)
2. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STD. DWG. NO. MH252
4. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STD. DWG. NO. JS229
5. CONSTRUCT JUNCTION STRUCTURE NO. 6 PER RCFC & WCD STD. DWG. NO. JS231
10. REMOVE AND DISPOSE
12. TO BE RELOCATED

(A) ℄ CURVE DATA
Δ = 60°00'00"
R = 34.00'
T = 19.63'
L = 35.60'
BC = 11+15.32
EC = 1150.93
PI = N 2120323.101
E 6307085.807

(B) ℄ CURVE DATA (FULL)
Δ = 8°32'52"
R = 2017.00'
T = 150.73'
L = 300.91'
BC = 12+89.13
EC = 15+90.04
PI = N 2121320.132
E 6308883.480

SCALE: 1"=20'

20 10 0 20 40 60

SCALE: 1"=20'

★PRELIMINARY★
FIRST PLAN CHECK
SUBJECT TO REVISION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL.

| REF. | REVISIONS | APPR. | DATE |
|---|---|---|---|

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: C. MORLOK

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER III No. 60132 Exp. 06/30/10 CIVIL STATE OF CALIFORNIA

JOHN D. TANNER, III RCE 60132 DATE:

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

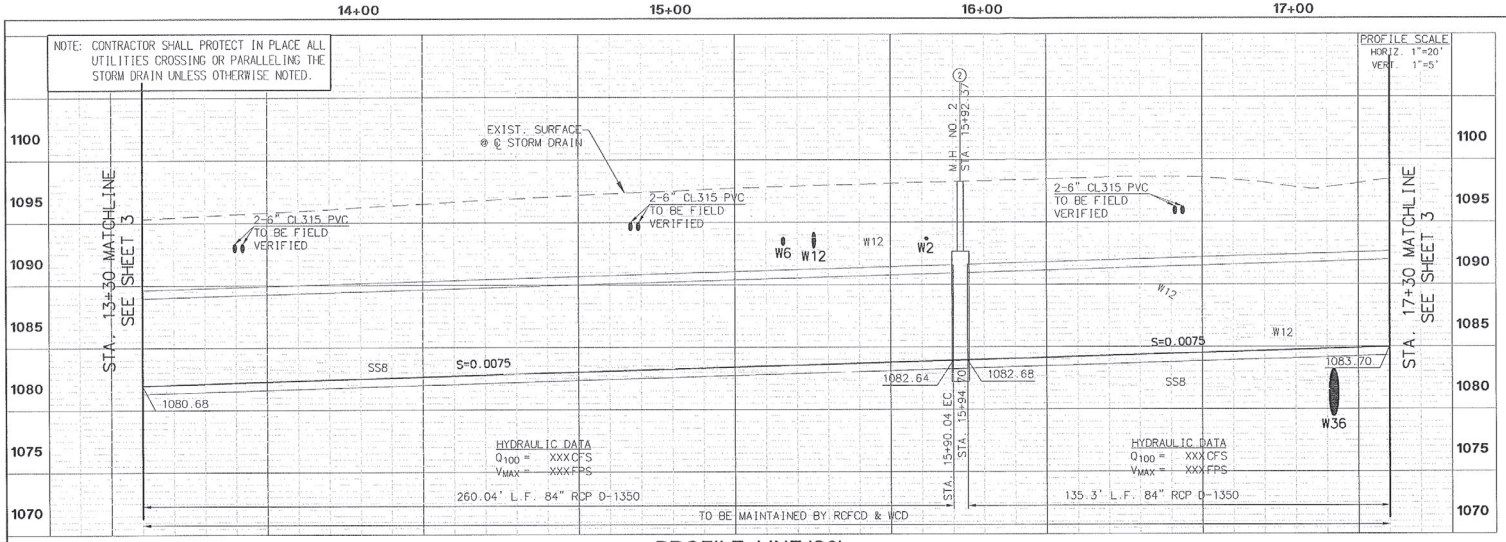
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE:

APPROVED BY: CHIEF ENGINEER DATE:

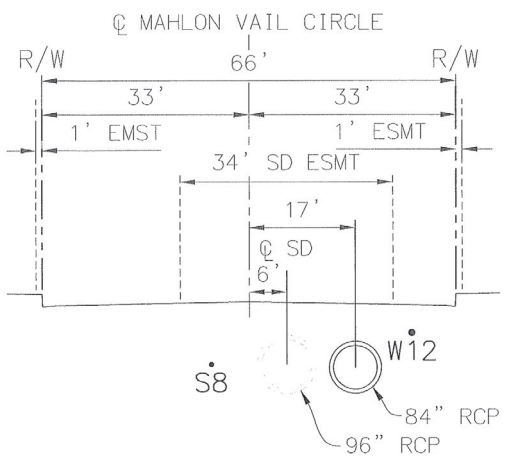
# MAHLON VAIL RD/TEMECULA PKWY STORM DRAIN

LINE 'S2' STATION: 10+00 TO 13+30

PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 2 OF 6




PROFILE: LINE 'S2'




SECTION AT SD STA. 15+50

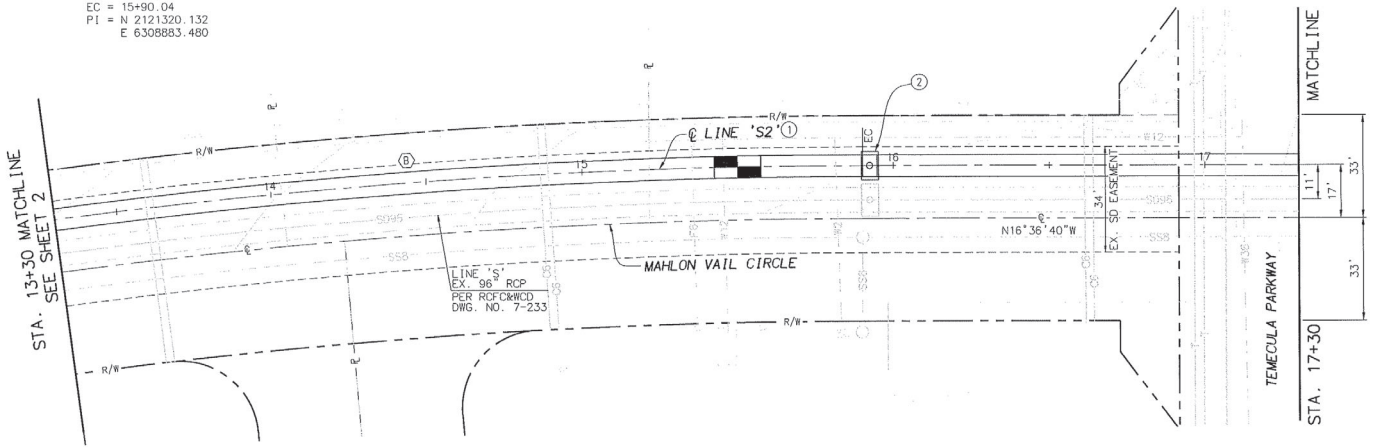
SCALE: 1"=10'

Ⓑ ℄ CURVE DATA (FULL)
Δ = 8°32'52"
R = 2017.00'
T = 150.73'
L = 300.91'
BC = 12+89.13
EC = 15+90.04
PI = N 2121320.132
E 6308883.480

CONSTRUCTION NOTES

① INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD SPECS. (SIZES AS SHOWN ON PROFILE)

② CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STD. DWG. NO. MH252




PLAN: LINE 'S2'

★PRELIMINARY★
FIRST PLAN CHECK
SUBJECT TO REVISION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE S/W CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL.

| REF. | DESCRIPTION | APPR. | DATE |
|---|---|---|---|
| | REVISIONS | | |

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: C. MORLOK

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER, III No. 60132 Exp. 06/30/10 CIVIL STATE OF CALIFORNIA

JOHN D. TANNER, III RCE 60132 DATE:

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

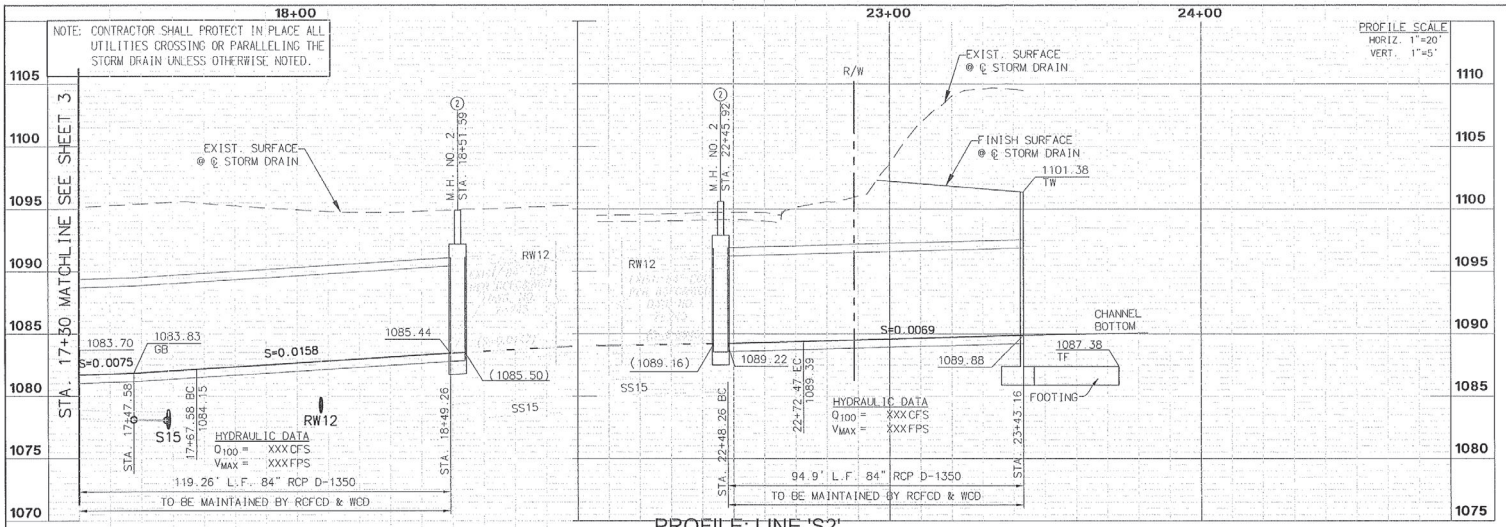
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE:

APPROVED BY: CHIEF ENGINEER DATE:

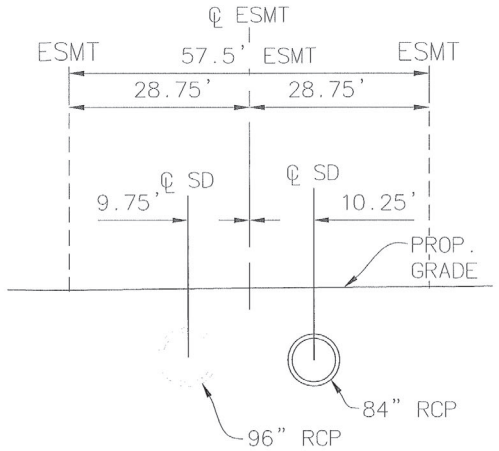
MAHLON VAIL RD/TEMECULA PKWY STORM DRAIN

LINE 'S2' STATION: 13+30 TO 17+30

PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 3 OF 6




PROFILE: LINE 'S2'

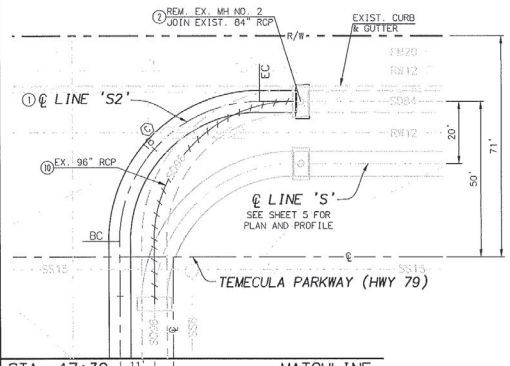



SECTION AT SD STA. 15+50

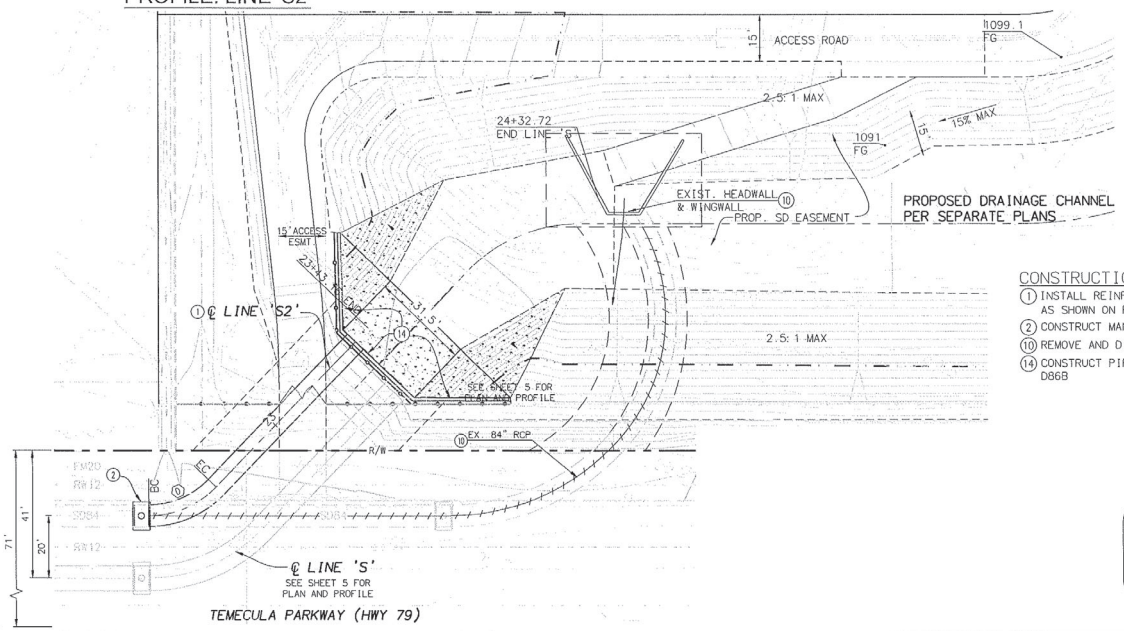
SCALE: 1"=10'

Ⓒ ℄ CURVE DATA
Δ = 90°00'00"
R = 45.00'
T = 45.00'
L = 70.69'
BC = STA. 17+67.58
EC = STA. 18+38.26
PI = N 2120926.519
E 6306943.023

Ⓓ ℄ CURVE DATA
Δ = 46°14'30"
R = 30.00'
T = 12.81'
L = 24.21'
BC = STA. 22+48.26
EC = STA. 22+72.47
PI = N 2121115.595
E 6307314.466




PLAN: LINE 'S2'




CONSTRUCTION NOTES

(1) INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD SPECS. (SIZES AS SHOWN ON PROFILE)
(2) CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STD. DWG. NO. MH252
(10) REMOVE AND DISPOSE
(14) CONSTRUCT PIPE CULVERT WARPED WINGWALLS PER CALTRANS STD. NO. D86B

★PRELIMINARY★
FIRST PLAN CHECK
SUBJECT TO REVISION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

**BENCHMARK:**
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL.

| REVISIONS | | | |
|---|---|---|---|
| REF. | DESCRIPTION | APPR. | DATE |

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: C. MORLOK

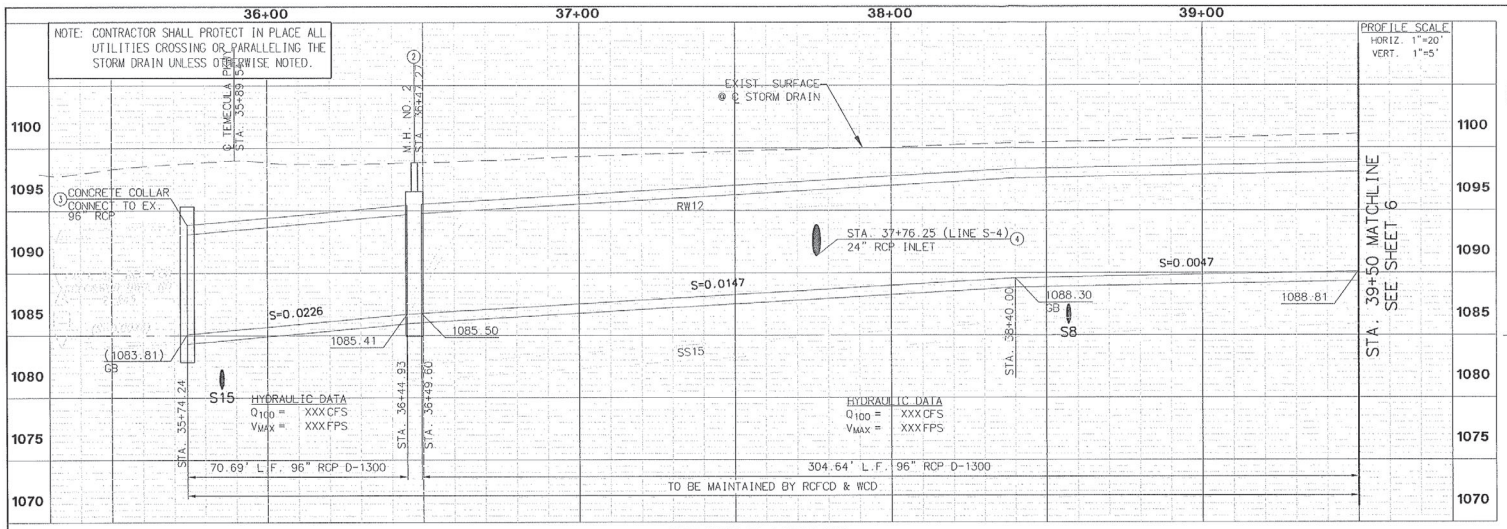
Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM
JOHN D. TANNER, III RCE 60132 DATE:

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE:
APPROVED BY: CHIEF ENGINEER DATE:

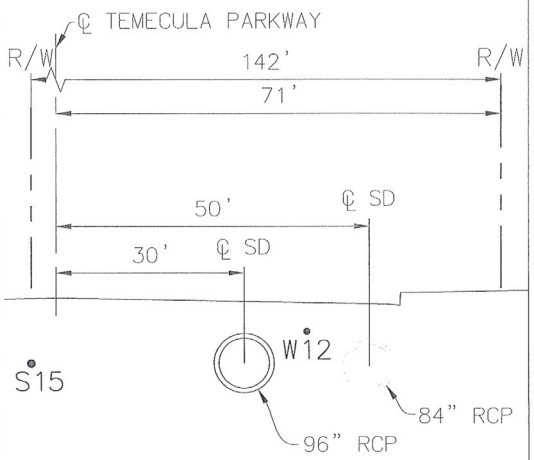
# MAHLON VAIL RD/TEMECULA PKWY STORM DRAIN

LINE 'S2' STA: 17+30.00 TO 18+49.26
LINE 'S2' STA: 22+48.26 TO 24+32.72

PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 4 OF 6

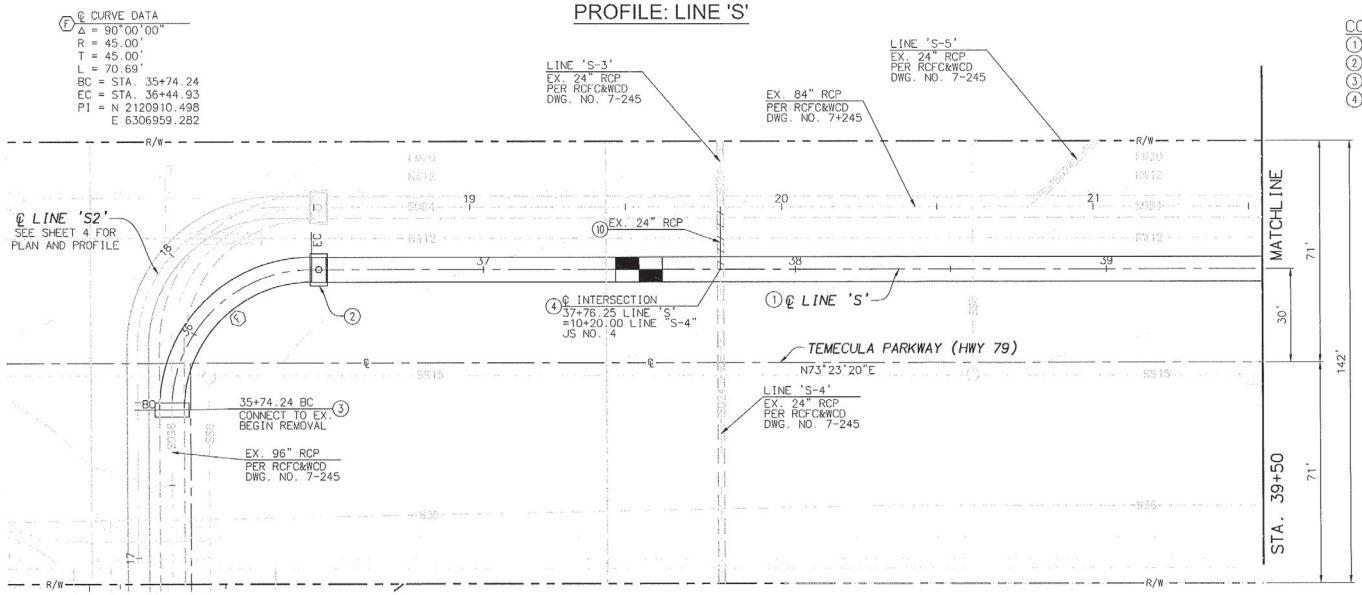



## PROFILE: LINE 'S'




## SECTION AT SD STA. 37+50

SCALE: 1"=10'




## PLAN: LINE 'S'

### CONSTRUCTION NOTES

1. INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD SPECS. (SIZES AS SHOWN ON PROFILE)
2. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STD. DWG. NO. MH252
3. CONSTRUCT MODIFIED CONCRETE COLLAR PER STD. DWG. NO. M803 AND DETAIL ON SHEET 6
4. CONSTRUCT JUNCTION STRUCTURE NO. 4 PER RCFC & WCD STD. DWG. NO. JS229

★PRELIMINARY★
FIRST PLAN CHECK
SUBJECT TO REVISION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

**BENCHMARK:**
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL.

| REVISIONS | | | |
|---|---|---|---|
| REF. | DESCRIPTION | APPR. | DATE |

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: C. MORLOK

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER III No. 60132 Exp. 06/30/10 CIVIL STATE OF CALIFORNIA

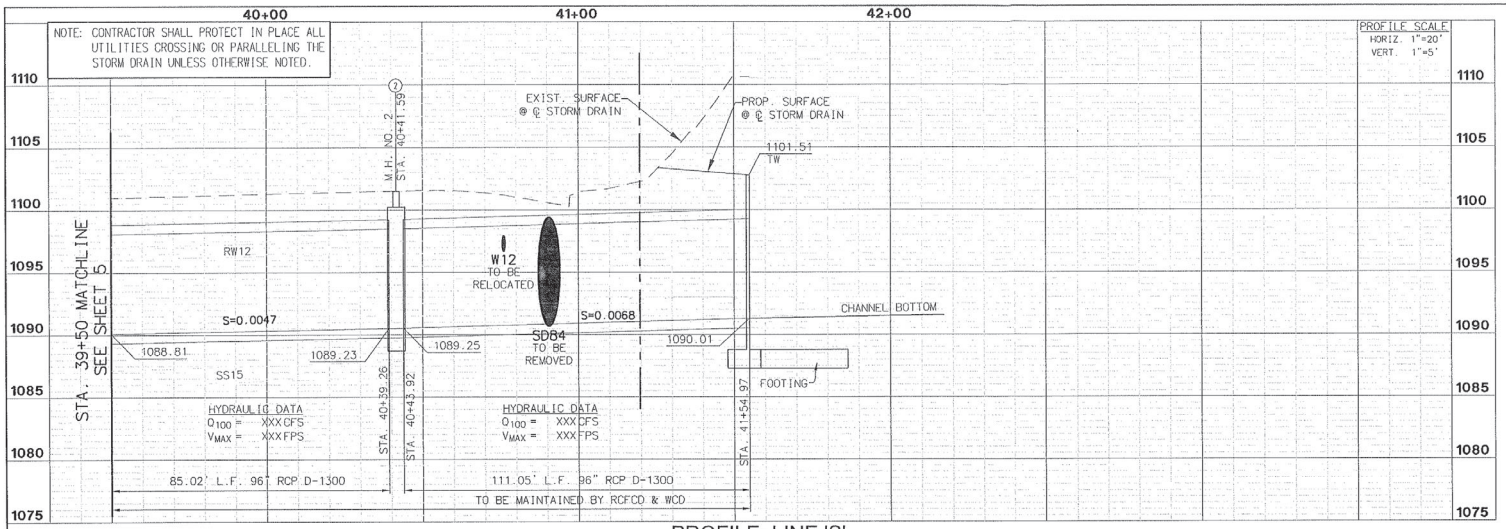
JOHN D. TANNER, III RCE 60132 DATE:

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE:
APPROVED BY: CHIEF ENGINEER DATE:

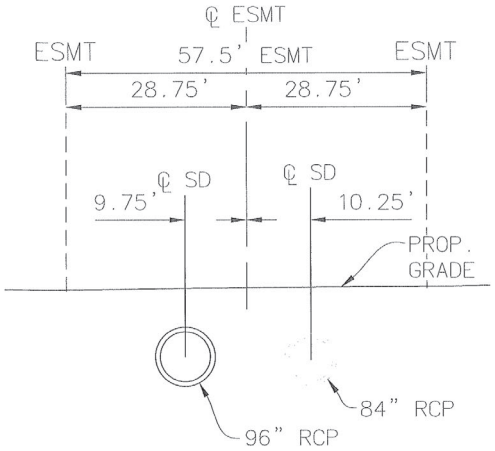
# MAHLON VAIL RD/TEMECULA PKWY STORM DRAIN

LINE 'S' STATION: 35+74.24 TO 39+50

PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 5 OF 6



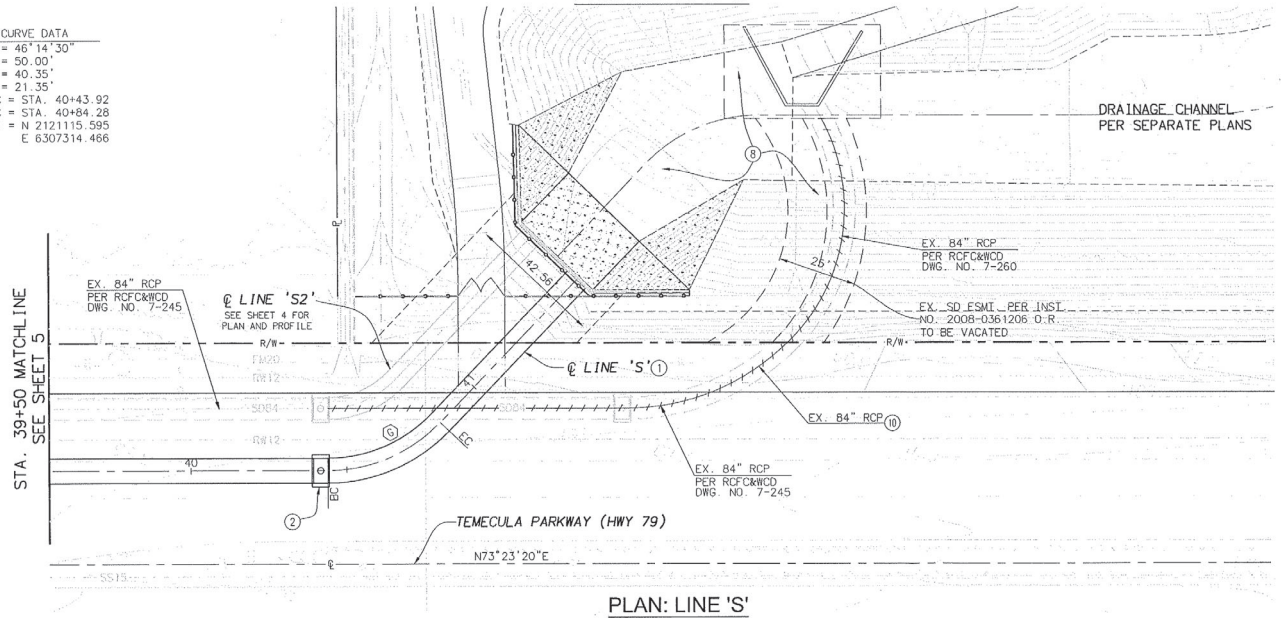

## PROFILE: LINE 'S'




## SECTION AT SD STA. 15+50

SCALE: 1"=10'

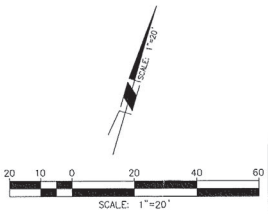
⑥ ℄ CURVE DATA
Δ = 46°14'30"
R = 50.00'
L = 40.35'
T = 21.35'
BC = STA. 40+43.92
EC = STA. 40+84.28
PI = N 2121115.595
E 6307314.466




## PLAN: LINE 'S'

### CONSTRUCTION NOTES

1. INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD SPECS. (SIZES AS SHOWN ON PROFILE)
2. CONSTRUCT MANHOLE NO. 2 PER RCFC & WCD STD. DWG. NO. MH252
6. CONSTRUCT PIPE CULVERT HEADWALL AND WINGWALLS PER CALTRANS STD. NO. D90
8. VEHICULAR TURN AROUND AREA PER RCFC & WCD STD. DWG. NO. M827




★PRELIMINARY★
FIRST PLAN CHECK
SUBJECT TO REVISION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

**BENCHMARK:**
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL.

| REF. | REVISIONS | APPR. | DATE |
|---|---|---|---|

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: C. MORLOK

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 100
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM
JOHN D. TANNER, III RCE 60132 DATE:

REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER III No. 60132 Exp. 06/30/19 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: PLANNING ENGINEER DATE:
APPROVED BY: CHIEF ENGINEER DATE:

MAHLON VAIL RD/TEMECULA PKWY STORM DRAIN
LINE 'S' STA: 39+50.00 TO 42+27.92

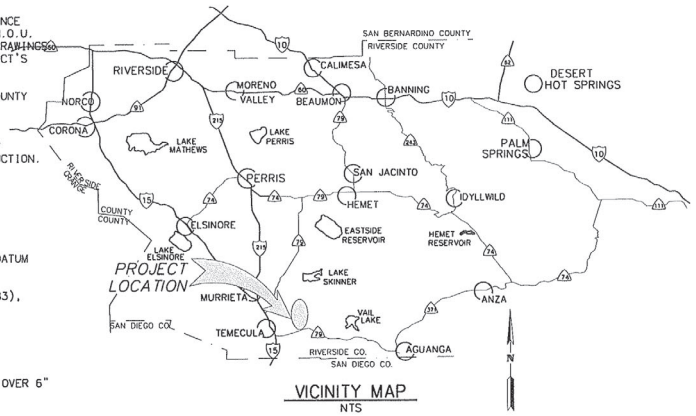
PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 6 OF 6

## EXCERPT D: MAHLON VAIL ROAD/TEMECULA PARKWAY STORM DRAIN PLANS

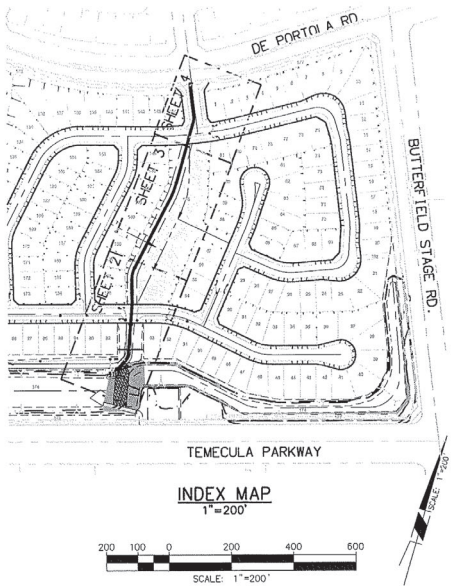
# RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

## GENERAL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S M.O.U. STANDARD SPECIFICATIONS DATED JUNE 24, 2008, AND THE RCFC&WCD STANDARD MANUAL. FOR THE LATEST DRAWINGS OF THE STANDARD MANUAL, PLEASE REFER TO THE "PUBLICATIONS AND RECORDS" PAGE FOUND ON THE DISTRICT'S WEBSITE.
2. CONTACT PERMIT ENGINEER AT 951/955-1266 IF AN ENCROACHMENT PERMIT IS REQUIRED FROM RIVERSIDE COUNTY FLOOD CONTROL. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
3. CONTACT CONTRACT ADMINISTRATION AT 951/955-1288 IF CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. THE DISTRICT MUST BE NOTIFIED TWENTY DAYS (20) PRIOR TO CONSTRUCTION.
4. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE INTERSECTION STATIONS.
6. FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-227-2600.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON THE NATIONAL GEODETIC VERTICAL DATUM (NGVD 29).
8. ALL COORDINATES ARE SHOWN IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN DATUM (NAD 83), CALIFORNIA COORDINATE SYSTEM (CCS), ZONE 6 AND EPOCH 2007.00.
9. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
10. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
11. UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "B" HOT MIX ASPHALT OVER 6" CLASS 2 AGGREGATE BASE OR AS SPECIFIED BY THE ENGINEER.
12. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
13. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO.4 (JS 229) UNLESS OTHERWISE NOTED.
14. PIPE BEDDING SHALL CONFORM TO RCFC&WCD STD. DWG. NO. MB15 EXCEPT FOR COVER<2 FEET. FOR COVER<2 FEET, CONCRETE SLURRY (2000 PSI - 2 SACK) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF THE PIPE.
15. BH-10 INDICATES SOIL BORING LOCATION BASED ON THE SOILS REPORT DATED JULY 14, 2015. LOCATIONS SHOWN ARE APPROXIMATE.
16. "V" IS THE DEPTH OF CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
17. CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
18. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
19. STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
20. THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS
21. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
22. APPROVAL OF THESE PLANS BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEER OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE THE NECESSARY CORRECTIONS.
23. THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL THE REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK.
24. THE CONCRETE COATING ON THE INSIDE OF ALL REINFORCED CONCRETE PIPES MUST BE INCREASED TO PROVIDE A MINIMUM OF 1-1/2 INCHES OVER THE REINFORCING AND INCREASED TO A MINIMUM OF 3-1/2 INCHES OVER REINFORCING FOR BOX CULVERTS WHEN DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'C=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND F'C=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.
25. CONSTRUCTION JOINT FOR CALTRANS STANDARD REINFORCED CONCRETE BOX SHALL BE ACCORDING TO RCFC&WCD STD. DWG. NO. BX401.




VICINITY MAP
NTS




INDEX MAP
1"=200'

200 100 0 200 400 600
SCALE: 1"=200'

## SHEET INDEX

| | SHEET NO. |
|---|---|
| TITLE SHEET | 1 |
| INDEX MAP | 1 |
| SD LINE 'A' PLAN & PROFILE | 2-4 |
| DETAILS | 4 |

## R.C.F.C. & W.C.D. STANDARD DRAWINGS

| | |
|---|---|
| MH252 | MANHOLE NO. 2 |
| MB03 | CONCRETE COLLAR |
| JS229 | JUNCTION STRUCTURE NO. 4 |
| JS231 | JUNCTION STRUCTURE NO. 6 |

## CALTRANS STANDARD DRAWINGS

D-90A HEADWALL AND WINGWALL

## STORM DRAIN MAINTENANCE RESPONSIBILITIES

RCFC & WCD WILL MAINTAIN ALL LINES LARGER THAN 36" INCLUDING: SD LINE 'A'

## STORM DRAIN MAINTENANCE RESPONSIBILITIES

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES, CONDUITS, OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN ON THESE DRAWINGS. THE CONTRACTOR FURTHER ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR THE UTILITY PIPES, CONDUITS OR STRUCTURES, SHOWN OR NOT SHOWN ON THESE PLANS.

★ PRELIMINARY ★
FIRST PLAN CHECK
SUBJECT TO REVISION

**CITY OF TEMECULA** DEPARTMENT OF PUBLIC WORKS

RECOMMENDED BY: _____ DATE: _____
AMER ATTAR, PRINCIPAL ENGINEER

ACCEPTED BY: _____ DATE: _____
PATRICK THOMAS
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER
R.C.E. 44223

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

**BENCHMARK:**
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL. (NGVD 29 DATUM)

| REF. | REVISIONS | APPR. | DATE |
|---|---|---|---|

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: K. HAGHIGHI


Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM
JOHN D. TANNER, III RCE 60132 DATE:

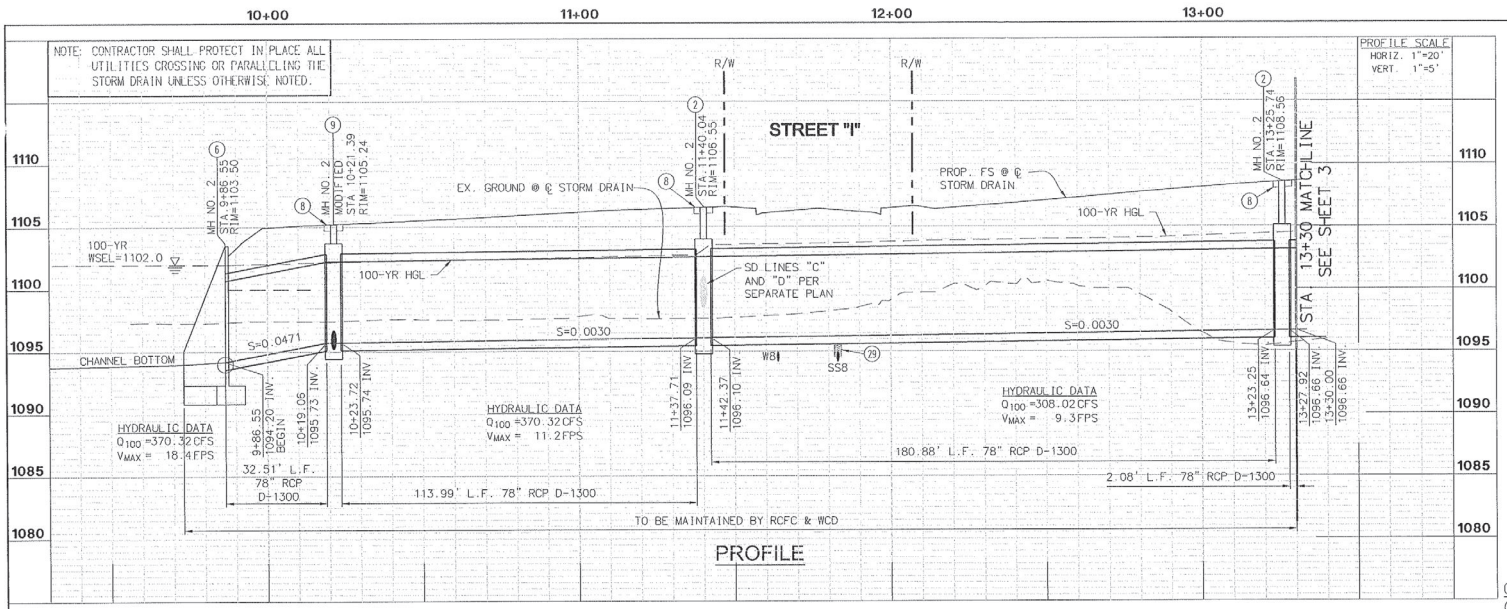

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: _____ PLANNING ENGINEER DATE: _____

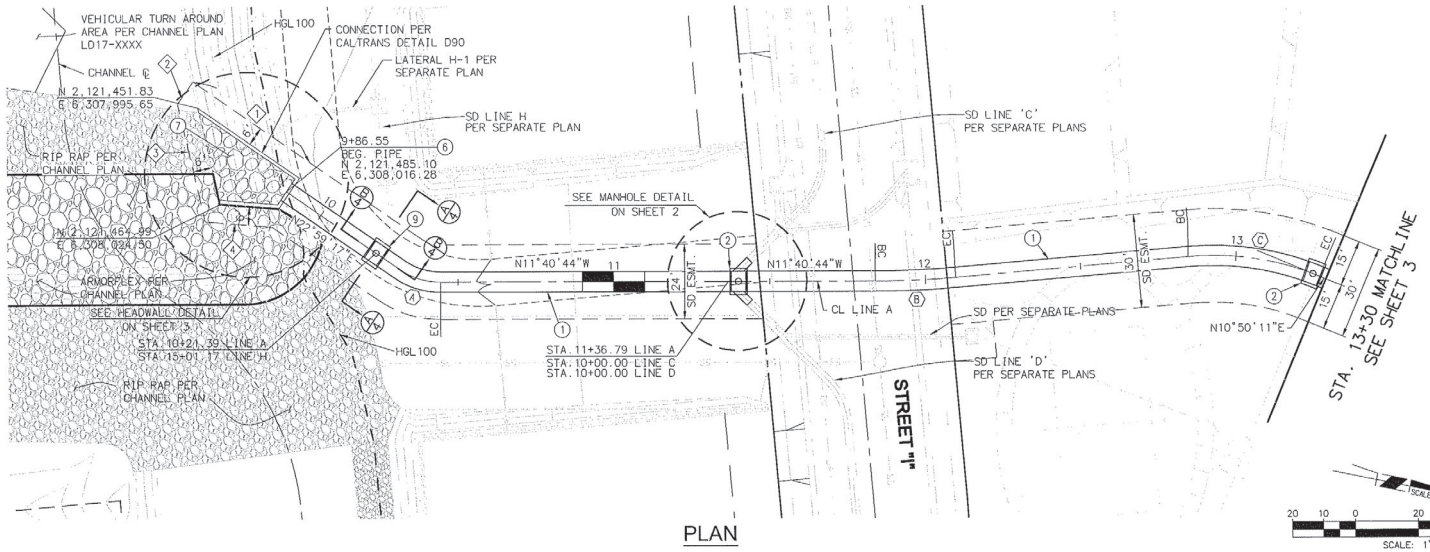
APPROVED BY: _____ CHIEF ENGINEER DATE: _____

TTM 36483 STORM DRAIN PLAN
STORM DRAIN
TITLE SHEET

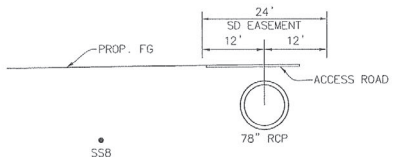
PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 1 OF 4




PROFILE



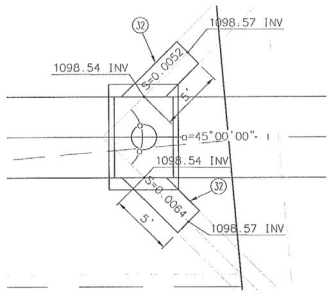

PLAN




SECTION AT SD STA. 11+00

X-SECTION TAKEN LOOKING DOWNSTREAM

NTS




(2) MANHOLE DETAIL

NTS

## CONSTRUCTION NOTES

1. INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD M.O.U. STANDARD SPECIFICATIONS PER GENERAL NOTE 1. D-LOAD PER PLAN.
2. CONSTRUCT MANHOLE NO. 2 PER STD. DWG. NO. MH252 AND DETAIL ON SHEET 2
6. CONSTRUCT PIPE CULVERT HEADWALL AND WINGWALLS PER CALTRANS STD. NO. D90 AND DETAIL ON SHEET 3
7. INSTALL 1/4 TON ROCK CLASS RIP RAP(3.3' THICK) OVER 4" CLASS 2 BASE FABRIC COVER OVER MIRAFI 700X (OR EQUIV.) FILTER FABRIC.
8. CONSTRUCT 6'x6'x6" THICK PCC PAD WITH #4 @ 18" OC EW, CENTERED ON MANHOLE
9. CONSTRUCT MODIFIED MANHOLE NO. 2 PER STD. DWG. NO. MH 252 AND DETAIL ON SHEET 4
29. CONSTRUCT SEWER PROTECTION PER STD. DWG. M807
32. CONSTRUCT 30" RCP STUB-OUT WITH BULKHEAD PER M816

| (A) ℄ CURVE DATA | (B) ℄ CURVE DATA | (C) ℄ CURVE DATA |
|---|---|---|
| Δ = 34°40'01" | Δ = 04°55'56" | Δ = 27°26'51" |
| R = 22.50' | R = 300.00' | R = 90.00' |
| T = 7.02' | T = 12.92' | T = 21.98' |
| L = 13.61' | L = 25.83' | L = 43.11' |
| BC = 10+30.75 | BC = 11+83.94 | BC = 12+84.80 |
| EC = 10+44.36 | EC = 12+09.77 | EC = 13+27.91 |
| PI = N 2,121,532.25 E 6,308,036.29 | PI = N 2,121,688.47 E 6,308,003.99 | PI = N 2,121,793.82 E 6,307,972.57 |

STORM DRAIN EASEMENT DATA TABLE

| NO. | BEARING/DELTA | LENGTH |
|---|---|---|
| 1 | N22°59'17"E | 45.69' |
| 2 | N67°00'43"W | 8.64' |
| 3 | N65°28'10"E | 38.75' |
| 4 | N07°00'43"W | 21.62' |

★PRELIMINARY★
FIRST PLAN CHECK
SUBJECT TO REVISION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services. TWO WORKING DAYS BEFORE YOU DIG

**BENCHMARK:**
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL.(NGVD 29 DATUM)

| REF. | REVISIONS | APPR. | DATE |
|---|---|---|---|

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: K. HAGHIGHI


Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM


REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER III No. 60132 CIVIL STATE OF CALIFORNIA

JOHN D. TANNER, III RCE 60132 DATE:

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

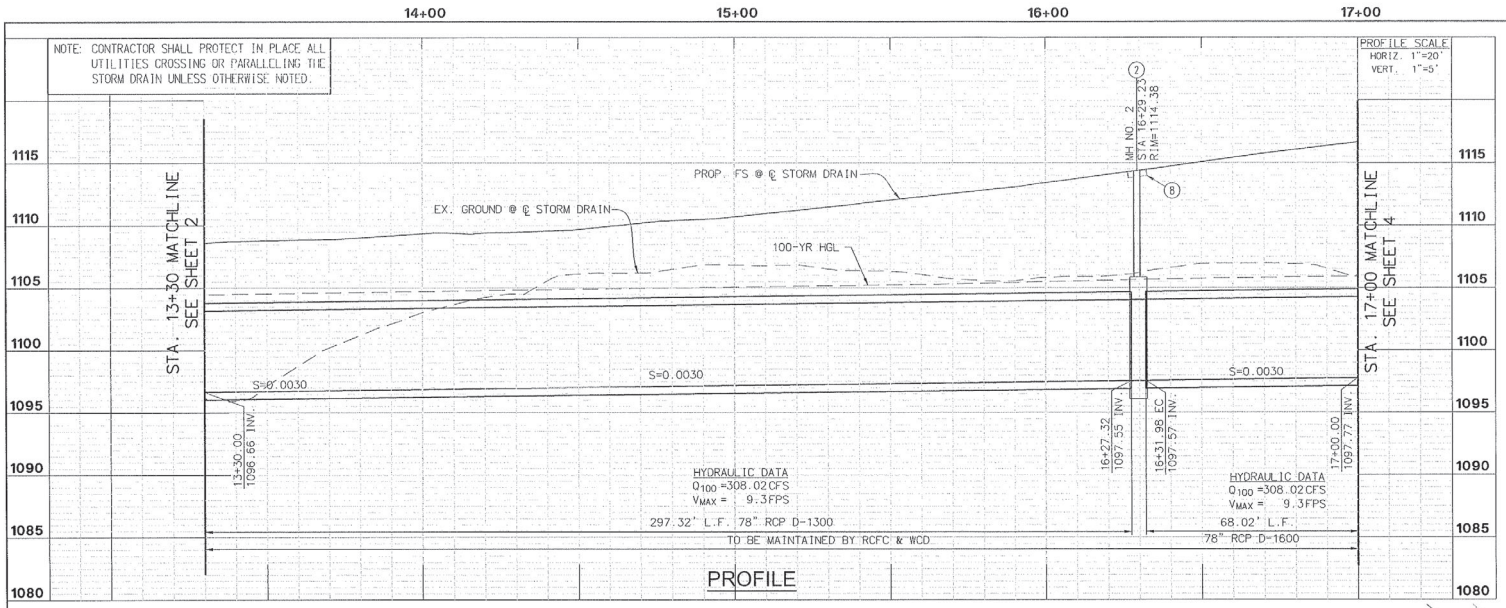
RECOMMENDED FOR APPROVAL BY: DATE:

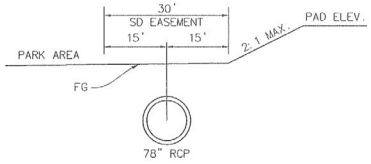
APPROVED BY: DATE:

# TTM 36483 STORM DRAIN PLAN STORM DRAIN

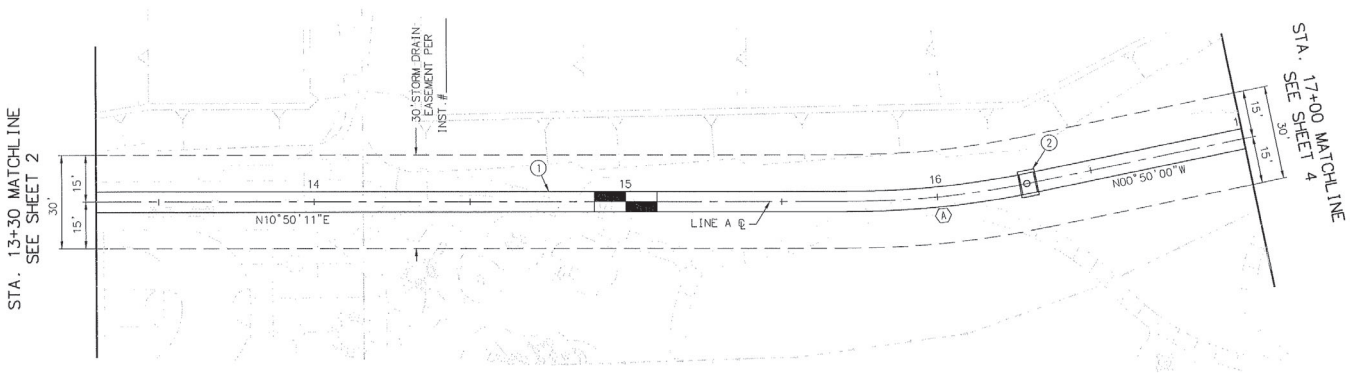
LINE 'A' STATION: 10+00 TO 13+30

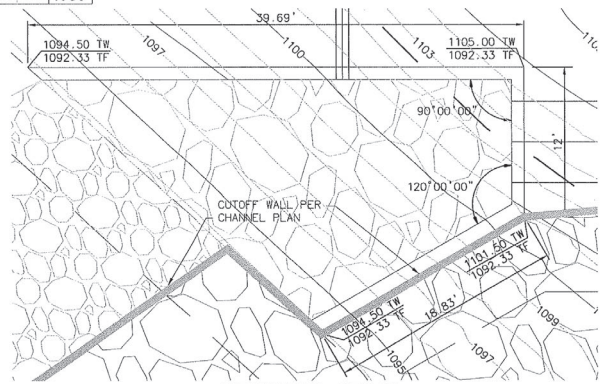
PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 2 OF 4




SECTION AT SD STA. 15+00
X-SECTION TAKEN LOOKING DOWNSTREAM
NTS




HEADWALL DETAIL
SCALE: 1"=5'
SEE SHEET 2 FOR PLAN AND PROFILE

℄ CURVE DATA
Δ = 11°40'11"
R = 300.00'
T = 30.66'
L = 61.10'
BC = 15+70.88
EC = 16+31.98
PI = N 2,122,084.14
E 6,308,028.14

PLAN

CONSTRUCTION NOTES
1. INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD M.O.U. STANDARD SPECIFICATIONS PER GENERAL NOTE 1. D-LOAD PER PLAN.
2. CONSTRUCT MANHOLE NO. 2 PER STD. DWG. NO. MH252 AND DETAIL ON SHEET 2
8. CONSTRUCT 6'x6'x6" THICK PCC PAD WITH #4 @ 18" OC EW, CENTERED ON MANHOLE

SCALE: 1"=20'
20 10 0 20 40 60
SCALE: 1"=20'

★PRELIMINARY★
FIRST PLAN CHECK
SUBJECT TO REVISION

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
RIVERSIDE COUNTY B.M. 600-6-81
INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
997.721 EL.(NGVD 29 DATUM)

| REF. | REVISIONS | APPR. | DATE |
|---|---|---|---|

DESIGNED BY: C. MORLOK
DRAWN BY: C. MORLOK
DATE DRAWN: 7-2016
CHECKED BY: K. HAGHIGHI

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40810 COUNTY CENTER DR., SUITE 200
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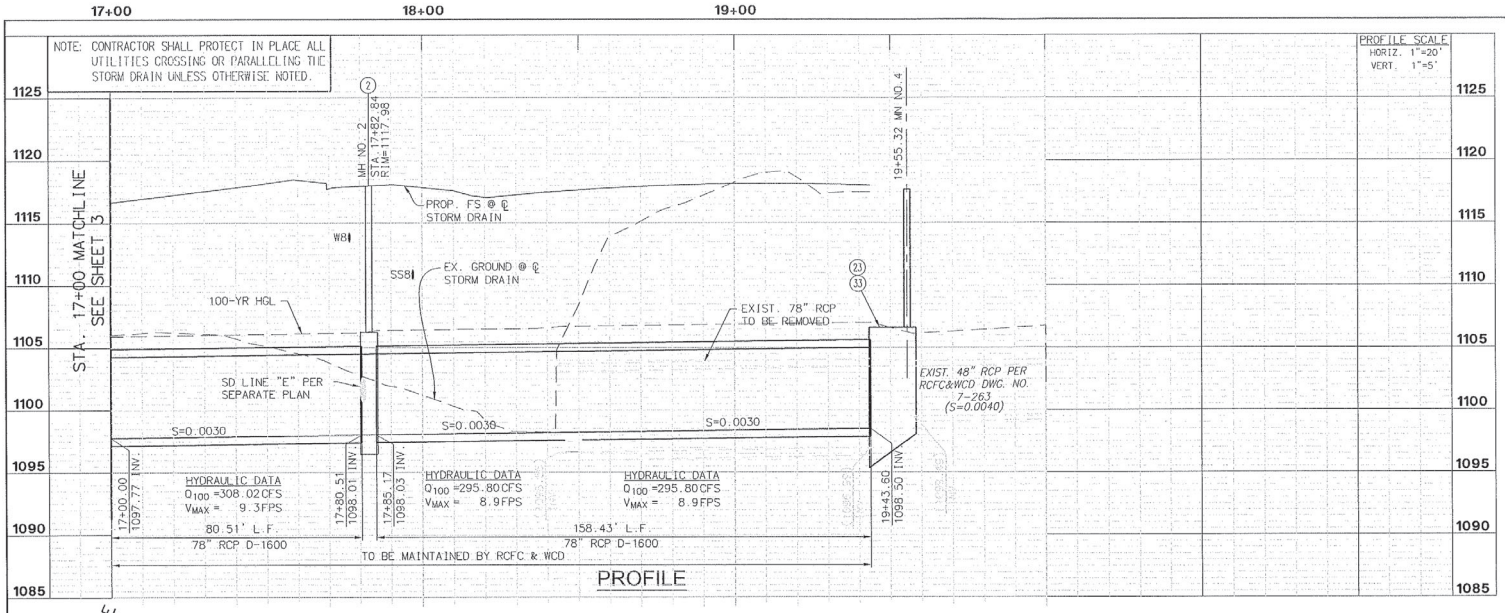
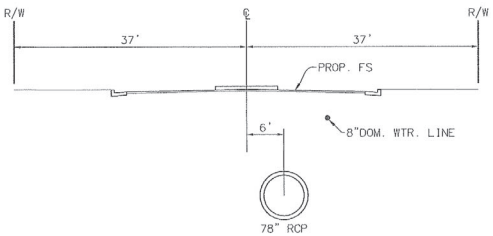
PHONE: (951) 676-8042
MBAKERINTL.COM
JOHN D. TANNER, III RCE 60132 DATE:

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE:
APPROVED BY: DATE:

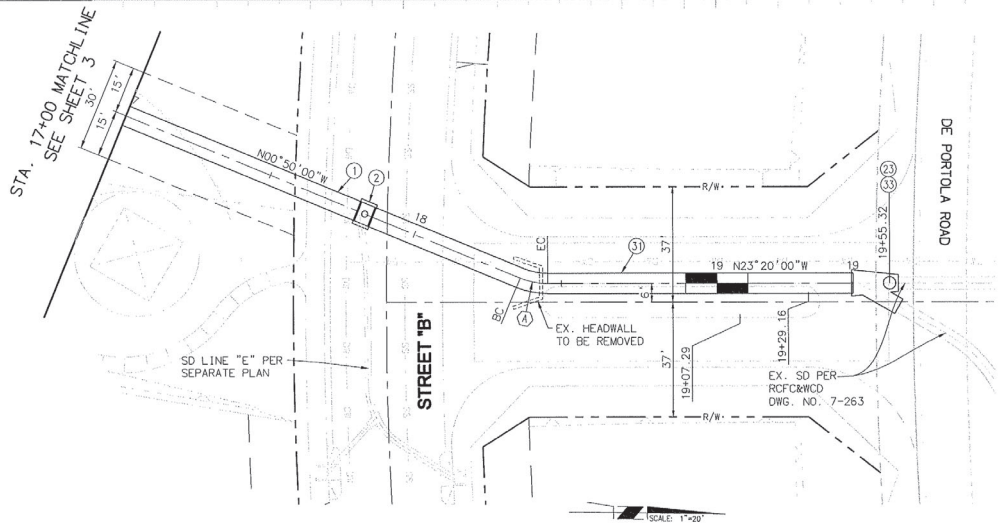
TTM 36483 STORM DRAIN PLAN
STORM DRAIN
LINE 'A' STATION: 13+30 TO 17+30

PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 3 OF 4



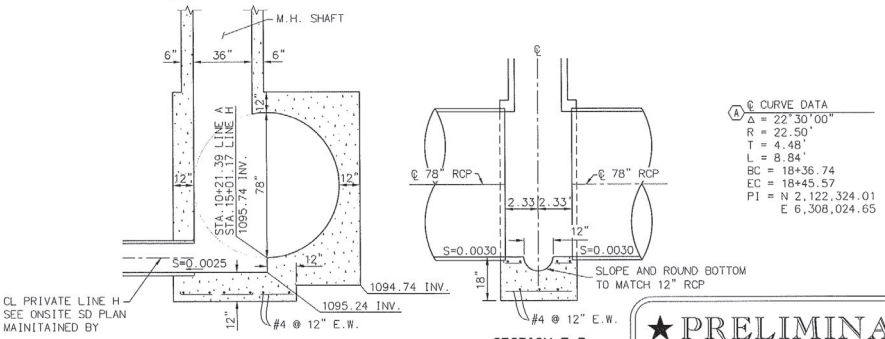

SECTION AT SD STA. 19+00
X-SECTION TAKEN LOOKING DOWNSTREAM
NTS




PLAN
SCALE: 1"=20'

CONSTRUCTION NOTES

1. INSTALL REINFORCED CONCRETE PIPE PER RCFC & WCD M.O.U. STANDARD SPECIFICATIONS PER GENERAL NOTE 1. D-LOAD PER PLAN.
2. CONSTRUCT MANHOLE NO. 2 PER STD. DWG. NO. MH252 AND DETAIL ON SHEET 2
23. REMOVE AND DISPOSE OF EXIST. MH
31. REMOVE AND REPLACE 100LF+/- OF EX. 78"RCP AT HIGHER ELEVATION PER PROFILE
33. CONSTRUCT MH NO.4 PER STD. DWG. MH254.




SECTION A-A
NOT TO SCALE

SECTION B-B
NOT TO SCALE

A ℄ CURVE DATA
Δ = 22°30'00"
R = 22.50'
T = 4.48'
L = 8.84'
BC = 18+36.74
EC = 18+45.57
PI = N 2,122,324.01
E 6,308,024.65

MODIFIED MANHOLE NO. 2
NOT TO SCALE
SEE SHEET 2

★PRELIMINARY★
FIRST PLAN CHECK
SUBJECT TO REVISION

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INSIDE FREEWAY R/W AT THE SW CORNER OF THE INT. OF HWY. 79 AND I-15E. 300' W OF OVERPASS BRIDGE, 87.9' SE OF BEG. OF 6' FWY. R/W FENCE, 2' N OF FWY. R/W FENCE 75.4' S OF LIGHT POLE.
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JOHN D. TANNER, III RCE 60132 DATE:

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: DATE:
APPROVED BY: DATE:

TTM 36483 STORM DRAIN PLAN
STORM DRAIN
LINE 'A' STATION: 17+30 TO 19+43.60

PROJECT NO. 0-0-0000
DRAWING NO. 0-000
SHEET NO. 4 OF 4

# EXHIBITS

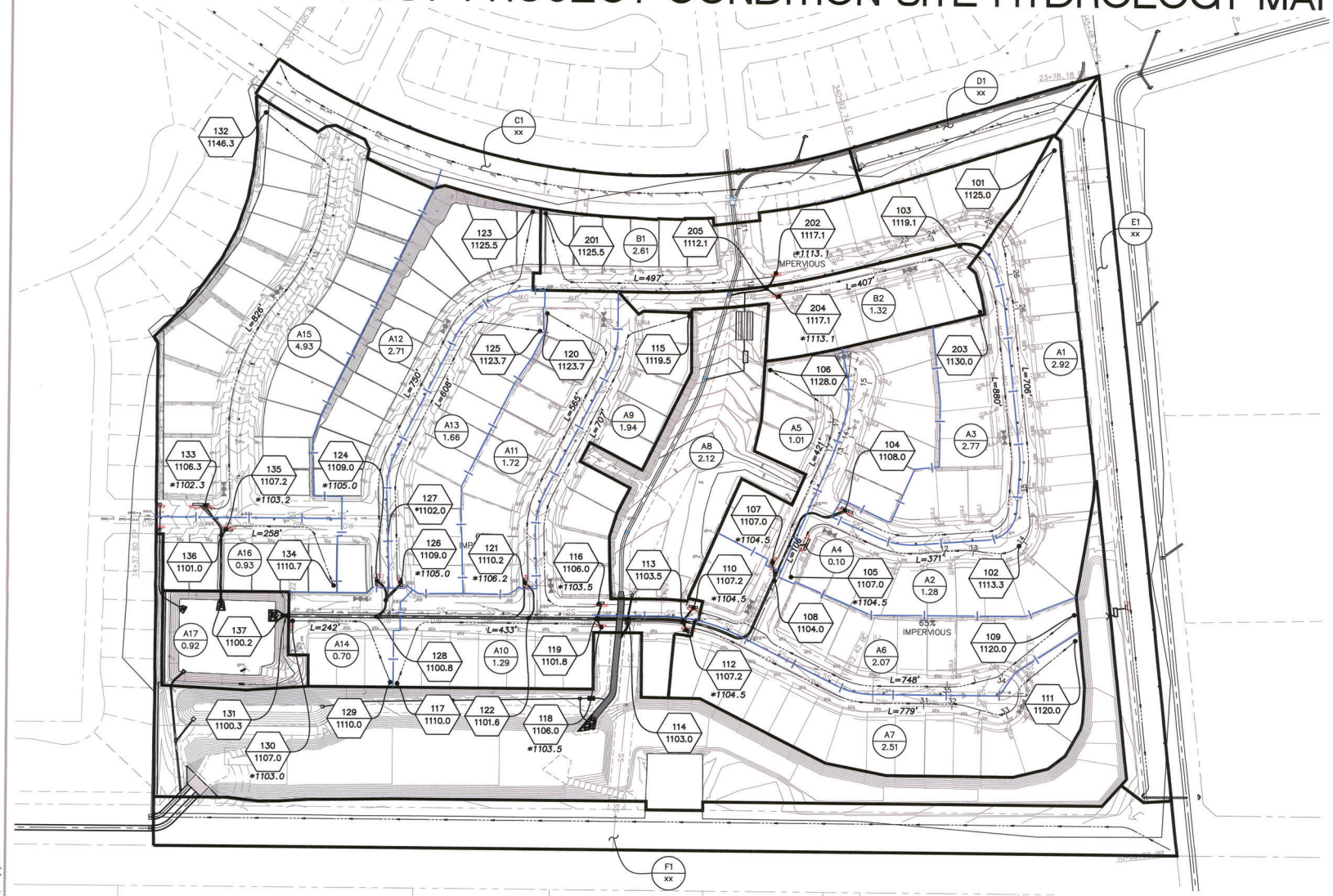
**EXHIBIT A:** POST-PROJECT CONDITION ONSITE RATIONAL METHOD HYDROLOGY MAP

SHEET 1 OF 1

# TTM 36483 - PLANNING AREA 4

IN THE CITY OF TEMECULA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

# POST-PROJECT CONDITION SITE HYDROLOGY MAP





JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568


## EXHIBIT "A"

TTM NO. 36483 - PA 4

POST-PROJECT CONDITION SITE HYDROLOGY MAP


Drawing Name: D:\1308.30.13\Engineering\Hydrology_Plan\Exhibits\Hydrology Map-REV-REV.dwg
Last Opened: Jun 06, 2019 - 3:18pm by jcarver

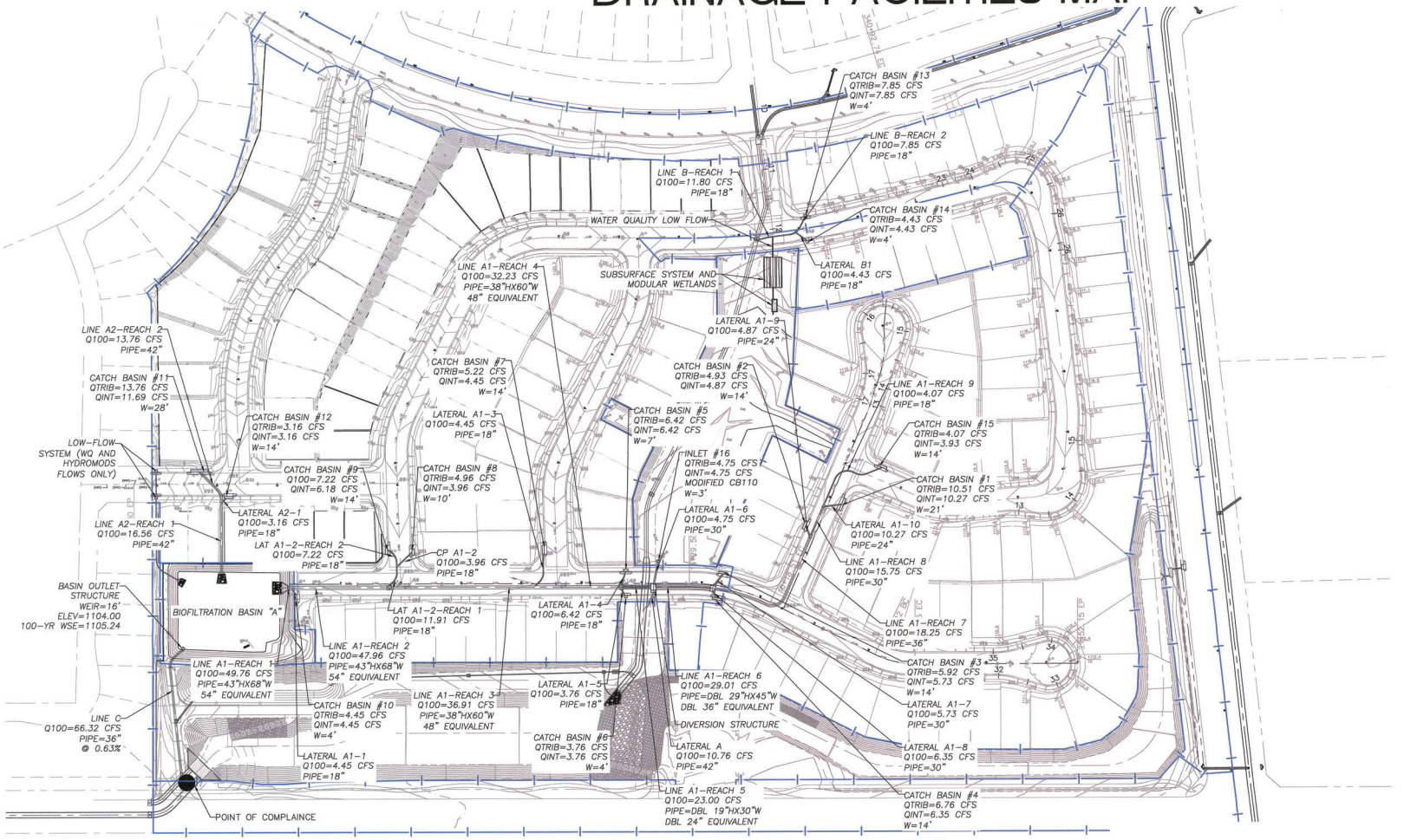
## EXHIBIT B: DRAINAGE FACILITIES MAP

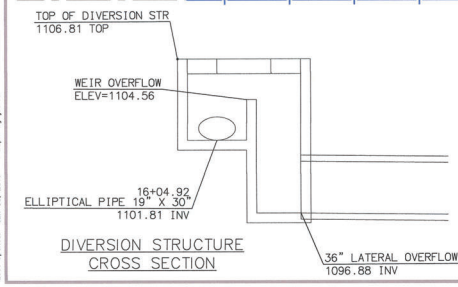
SHEET 1 OF 1

# TTM 36483 - PLANNING AREA 4

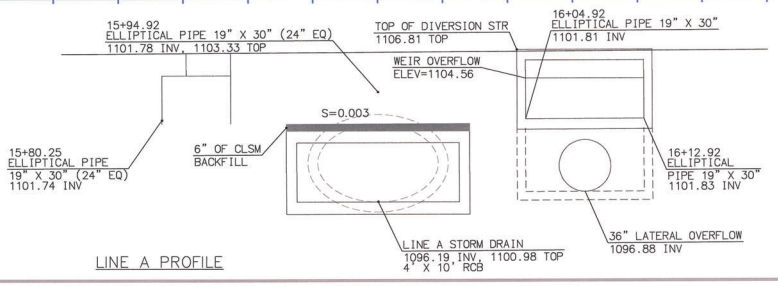
IN THE CITY OF TEMECULA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

# DRAINAGE FACILITIES MAP

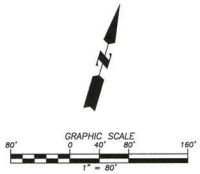



DIVERSION STRUCTURE
CROSS SECTION




LINE A PROFILE

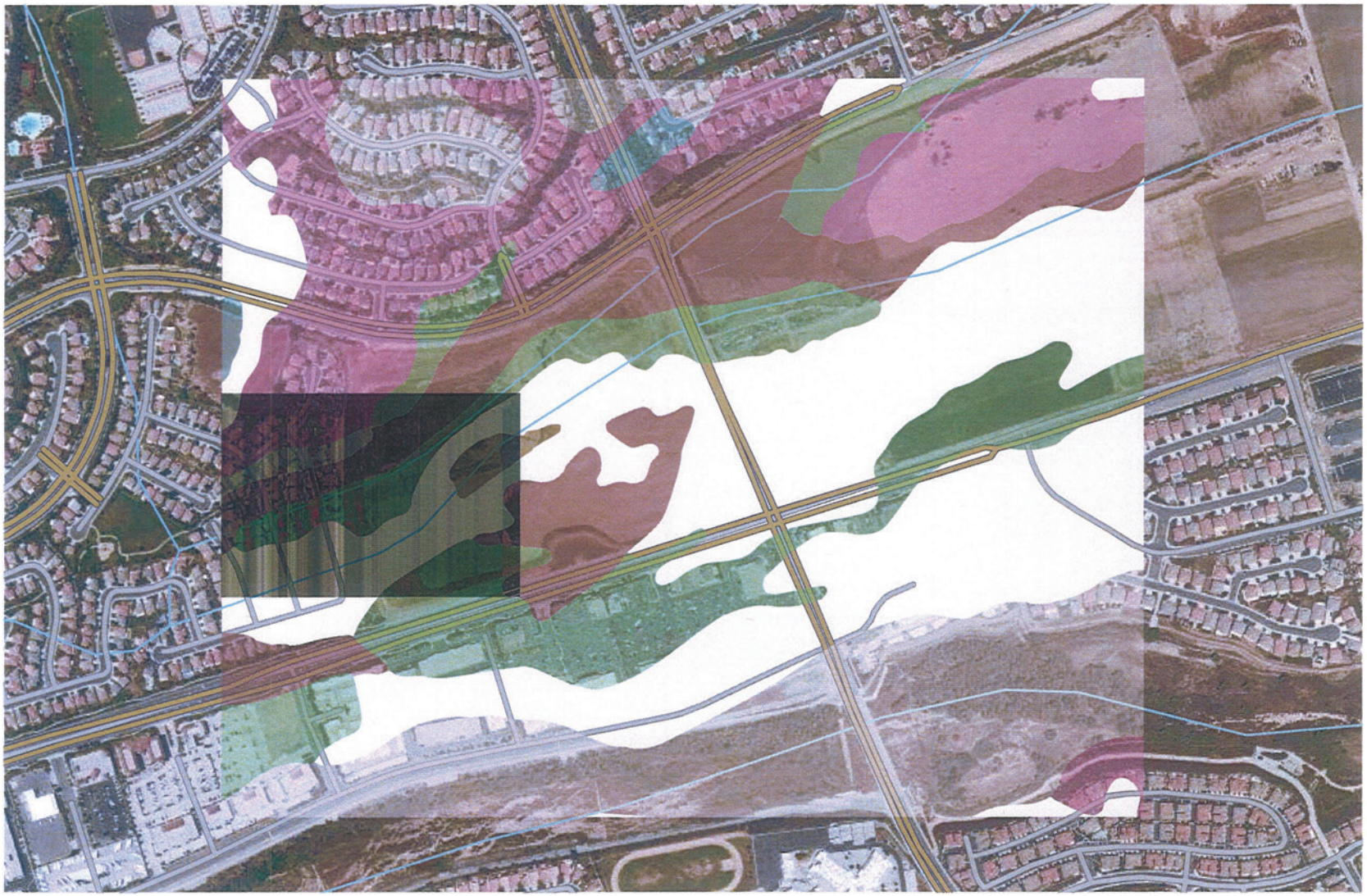



## EXHIBIT "B"

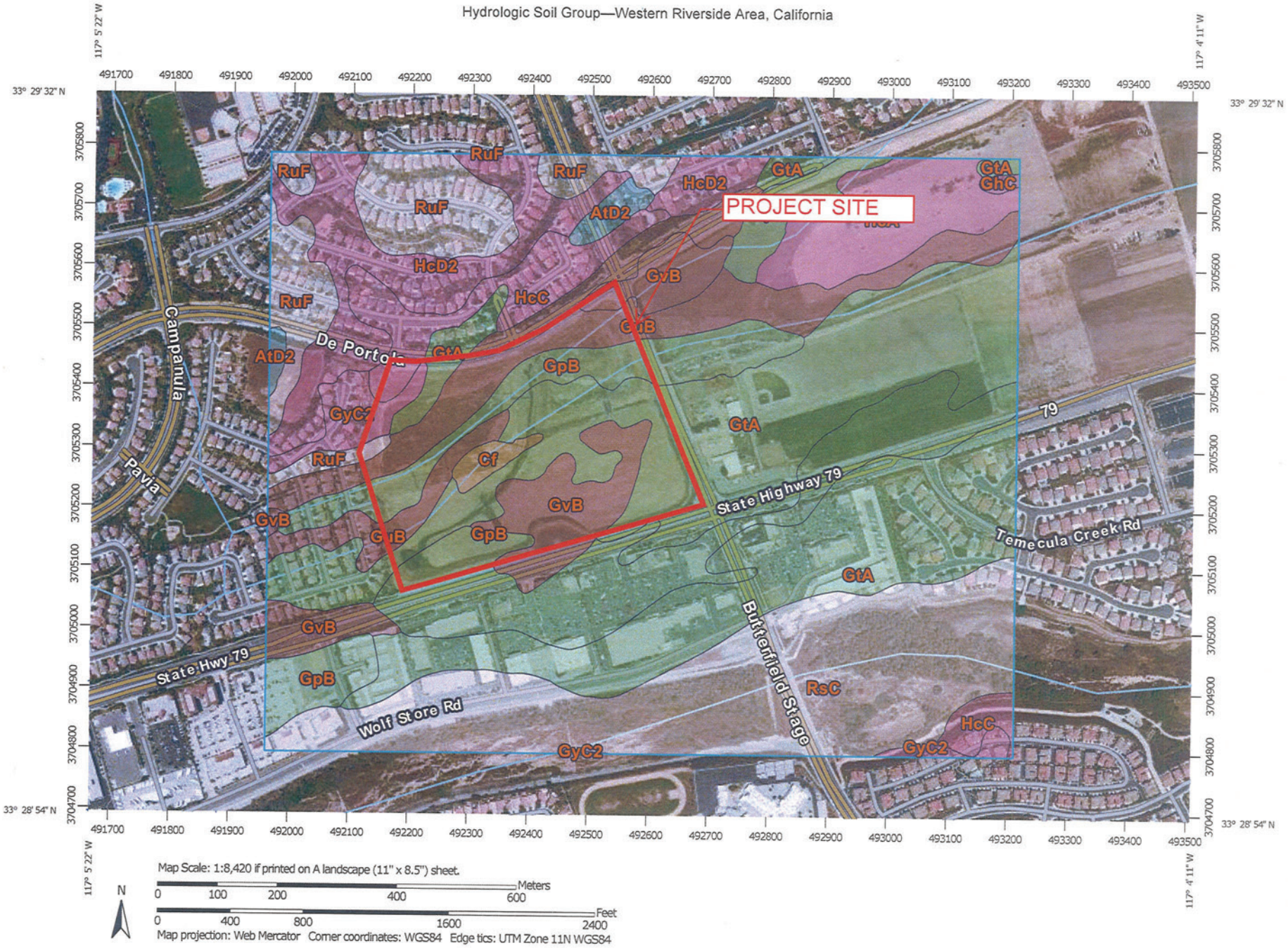
| | |
|---|---|
| JLC Engineering & Consulting, Inc.<br>41660 IVY STREET, SUITE A<br>MURRIETA, CA 92562<br>PH. 951.304.9552 FAX 951.304.3568 | TTM NO. 36483 - PA4<br>DRAINAGE FACILITIES MAP |

Drawing Name: G:\108.30.13\Engineering\Hydrology_Plan\Exhibits\Drainage Facilities Map.dwg
Last Opened: Jun 06, 2019 - 3:22pm by jpraver

## EXHIBIT C: HYDROLOGIC SOILS MAP



Hydrologic Soil Group—Western Riverside Area, California




Map Scale: 1:8,420 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

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

USDA **Natural Resources Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

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

**Soil Rating Lines**

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

**Soil Rating Points**

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

**Water Features**

- Streams and Canals

**Transportation**

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

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 6, Dec 9, 2013

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

Date(s) aerial images were photographed: May 3, 2010—Jun 19, 2010

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

# Hydrologic Soil Group

| Hydrologic Soil Group— Summary by Map Unit — Western Riverside Area, California (CA679) | | | | |
|---|---|---|---|---|
| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
| AtD2 | Arlington and Greenfield fine sandy loams, 8 to 15 perc ent slopes, eroded | C | 2.3 | 0.7% |
| Cf | Chino silt loam, drained, saline-alkali | C/D | 1.5 | 0.5% |
| GhC | Gorgonio loamy sand, 0 to 8 percent slopes | A | 0.4 | 0.1% |
| GpB | Grangeville sandy loam, drained, saline-alkali, 0 to 5 percent slopes | A/D | 47.7 | 15.5% |
| GtA | Grangeville fine sandy loam, drained, 0 to 2 percent sl opes | A/D | 89.4 | 29.0% |
| GuB | Grangeville fine sandy loam, poorly drained, saline-alk ali, 0 to 5 percent slopes | B/D | 26.8 | 8.7% |
| GvB | Grangeville fine sandy loam, saline-alkali, 0 to 5 perc ent slopes | B/D | 17.0 | 5.5% |
| GyC2 | Greenfield sandy loam, 2 to 8 percent slopes, eroded | A | 5.1 | 1.7% |
| HcA | Hanford coarse sandy loam, 0 to 2 percent slopes | A | 13.4 | 4.4% |
| HcC | Hanford coarse sandy loam, 2 to 8 percent slopes | A | 11.6 | 3.8% |
| HcD2 | Hanford coarse sandy loam, 8 to 15 percent slopes, erod ed | A | 21.9 | 7.1% |
| RsC | Riverwash | | 50.2 | 16.3% |
| RuF | Rough broken land | | 20.5 | 6.6% |
| **Totals for Area of Interest** | | | **307.8** | **100.0%** |

## Description

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

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

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

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

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

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

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

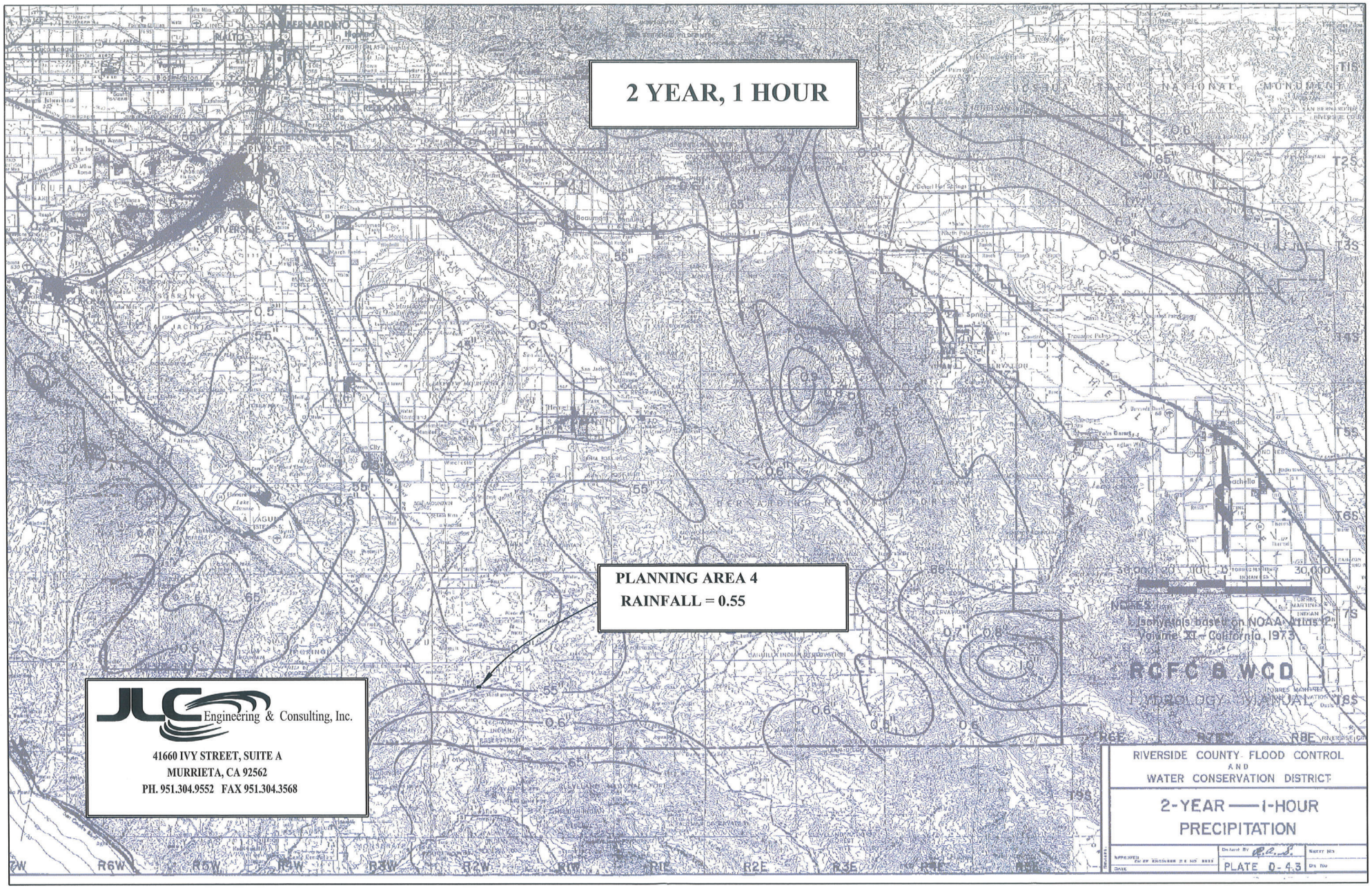
## Rating Options

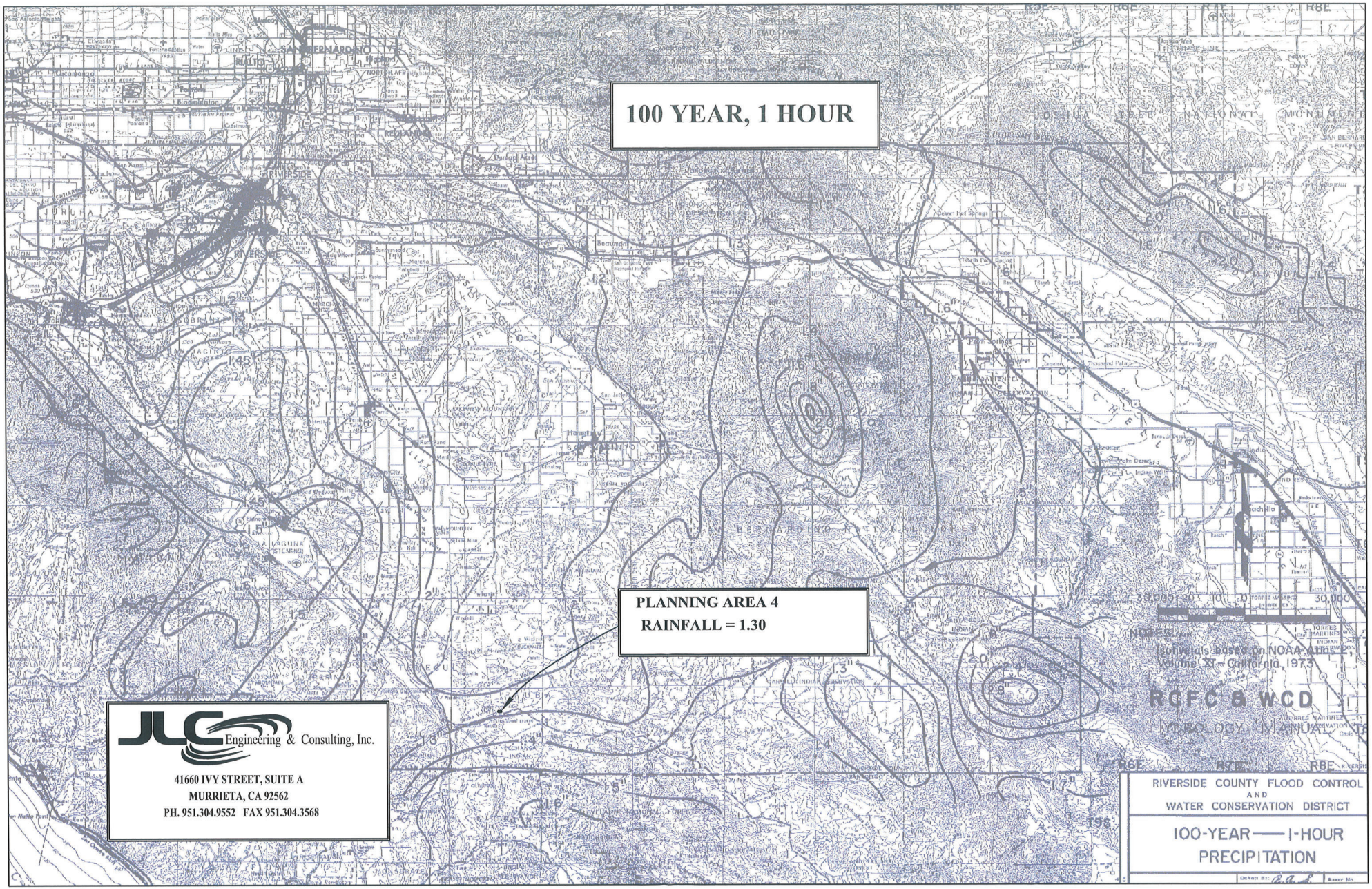
*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* *None Specified*

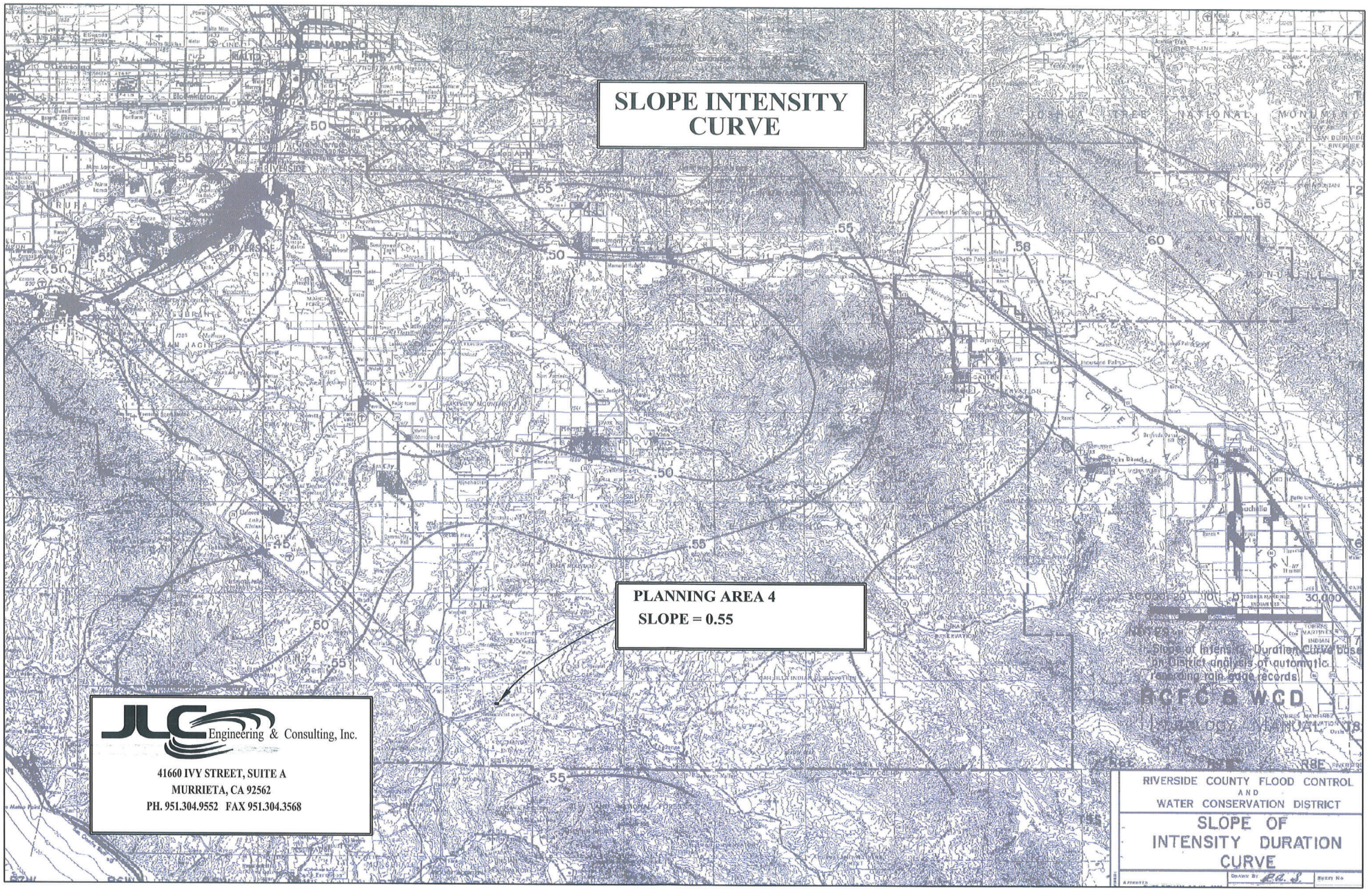
*Tie-break Rule:* Higher

## EXHIBIT D: RAINFALL MAPS


2 YEAR, 1 HOUR
PLANNING AREA 4
RAINFALL = 0.55
JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568
NOTES
Isohyetals based on NOAA Atlas 2,
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR
PRECIPITATION
PLATE D-4.3


100 YEAR, 1 HOUR
PLANNING AREA 4
RAINFALL = 1.30
Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

## EXHIBIT E: SLOPE OF INTENSITY DURATION CURVES


SLOPE INTENSITY CURVE
PLANNING AREA 4
SLOPE = 0.55
.55
.50
.60
.65
.58
.45
Slope of Intensity-Duration Curve base on District analysis of automatic recording rain gage records
RCFC & WCD
JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
SLOPE OF INTENSITY DURATION CURVE