Preliminary Hydrology and Drainage Study

Rugged Acres Solar Farm

Located in the County of San Diego

September 2012

ER 3910-120005
MUP 3300-12-007

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DECLARATION OF RESPONSIBLE CHARGE

I, hereby declare that I am the Civil Engineer of work for this report, that I have exercised responsible charge over the preparation of this report as defined in section 6703 of the business and professions code, and that the report is consistent with current project concept.

I understand that the check of the project report, by the County of San Diego is confined to a review only and does not relieve me, as the Civil Engineer of work, of my responsibilities for project design.

Keri Gannon

9/7/2012

Keri L. Gannon, P.E.
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Date

SECTION 1.0 EXECUTIVE SUMMARY

The Rugged Acres Solar Energy project (Project) will produce up to 84 megawatts (MW) of alternating current (AC) solar generating capacity and is located in the unincorporated community of Boulevard in east San Diego County. In total, the Project covers approximately 765 acres.

The objective of this study is to develop and evaluate the existing drainage patterns and flow rates for the runoff tributary to the Project and ensure that these patterns and flow rates are maintained after the construction of the Project. The study also identifies the 100-year inundation limits for Tule Creek within the Project.

The Project is located in the southeast portion of McCain Valley and the main watercourse within the watershed, Tule Creek, flows down the middle of the Project. The existing watershed tributary to Tule Creek was analyzed using the San Diego County Hydrology Manual's (SDCHM) NRCS hydrologic method. However, there are smaller watercourses that wind their way through the Project and the areas tributary to these smaller watercourses were analyzed using the SDCHM rational method.

The Project does very little to change the characteristics of the existing watershed and the drainage areas tributary to the Project. Minor amounts of impervious areas will be added during construction, such as transformer pads, driveways, sub-station pads, foundation posts for the solar panels, and drainage crossings. The exposed ground will be replanted with native plants or compacted to serve as access roads. However, the existing drainage patterns will be retained and the flow rates will not increase due to the minimal impervious area added. Since there is no increase in flow, the project is not subject to hydromodification or stormwater requirements. This project has no hydromodification or stormwater connectivity to the Salton Sea. The grading will also take into account the existing Tule Creek and tributaries that crisscross the proposed project site.

Due to the 100-year inundation limits developed, many of the proposed trackers will be within the 100-year flow of Tule Creek. In order to protect the trackers, the design will take into account the proposed water depth and shall ensure that there is no negative impact to the trackers and their infrastructure. Also, all underground facilities will take into account the potential scour depth of 3 to 5 ft.

This study concludes that the construction of the Project does not adversely affect or substantially alter the existing watershed, Tule Creek, and the tributaries crossing the project site.

SECTION 2.0 PROJECT DESCRIPTION

2.1 Project Location

The Rugged Acres Solar Energy project (Project) is located in the unincorporated community of Boulevard in east San Diego County. The project site is located approximately 1.25 miles north of Interstate 8 (I-8) and extends roughly 2 miles between Ribbonwood Road and approximately 0.5 mile east of McCain Valley Road.

The main project site includes the following Assessor Parcel Numbers (APNs): 611-110-01-00, 611-100-02-00, 611-100-01-00, 611-090-04-00, 611-091-03-00, 611-090-02-00, 611-060-04-00, 611-091-07-00, 612-030-19-00, 611-091-09-00, and 612-030-01-00. Off-site facilities for the project would impact the following APNs: 611-110-01-00, 612-030-15-00, 612-091-12-00, 612-091-13-00, 611-110-06-00 (CA State Lands), and 612-030-13-00 (BLM).

2.2 Project Description

The Project includes a Major Use Permit (MUP) to authorize a Major Impact Services and Utility pursuant to Sections 1350, 2705, and 2926 of the Zoning Ordinance. The Project will produce up to 84 megawatts (MW) of alternating current (AC) solar generating capacity. The Project will consist of approximately 3,588 concentrating photovoltaic (CPV) electric generation systems utilizing dual axis tracking CPV trackers on 765 acres in southeastern San Diego County in the unincorporated community of Boulevard, California. In addition to the CPV trackers and inverter transformer units, the Project includes the following primary components:

- A collection system linking the CPV trackers to the on-site Project substation comprised of 1,000 volt (V) direct current (DC) underground conductors leading to 34.5 kV underground and overhead AC conductors.
- A 7,500-square-feet (sf) (60 feet by 125 feet) operations and maintenance (O&M) building.
- A 2-acre onsite private collector substation site with a pad area of 6000 sf (60 feet by 100 feet) with maximum height of 35 feet and includes a 450 sf (15 feet by 30 feet) control house.
- 61 Inverter/Transformer enclosures. The dimensions of each inverter unit are 10 feet by 25 or 40 feet (250 or 400 sf each) with a total structure height of up to 12 feet.
- A 69 kV overhead generator transmission line (gen-tie) connecting the on-site substation to San Diego Gas and Electric's (SDG&E) proposed new Boulevard Substation. There will be approximately 5,130 feet of 69-kV Gen-Tie line between the onsite

substation and McCain Valley Road. Approximately 3,180 feet will be onsite and 1,940 feet will be offsite. The 50 to 125 feet tall steel poles, spaced up to 300 feet apart, will also support 34.5-kV overhead conductors.

- 20.5-miles of newly-constructed, load-bearing, on-site access roads.
- 46.5-miles of graded, non load-bearing dirt service roads
- Three permanent on-site water wells for the O&M building and to facilitate washing of the CPV trackers.
- Two 20,000 gallon water storage tanks to be located at the O&M building site and to be dedicated exclusively for fire suppression.
- Three additional on-site 20,000 gallon water storage tanks to support tracker washing. Each of these three 20,000 gallon water storage tanks would include 10,000 gallons of water dedicated solely for fire suppression. The outlet on the tank for tracker washing and any other non-fire uses would be located at the midpoint on the tank making it impossible to draw the water level down below 10,000 gallons in each tank for non-fire suppression use.
- A septic tank system and leach field for the O&M building.
- 6 foot perimeter fencing topped with an additional 1 foot of security barbed wire.
- Vista Oaks Road and Roadrunner Lane are existing roadways that would be improved to a width of 24 feet to meet County fire standards for access to the western side of the project site from Ribbonwood Road. Vista Oaks Road would be constructed across APN 611-090-02-00. Roadrunner Lane would be constructed on APN 611-091-09-00. A third road, which would be newly created if Rough Acres Ranch Road were to not be constructed as part of Tule Wind Project MUP (MUP P3300-09-019), would provide an optional access route to the eastern portion of the project site, west of McCain Valley Road, from McCain Valley Road. This optional access route would cross APN 611-100-01-00.

The Proposed Project includes a total installation of 3,588 CPV trackers installed in groups or "building blocks composed of approximately 61 individual Soitec Concentrix™ CX-S530 systems (includes dual-axis tracker), with any of the following inverter combinations: two 630-kW inverters, two 680-kW inverters, or three 680-kW inverters; and either a 1.5- or 2.0-megavolt ampere (MVA) transformer.

2.3 Study Objective

The objective of this study is to develop and evaluate the existing drainage patterns and flow rates for the runoff tributary to the Project. The hydrology will be the base used to determine the location of the natural watercourses upstream and within the project area and the amount

of runoff that flows in the existing watercourses. The 100-year inundation limits will also be determined for the major watercourse that crosses the Project.

The proposed design of the Project will then take into account the location of the existing drainage courses and the amount of flow, as well as the 100-year flow width, depth, and velocity. This study will also show the change in runoff rates and characteristics and the 100-year inundation limits due to the development of the Project.

A Vicinity Map (Figure 1) is included in Appendix A.

SECTION 3.0 HYDROLOGY

3.1 Hydrology Design Criteria

The hydrologic design for this project is based on the design criteria outlined in the San Diego County Hydrology Manual, June 2003 (SDCHM), which is based on two methods, the rational method and the NRCS hydrologic method. The rational method is the accepted methodology for watersheds up to 640 acres (1 square mile) in size and the NRCS hydrologic method is to be used for watersheds greater than 640 acres.

The Tule Creek watershed tributary to the Project is 24.25 square miles (or 15,522 acres), so the NRCS methodology will be used to determine the watershed's pre- and post-project peak runoff in Tule Creek for the 100-year storm. Please refer to Chapter 4 of the SDCHM for a more detailed description of the NRCS methodology.

The peak runoff for the Project areas also has to be determined. The Project site is divided into sub-watersheds smaller than 640 acres, except for one, and so the rational method will be used to determine the sub-watershed's pre- and post-project peak runoff for the 100-year storm. One watershed is 734 acres in size but in order to retain a consistent methodology, the rational method was used instead of the NRCS hydrologic method. Please refer to Chapter 3 of the SDCHM for a more detailed description of the rational method.

3.2 Software Used

AES 2011 RATSCx

The AES software is designed with separate modules that are programmed to meet specific SDCHM requirements, which in turn meet all agency requirements. The module used for the calculations in this study will be the rational method module programmed to meet the calculation requirements set forth by Chapter 3 of the SDCHM. This program will be used to develop the runoff amounts for the pre- and post-project conditions of the Project site and tributary drainage area.

AES 2011 FLOODSCx

The AES software is designed with separate modules that are programmed to meet specific SDCHM requirements, which in turn meet all agency requirements. The module used for the calculations in this study will be the NRCS hydrologic method module programmed to meet the calculation requirements set forth by Chapter 4 of the SDCHM. This program will be used to

develop the runoff amounts for the pre- and post-project conditions of the Tule Creek watershed tributary to the proposed project site.

HEC-RAS 4.1.0

HEC-RAS is a river analysis system developed by the U.S. Army Corps of Engineers that can be used for a steady flow water surface profile computation. This project utilizes HEC-RAS to analyze the conditions in the dry Tule Creek bed during the 100-year storm event to understand the existing conditions, ensure that the proposed condition does not propose an adverse effect on the properties upstream and downstream of the Project and analyze the velocities and erosion potential within the channel.

3.3 Pre-Project Watershed Characteristics

In the vicinity of the Project, the tributary watershed flows from northwest to southeast. The main watercourse, Tule Creek, flows down the middle of the watershed within McCain Valley. The northwest end of the watershed is fairly mountainous with rugged and steep watercourses. As the runoff from the watershed flows southeast, the terrain becomes less steep and the smaller watercourses merge and form the main watercourse, Tule Creek. Tule Creek eventually becomes a wide open area, between 500' and 1,000' in width, with a slope of 1%. This is the portion of the watercourse that extends across the majority of the Project from the northwest corner of the site to the southeast.

In total, the Project covers approximately 765 acres. Site elevations range from approximately 3,510 feet above mean sea level (MSL) in the easternmost portion of the site, east of McCain Valley Road, to approximately 3,680 feet MSL in the northern portion of the site.

Due to the rugged and valley terrain of the watershed, some areas are steep with many rock outcroppings and other areas are relatively flat with existing vegetation, including oak trees. The ground cover varies between rock, vegetation, or a loose, silty, sand.

The Tule Creek watercourse length through it's watershed is 10.45 miles and elevations of the watershed range from approximately 5640 feet to 3515 feet. Accurate topo data was provided for the project area. The County SANGIS 40 foot contour mapping and a site visit were used to determine the watershed boundaries outside of the project area. The total watershed area is approximately 24.25 square miles.

Refer to Appendix B and C for the existing hydrology exhibits for Tule Creek (Figure 2) and the Project Site (Figures 3A-3E).

3.3.1 Land Use

The majority of the tributary watershed and the Project is currently undeveloped and is covered by sparse to moderate growth of native chaparral, shrubs, low-lying grasses, and scattered trees. The area of the watershed where the Project is proposed to be constructed appears to be previous range land. Unpaved roads provide access through the Project, including roads recently constructed to support construction of the Sunrise Powerlink project. During the site reconnaissance, Sunrise Powerlink transmission towers were observed crossing the project site east of McCain Valley Road. Additionally, the central portion of the Project (APNs 611-100-01 and 611-100-02) is currently being used as a construction storage and staging area. Other improvements include several residential structures and minor agricultural developments in the western portion of the project area.

3.3.2 Flow Patterns

The flow patterns existing in this watershed are from the west, north and south ridges towards the central valley and down towards the southeast.

3.3.3 100-YR Flood Inundation

There are no recorded 100-YR floodplain limits within the proposed Project or the upstream watershed per FEMA or the County of San Diego. However, this project will determine the 100-year inundation limits in order to determine the flow width, depth and velocity that the project will have to be designed for, as well as if there are any adverse effects on the upstream and downstream properties of the Project.

3.3.4 Rainfall/Soils

Rainfall and soils data are taken from the SDCHM. The Manual gives the following data:

NRCS Hydrologic Method

1. 100-year 6-hour rainfall = 3.75 inches.

   100-year 24-hour rainfall = 6.5 inches.

According to the SDCHM, the P_6 (6 hour rainfall in inches) needs to be within 45% and 65% of the 100-yr 24-hour rain event (P_{24}). The current P_6 for the 100-yr storm falls within the specified range.

(3.75 in ÷ 6.5 in) × 100 = 58%

See Appendix B for the 100-yr 6-hrand 24-hr Isopluvial Charts.

2. Precipitation Zone Number (PZN) = 3.50

   See Appendix B, Figure C-1.

3. Runoff Curve Numbers (CN). The soil types are A, B, C, & D as shown in Appendix B, Soil Hydrologic Groups Map.

   a. Desert Shrub (Fair) CN, Soil Type A = 55 (Appendix B, Table 4-2)

   b. Desert Shrub (Fair) CN, Soil Type B = 72 (Appendix B, Table 4-2)

   c. Desert Shrub (Fair) CN, Soil Type C = 81 (Appendix B, Table 4-2)

   d. Desert Shrub (Fair) CN, Soil Type D = 86 (Appendix B, Table 4-2)

   Since the watershed area has three to four different types of soils, an average CN is calculated. The PZN adjustment factor is based on the initial PZN of 3.5 and so the adjustment factor is 2.5 for the 100-yr storm, as shown in Table 4-6 in Chapter of the SDCHM. Table 4-10 in Chapter 4 of the SDCHM is then used to apply the adjustment to each average CN for each sub-area.

   The above referenced charts, figures, and calculations are in Appendix B.

Rational Method

1. 100-year 6-hour rainfall = 3.75 inches.

   100-year 24-hour rainfall = 6.5 inches.

   According to the SDCHM, the P_6 (6 hour rainfall in inches) needs to be within 45% and 65% of the 100-yr 24-hour rain event (P_{24}). The current P_6 for the 100-yr storm falls within the specified range.

(3.75 in ÷ 6.5 in) × 100 = 58%

See Appendix B for the 100-yr 6-hrand 24-hr Isopluvial Charts.

2. Runoff Coefficients: The soil types are A, B, C, & D as shown in Appendix B, Soil Hydrologic Groups Map and the following runoff coefficients are for Undisturbed Natural Terrain in Table 3-1 of SDCHM.

    a. Soil Type A: C=0.20

    b. Soil Type B: C=0.25

    c. Soil Type C: C=0.30

    d. Soil Type D: C=0.35

    Since each sub-area of the watershed area has three to four different types of soils, an average C is calculated for each sub-area.

3. The maximum overland flow length is determined to be 100 from Table 3-2 of the SDCHM for each drainage area.

4. The land cover is assumed to be pasture/range land for the drainage areas within the proposed project site.

    The above referenced charts, figures, and calculations are in Appendix C.

3.4 Pre-Project Hydrology

3.4.1 Basin Parameters

For this analysis of the pre-project runoff rate of Tule Creek, the 24.25 acre watershed is analyzed as one watershed. Appropriate watershed characteristics were developed for each sub-area using the NRCS hydrologic methodologies discussed in the SDCHM. These pre-project characteristics are shown in Appendix B.

For the analysis of the pre-project runoff within the Project, the watercourses that crisscross the site are analyzed separately as their own tributary areas. Appropriate watershed characteristics are developed for each sub-area using the rational

methodologies discussed in the SDCHM. These pre-project characteristics are shown in Appendix C.

3.4.2 Results – Tule Creek

The pre-project peak flows for the Tule Creek, as determined by the watershed inputs to AES 2008 FLOODSCx, are:

Table 1: Pre-Project Peak Flow Rates for the Tule Creek Watershed

Drainage Area Node	Type of Flow	Area (ac)	Pre-Project Q_{100} (cfs)
101	**Total Routed Flow**	**15,522**	**14,033**

See Appendix D for the AES 2008 FLOODSCx Output.

3.4.3 Results – Project Site

The pre-project peak flows for the drainage areas tributary to the Project, as determined by the sub-area inputs to AES 2008 RATSCx, are:

Table 2: Pre-Project Peak Flow Rates for the Project Site Sub-Areas

Drainage Area Node	Type of Flow	Area (ac)	Pre-Project Q_{100} (cfs)
204	Total Flow	418	444
302	Total Flow	45	59
402	Total Flow	20	29
502	Total Flow	13	18
603	Total Flow	102	97
705	Total Flow	734	683
802	Total Flow	78	71
902	Total Flow	65	70
1004	Total Flow	579	407
1103	Total Flow	151	123

Drainage Area Node	Type of Flow	Area (ac)	Pre-Project Q_{100} (cfs)
1202	Total Flow	104	115
1303	Total Flow	46	44
1403	Total Flow	83	74
1502	Total Flow	78	73
1602	Total Flow	18	21
1702	Total Flow	20	23
1803	Total Flow	91	71
1903	Total Flow	136	122
2004	Total Flow	503	374
2102	Total Flow	10	11

See Appendix E for the AES 2008 RATSCx Output.

3.5 Post-Project Watershed Characteristics

The Project does very little to change the characteristics of the existing watershed and the drainage areas tributary to the Project. Minor amounts of impervious areas will be added during construction, such as transformer pads, driveways, sub-station pads, foundation posts for the solar panels, and drainage crossings. The exposed ground will be replanted with native plants or compacted to serve as access roads.

The Project will be graded but will retain the same slope characteristics as the existing ground, as well as the same pre-project runoff patterns. The grading will also take into account the existing Tule Creek and tributaries that crisscross the proposed project site.

The largest change within the Project will be the addition of the CPV trackers. The effect of the trackers on the drainage characteristics of the project site will be minimal, even though the actual panel of the tracker is impervious. The panel is divided into two smaller panels by a horizontal break along the middle of the panel. This allows the precipitation falling on the top part if the panel to run off at the middle and the precipitation falling on the lower half of the panel to run off at the bottom. Erosion of the ground below will be minimal since only 2 tablespoons of water per second will flow off of 1 foot of length of the solar panel during a 2-year storm. However, the ground below the panel will be vegetated in order to eliminate erosion of the soil, except for the area that is utilized as an access road. The access roads will be

compacted in order to minimize the erosion from the tracker runoff. Please refer to Appendix H for the runoff calculations and diagram of the CPV tracker.

Refer to Appendix B proposed hydrology exhibit for Tule Creek (Figure 2), since it is the same as the Existing Hydrology exhibit, and the Proposed Hydrology exhibit for the Project Site (Figures 4A-4E) is located in Appendix G.

3.6 Post-Project Hydrology

3.6.1 Basin Parameters

For the analysis of the post-project runoff rate of Tule Creek, the 24.25 acre watershed is analyzed the same as under the pre-project conditions. The only difference in the input characteristics for the drainage areas is the increase in the percent impervious for the watershed by 3 acres (.02%) to the impervious areas within the Project. Since the slight change in impervious did not change the overall C vale for the watershed, the pre-project and post-project analysis is the same. The post-project characteristics for the watershed are shown in Appendix F.

The analysis of the post-project runoff within the Project is the same as under the pre-project conditions. All of the drainage areas see a slight increase in impervious area after construction, but not enough to change the overall C value for the drainage area. The post-project characteristics are shown in Appendix G.

3.6.2 Results – Tule Creek

The post-project peak flows for Tule Creek, as determined by the sub-area inputs to AES 2008 FLOODSCx, are unchanged from the pre-project peak flows:

Table 3: Post-Project Peak Flow Rates for Tule Creek Watershed

Drainage Area Node	Type of Flow	Area (ac)	Post-Project Q_{100} (cfs)
101	Total Routed Flow	15,522	14,033

3.6.3 Results –Project Site

The post-project peak flows for the drainage areas tributary to the Project, as determined by the sub-area inputs to AES 2011 RATSCx, are unchanged from the pre-project peak :

Table 4: Post-Project Peak Flow Rates for Project Sub-Areas

Drainage Area Node	Type of Flow	Area (ac)	Post-Project Q_{100} (cfs)
204	Total Flow	418	444
302	Total Flow	45	59
402	Total Flow	20	29
502	Total Flow	13	18
603	Total Flow	102	97
705	Total Flow	734	683
802	Total Flow	78	71
902	Total Flow	65	70
1004	Total Flow	579	407
1103	Total Flow	151	123
1202	Total Flow	104	115
1303	Total Flow	46	44
1403	Total Flow	83	74
1502	Total Flow	78	73
1602	Total Flow	18	21
1702	Total Flow	20	23
1803	Total Flow	91	71
1903	Total Flow	136	122
2004	Total Flow	503	374
2102	Total Flow	10	11

3.7 Pre- and Post-Project Peak Flow Summary

3.7.1 Tule Creek

Table 5: Summary Table for Pre- and Post- Project Peak Flow Rates for Tule Creek

Drainage Area Node	Type of Flow	H	L	Area	Q100 (cfs)		Velocity (fps)	
		(ft)	(ft)	acres	Pre-Project	Post-Project	Pre-Project	Post-Project
101	Total Routed Flow	2,125	55,176	15,522	14,033	14,033	8.45	8.57

3.7.2 Project Site

Table 6: Summary Table for Pre- and Post- Project Peak Flow Rates for Project Site

Drainage Area Node	H	L	C Pre-Project	C Post - Project	Tc	I	Area	Q100 (cfs)		Velocity (fps)	
	(ft)	(ft)			(min.)	(in/hr)	acres	Pre-Project	Post-Project	Pre - Project	Post-Project
204	437	10,381	0.31	0.31	25.83	3.426	418	444	444	9.30	9.30
302	187	4,318	0.34	0.34	21.63	3.841	45	59	59	6.10	6.10
402	113	2,210	0.31	0.31	16.25	4.62	20	29	29	5.31	5.31
502	109	1,253	0.27	0.27	12.93	5.353	13	18	18	4.58	4.58
603	190	7,158	0.28	0.28	25.96	3.415	102	97	97	8.97	8.97
705	738	14,622	0.25	0.25	34.80	2.827	734	683	683	9.36	9.36
802	247	4,572	0.24	0.24	21.8	3.823	78	71	71	5.85	5.85
902	176	2,948	0.24	0.24	16.93	4.499	65	70	70	6.03	6.03
1004	562	11,157	0.24	0.24	32.89	2.932	579	407	407	9.57	9.57
1103	230	6,501	0.25	0.25	27.88	3.261	151	123	123	5.82	5.82
1202	242	3,737	0.25	0.25	17.46	4.411	104	115	115	7.12	7.12
1303	253	4,075	0.25	0.25	21.87	3.814	46	44	44	5.32	5.32
1403	277	4,562	0.25	0.25	24.65	3.531	83	74	74	4.70	4.70
1502	181	4,551	0.25	0.25	22.90	3.702	78	73	73	5.32	5.32
1602	103	1,680	0.25	0.25	15.11	4.842	18	21	21	4.28	4.28
1702	104	1,868	0.25	0.25	15.83	4.699	20	23	23	4.28	4.28

Drainage Area Node	H	L	C Pre-Project	C Post - Project	Tc	I	Area	Q100 (cfs)		Velocity (fps)	
	(ft)	(ft)			(min.)	(in/hr)	acres	Pre-Project	Post-Project	Pre - Project	Post-Project
1803	336	7,060	0.25	0.25	29.99	3.112	91	71	71	5.41	5.41
1903	333	6,076	0.25	0.25	24	3.593	136	122	122	6.42	6.42
2004	508	10,747	0.25	0.25	32.19	2.972	503	374	374	9.18	9.18
2102	105	1,827	0.25	0.25	16.4	4.592	10	11	11	3.86	3.86

SECTION 4.0 FLOOD HAZARD

4.1 Tule Creek Inundation Limits

Tule Creek drains a 24.25 square mile watershed and conveys 14,033 cfs during a 100-year storm event. Due to the large nature of the flow, the flow width, depth and velocity need to be known for design purposes, as well as analysis of the effect of the project on the upstream and downstream properties. The same flow rate has been established for the pre-project and post-project conditions, so the only difference between the pre- and post-project conditions is the proposed grading and tracker poles. The tracker poles were assumed to be 2 feet in diameter, but far enough apart to not collect debris.

The difference in the width, depth and velocity of flow between the pre- and post-project conditions is very minimal, even through the Project area. Please refer to Figures 5A & B in Appendix I for the pre- and post-project inundation limits and water surface elevations. Please refer to Appendix J for the pre-project HEC-RAS model run and Appendix K for the post-project HEC-RAS model run.

4.2 Post-Project Effects

The effects of the Project on the upstream and downstream properties are negligible when compared. The average post-project difference in water surface elevation and velocity upstream of the Project is -0.14 feet and 0.22 fps respectively and downstream is 0.03 feet and 0.09 fps. These differences are considered negligible since the input developed for HEC-RAS was developed from the surveyed topo with an error of +/- 0.25 feet and a Civil 3D generated surface. There also are no structures within the inundation limits on the adjacent properties that could potentially be affected by a change in water surface elevation or flow velocity.

Please refer to Appendix J for a complete comparison of each cross section upstream and downstream of the Project.

4.3 Potential Scour

Due to the preliminary nature of the project design, only a preliminary scour analysis was completed. Approximate calculations using the CSU and Froehlich Equations were prepared and they indicated a scour potential of 3 to 5 feet. However, because several critical design parameters including the final tracker pole diameter, D50 and D95 have not been established, these calculations are very preliminary and have not been included as part of this report. Once the final design of the trackers and has been determined and a complete geological

reconnaissance of the surface and underlying soils has been completed, final scour calculations will be included in the final design drainage study.

4.4 Project Site Mitigation

Due to the width, depth and velocity of the 100-year storm flow within Tule Creek, the trackers within the inundation limits will be designed to handle the inundation and scour. The following methods will be employed to protect the trackers and their associated infrastructure:

- Increase clearance between final grade and electrical boxes, including MAU, TCU, ADU and disconnect.
- All interconnects leading to inverter shall be waterproof.
- No inverters to be installed within the Tule Creek's 100-year inundation limits.
- Electrical box shall be waterproof.
- Overall height of tracker shall be raised to allow for electrical boxes to clear water surface by at least 1 foot.

With all of the above mitigation measures the trackers proposed within the 100-year inundation limits for Tule Creek will be able to handle the flow, velocity and scour potential.

SECTION 5.0 DRAINAGE DESIGN

5.1 Pre-Project Drainage Design

Currently there are no drainage facilities within the proposed Project area except for natural watercourses, which will remain.

5.2 Post-Project Drainage Design

The Project is divided into approximately four different areas where the trackers are clustered. Tule Creek runs through the middle of the northwest area with trackers on both sides. At this location, the flow from the 100-yr storm could easily flow within and around the trackers. The tracker foundations need to be evaluated in order to ensure that they will be able to withstand the flow and the tracker panels shall be placed 1foot above the 100 year flow elevation in order to not impede the flow.

All the other areas have smaller watercourses that cross the layout of the trackers. Each watercourse will remain in order to continue to carry the flow even after construction of the Project. Each existing drainage course will be re-graded to work within the Project and will meet each existing watercourse on the upstream and downstream ends. If an access road crosses an existing watercourse, the road will be paved and constructed contiguous with the flow line of the channel in order to not impede the flow of the channel and protect the road from erosion during a storm. Please see Table 7 below for information on each road crossing and Appendix G for the calculations.

Table 7: Summary of Existing Watercourse & Proposed Road Crossings

Watercourse No.	Dip Crossing Down Stream Node.	Design Flow Rate	Depth	Flooded Width	Crossing Length
		(cfs)	(ft)	(ft)	ft
200	**204**	444	1.37	47.4	20
	204	444	1.37	47.4	20
600	**602**	96	0.61	32.2	20
	602	96	0.61	32.2	20
900	**902**	70	0.51	30.2	20
1300	**1303**	44	0.39	27.80	20
	1303	44	0.39	27.80	20

Watercourse No.	Dip Crossing Down Stream Node.	Design Flow Rate	Depth	Flooded Width	Crossing Length
		(cfs)	(ft)	(ft)	ft
1400	**1402**	15	0.21	24.20	20
	1402	15	0.21	24.20	20
	1402	15	0.21	24.20	20
1500	**1502**	73	0.51	30.20	20
	1502	73	0.51	30.20	20
	1502	73	0.51	30.20	20
1800	**1803**	71	0.51	30.20	20
	1803	71	0.51	30.20	20
	1803	71	0.51	30.20	20
	1803	71	0.51	30.20	20
	1803	71	0.51	30.20	20
1900	**1902**	122	0.69	33.8	20
	1902	122	0.69	33.80	20
2000	**2004**	374	1.25	45.00	20
	2004	374	1.25	45.00	20
	2004	374	1.25	45.00	20
	2004	374	1.25	45.00	20

Within the Project, the proposed design for the site drainage is to provide earthen swales along the service roads in between the trackers. These swales will capture the runoff from the trackers and site and will only convey low flows. The larger flows will over top the channels and flow down the service roads, following the topography of the Project. The swales will be constructed with fiber roll check dams in place to capture the sediment that erodes off the site. Gravel bag check dams will be placed prior to the swales entering the existing drainage course, Tule Creek, in order to capture sediment. At the tie-in of the proposed earthen swales and the existing drainage course, Tule Creek, outlet protection will be provided to prevent scour and erosion.

Please refer to Appendix G for the Project Site Proposed Hydrology exhibit which shows the proposed site design and drainage facilities.

SECTION 6.0 SUMMARY

This study concludes that the construction of the Project does not adversely affect or substantially alter the existing watershed, Tule Creek, the tributaries crossing the project site and the properties upstream and downstream of the Project.

Due to the nature of the Project, the addition of impervious area is very minimal and will not increase the amount of runoff. The grading of the site will mimic the existing terrain and the drainage patterns will remain unchanged, also helping to keep the pre-project peak flow rates. Since there is no increase in flow, the project is not subject to hydromodification or stormwater requirements. There is no hydromodification or water quality flow connection to the Salton Sea since these small flow rates would infiltrate and evaporate into the ground before leaving the valley and reaching the Salton Sea.

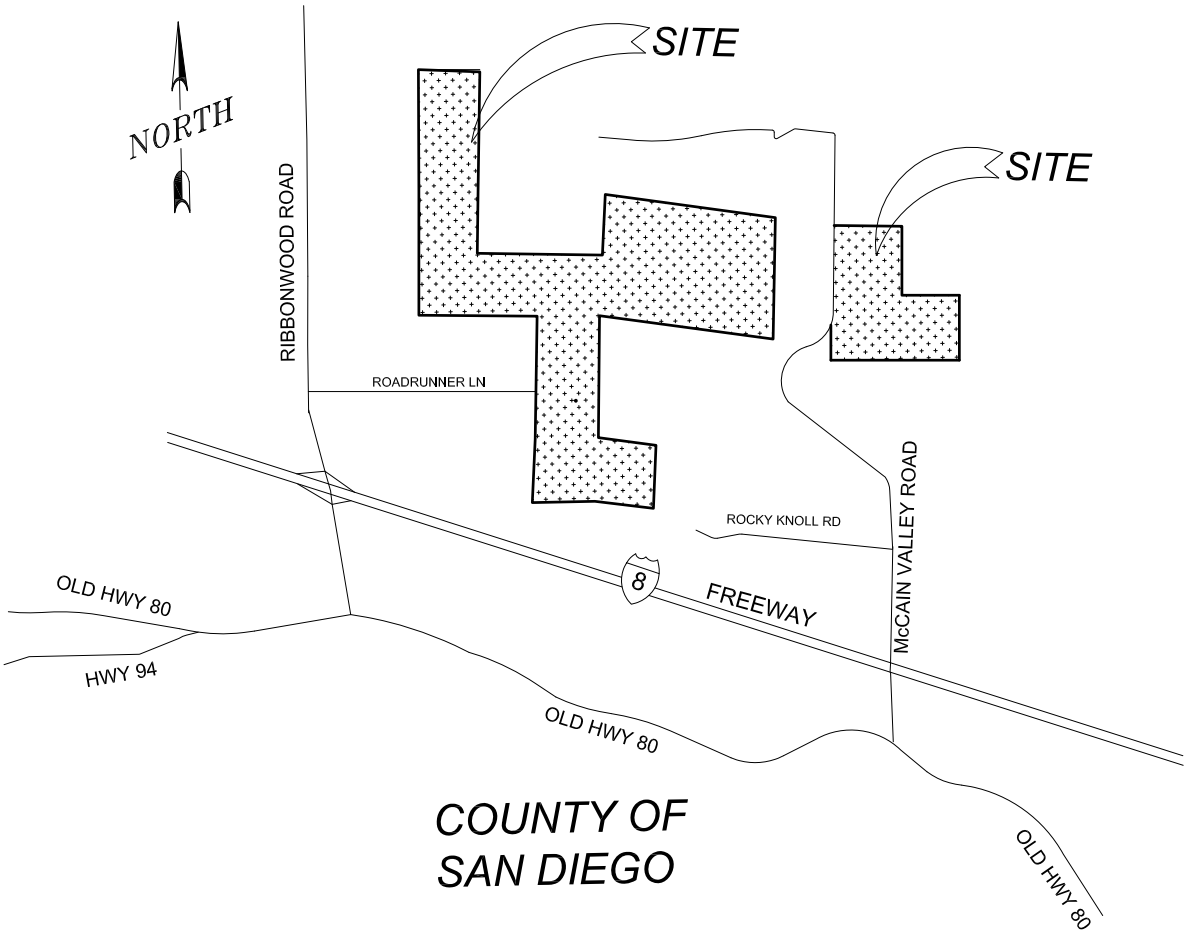
Most of the proposed site will be planted with native vegetation; however there will be earthen roads that may be susceptible to erosion. Check dams will be provided in the proposed drainage channels along side of the access roads in order to capture any sediment that is eroded off of the earthen roads. There will not be any additional sediment transported to Tule Creek due to the Project since it will be collected on site.

Currently the only drainage conveyance that exists with the Project is Tule Creek and the tributary watercourses. The tributary watercourses will remain within the Project in order to maintain the existing drainage patterns and flow capacity. There are no existing drainage facilities that will be adversely affected by the project and the post-project flows will be able to be conveyed within the watercourses crossing the Project. The change in water surface elevation and velocity on the upstream and downstream properties is negligible in the post-project condition.

Trackers will be placed within the 100-year storm inundation limits; however mitigation measures will be taken to ensure that the trackers and associated infrastructure will be able to handle the inundation and potential scour.

Appendix A

Vicinity Map



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VICINITY MAP	60212653	1

Appendix B

NRCS Hydrologic Method Inputs

Existing/Proposed Hydrology Map – Tule Creek

Soil Hydrologic Groups Map

Rainfall Isopluvials

Figure C-1

Table 4-2

Table 4-6

Table 4-10

CN Calculations

Watershed Characteristics

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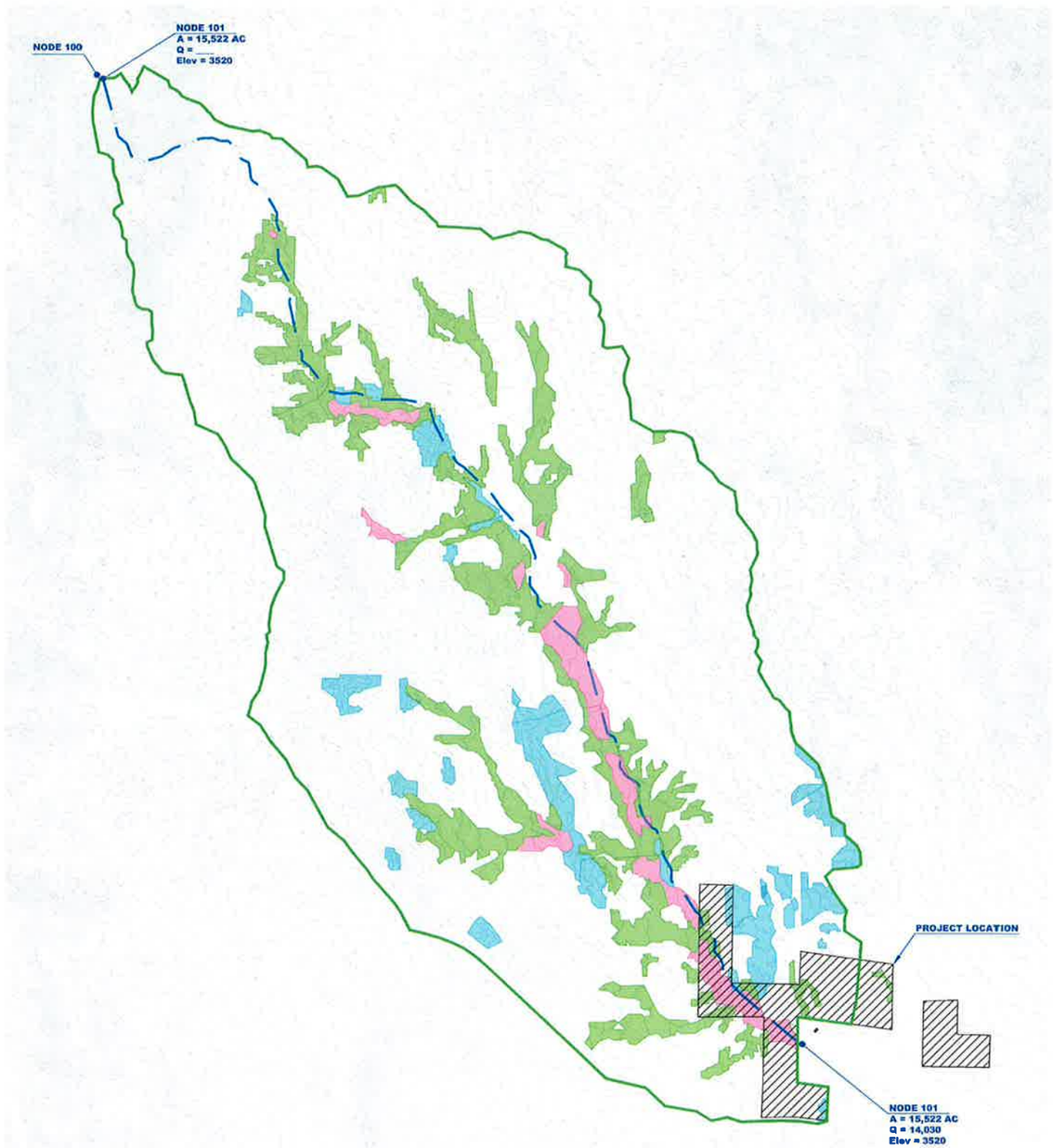

LEGEND

- EXISTING DRAINAGE BASIN
- EXISTING DRAINAGE COURSE
- SOIL A
- SOIL B, ALL OTHER PROJECT AREAS
- SOIL C
- SOIL D
- PROPOSED PROJECT AREA

2500 1250 0 2500 5000
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TULE CREEK DRAINAGE BASIN

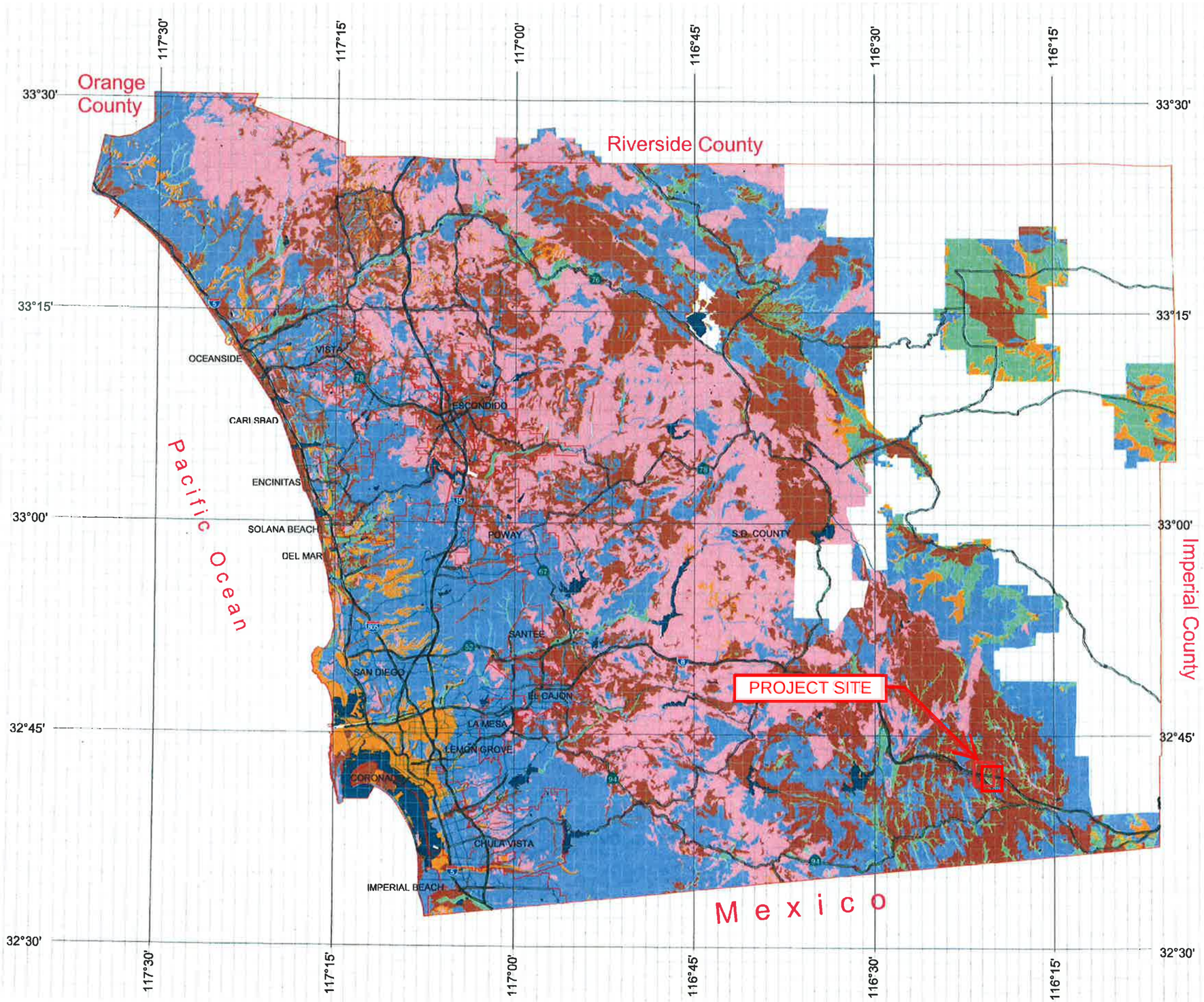
EXISTING & PROPOSED HYDROLOGY

AECOM PROJECT NO.
60212653

FIGURE
2

County of San Diego Hydrology Manual

Soil Hydrologic Groups



Legend

Soil Groups

- Group A
- Group B
- Group C
- Group D
- Undetermined
- Data Unavailable

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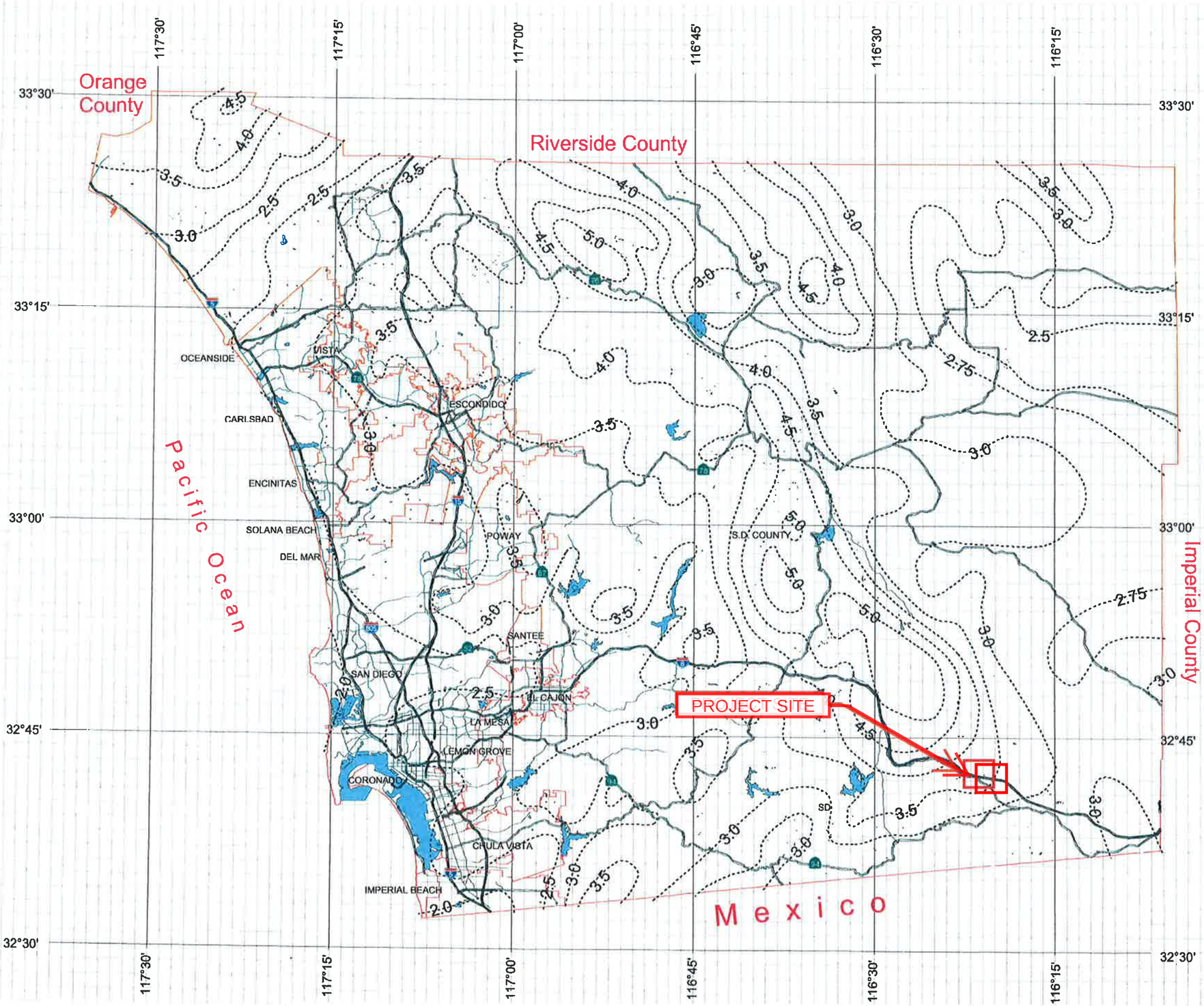
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

PROJECT SITE

OCEANSIDE

VISTA

CARLSBAD

ESCONDIDO

ENCINITAS

SOLANA BEACH

DEL MAR

POWAY

S.D. COUNTY

SANTEE

SAN DIEGO

EL CAJON

LA MESA

LEMON GROVE

CORONADO

CHULA VISTA

IMPERIAL BEACH

SD

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'

33°30' 33°15' 33°00' 32°45' 32°30'

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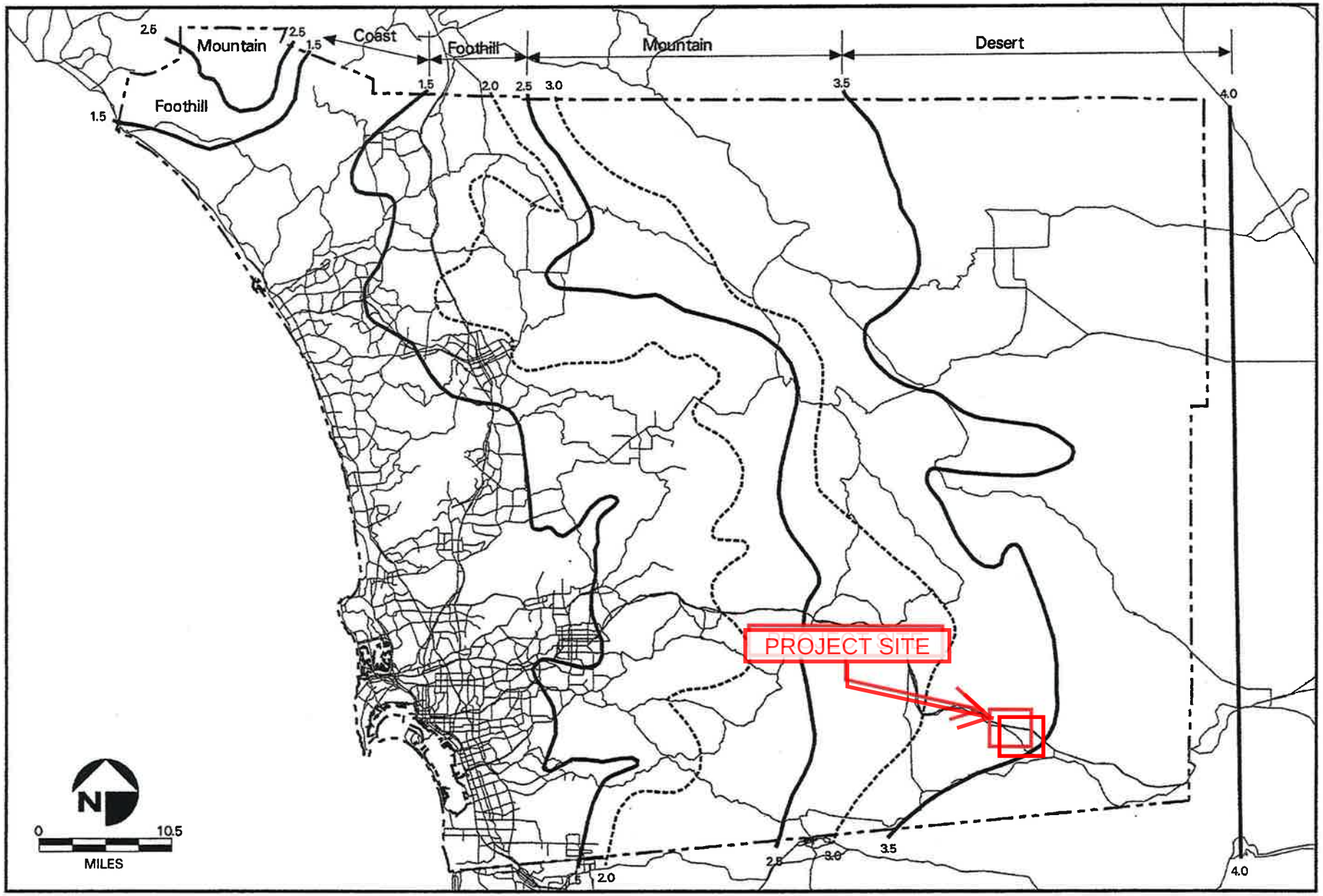
3 0 3 Miles



County of San Diego Hydrology Manual

Precipitation Zone Numbers (PZN)

FIGURE

C-1

The adjustment for PZN Condition may be made to the composite CN for the watershed. It is not necessary to make the PZN Condition adjustment to each of the CNs for the different combinations of ground cover and soil group within the watershed before calculating the composite CN.

PZN=3.5 FROM FIGURE C-1

Table 4-6

PZN ADJUSTMENT FACTORS FOR FLOW COMPUTATIONS (San Diego County)

Storm Frequency	Coast (PZN = 1.0)	Foothills (PZN = 2.0)	Mountains (PZN = 3.0)	Desert (PZN = 4.0)
Less than 35-year return period	1.5	2.5	2.0	1.5
Greater than or equal to 35-year return period	2.0	3.0	3.0	2.0

2.5

Notes: PZN is the precipitation zone number (see Map, Appendix C). The PZN adjustment factor represents the PZN Condition that the CN for the watershed should be adjusted to.

4.1.3 Rainfall-Runoff Relationship

A relationship between accumulated rainfall and accumulated runoff was derived by NRCS from experimental plots for numerous soils and vegetative cover conditions. The following NRCS runoff equation is used to estimate direct runoff from 24-hour or 6-hour storm rainfall. The equation is:

$$Q_a = \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \text{(Eq. 4-1)}$$

where: Q_a = accumulated direct runoff (in)

P = accumulated rainfall (potential maximum runoff) (in)

I_a = initial abstraction including surface storage, interception, evaporation, and infiltration prior to runoff (in)

S = potential maximum soil retention (in)

Table 4-2 (Continued)
RUNOFF CURVE NUMBERS[1] FOR PZN CONDITION = 2.0

Cover Description	Cover Treatment or Practice[2]	Hydrologic Condition[3]	Average Percent Impervious Area[4]	Curve Numbers for Hydrologic Soil Groups: A	B	C	D
Turf[8]		Poor		58	74	83	87
		Fair		44	65	77	82
		Good		33	58	72	79
Water surfaces (during floods)				97	98	99	99
Broadleaf chaparral		Poor		53	70	80	85
		Fair		40	63	75	81
		Good		31	57	71	78
Desert shrub–major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus		Poor		63	77	85	88
		Fair		55	72	81	86
		Good		49	68	79	84
Herbaceous–mixture of grass, weeds, and low-growing brush, with brush the minor element		Poor		[9]	80	87	93
		Fair		[9]	71	81	89
		Good		[9]	62	74	85
Narrowleaf chaparral		Poor		71	82	88	91
		Fair		55	72	81	86
Oak-aspen–mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush		Poor		[9]	66	74	79
		Fair		[9]	48	57	63
		Good		[9]	30	41	48
Open brush		Poor		62	76	84	88
		Fair		46	66	77	83
		Good		41	63	75	81

Table 4-10

RUNOFF CURVE NUMBERS FOR PZN CONDITIONS 1.0, 2.0, AND 3.0

CN For:			CN For:		
PZN Condition = 1.0	PZN Condition = 2.0	PZN Condition = 3.0	PZN Condition = 1.0	PZN Condition = 2.0	PZN Condition = 3.0
100	100	100	40	60	78
97	99	100	39	59	77
94	98	99	38	58	76
91	97	99	37	57	75
89	96	99	37	56	75
87	95	98	34	55	73
85	94	98	34	54	73
83	93	98	33	53	72
81	92	97	32	52	71
80	91	97	31	51	70
78	90	96	31	50	70
76	89	96	30	49	69
75	88	95	29	48	68
73	87	95	28	47	67
72	86	94	27	46	66
70	85	94	26	45	65
68	84	93	25	44	64
67	83	93	25	43	63
66	82	92	24	42	62
64	81	92	23	41	61
63	80	91	22	40	60
62	79	91	21	39	59
60	78	90	21	38	58
59	77	89	20	37	57
58	76	89	19	36	56
57	75	88	18	35	55
55	74	88	18	34	54
54	73	87	17	33	53
53	72	86	16	32	52
52	71	86	16	31	51
51	70	85	15	30	50
50	69	84			
48	68	84	12	25	43
47	67	83	9	20	37
46	66	82	6	15	30
45	65	82	4	10	22
44	64	81	2	5	13
43	63	80	0	0	0
42	62	79			
41	61	78			

The CN is taken between the PZN 2.0 and PZN 3.0 since the adjusted PZN is 2.5.

Pre-Project Soil Type Areas for Tule Creek

Sub Basins Area (ft^2)	Soil Type - Area 100			
	A	B	C	D
1	87631401	0	17697306	24105750
2				
3				
4				
5				
6				
7				
Sub Basin Total Area		676102604		
Total Area (ft^2)	87631401	570773897	17697306	24105750
Total Area (acres)	2011.74	13103.17	406.27	553.39
Total Sub Basin Drainage Area (acres)	15521.18			
Percentage of Total	12.96%	84.42%	2.62%	3.57%
CN for Desert Shrub (Fair)	55	72	81	86
Watershed Weighted CN	70			
Adjusted PZN for Q100 (Table 4-10)	79			

PZN (Figure C-1)	3.5
PZN Adjustment Factor (Table 4-6, Page 4-20)	2.5

PRE-PROJECT AES 2011 FLOODSCx Inputs - Tule Creek

P6 (in)	3.75
P24 (in)	6.5

	Drainage Area
Watershed Parameters	**100**
Area (ft^2)	676,154,521.00
Area (acres)	15,522.37
Area (miles^2)	24.25
Percent Impervious	0.0%
Max elev. (ft)	5640
Min elev. (ft)	3515
Difference (ft)	2,125.00
Longest Watercourse (ft)	55,176.00
Longest Watercourse (miles)	10.45
Slope (ft/mile)	203.35
Lc (ft)	22,726.00
Lc (miles)	4.30
Basin n	0.04

Appendix C

Rational Method Inputs

Existing Hydrology Map – Project Site

Figure 3-1

Table 3-1

Table 3-2

C Calculations

Watershed Sub-Area Characteristics

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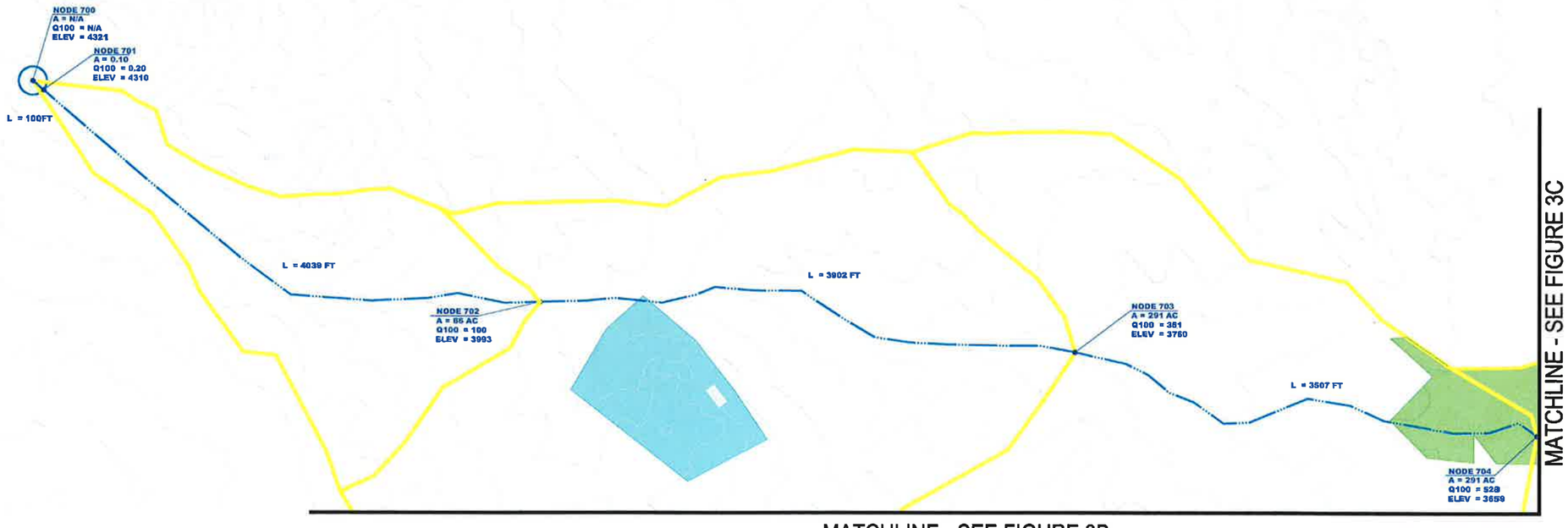
LEGEND

- EXISTING DRAINAGE BASIN
- EXISTING DRAINAGE COURSE
- SOIL A
- SOIL B, ALL OTHER PROJECT AREAS
- SOIL C
- SOIL D



300 150 0 300 600
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EXISTING HYDROLOGY

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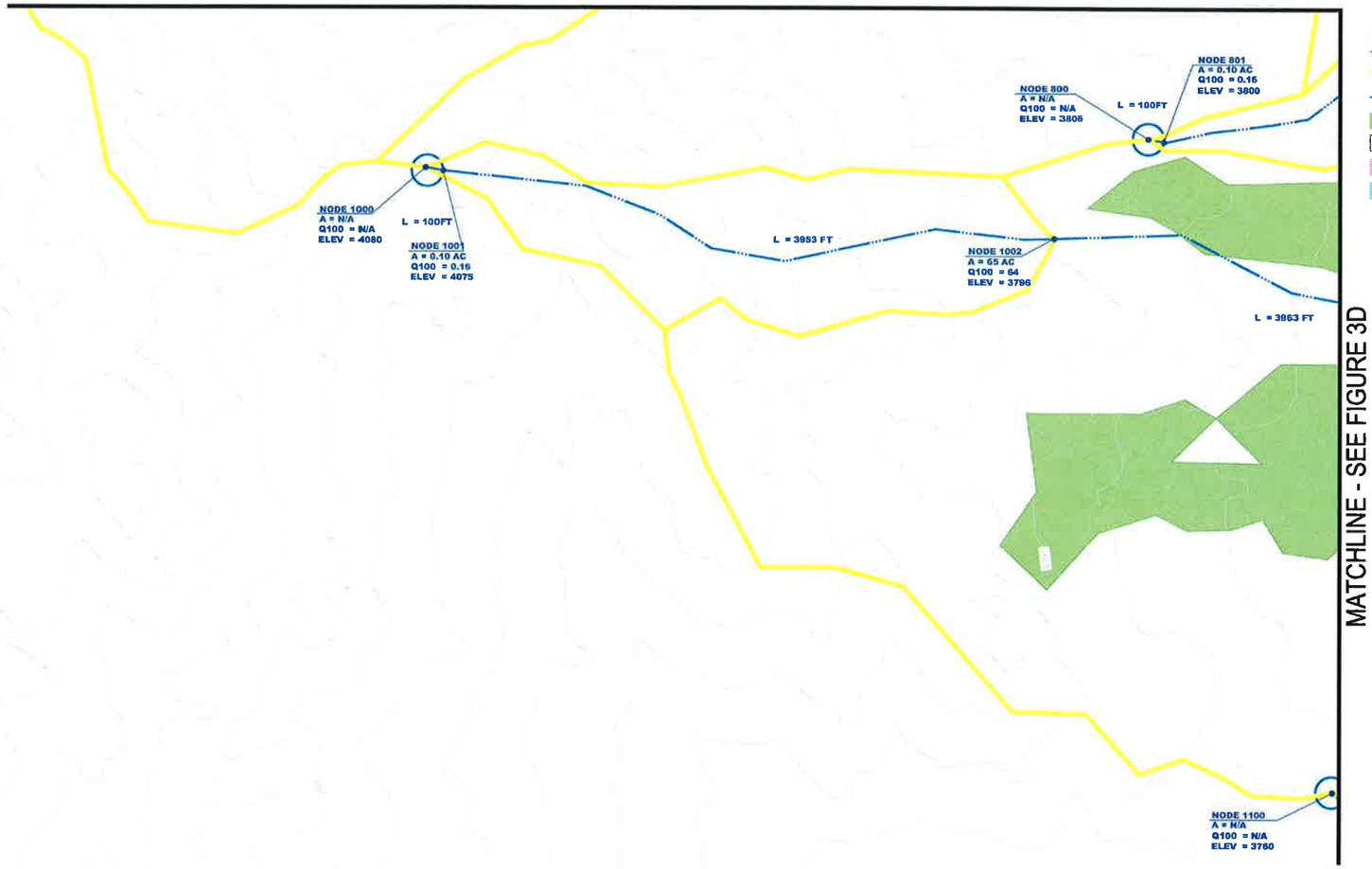
FIGURE
3A

MATCHLINE - SEE FIGURE 3A



MATCHLINE - SEE FIGURE 3D

LEGEND

- EXISTING DRAINAGE BASIN
- EXISTING DRAINAGE COURSE
- SOIL A
- SOIL B, ALL OTHER PROJECT AREAS
- SOIL C
- SOIL D

300 150 0 300 600
SCALE IN FEET

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EXISTING HYDROLOGY

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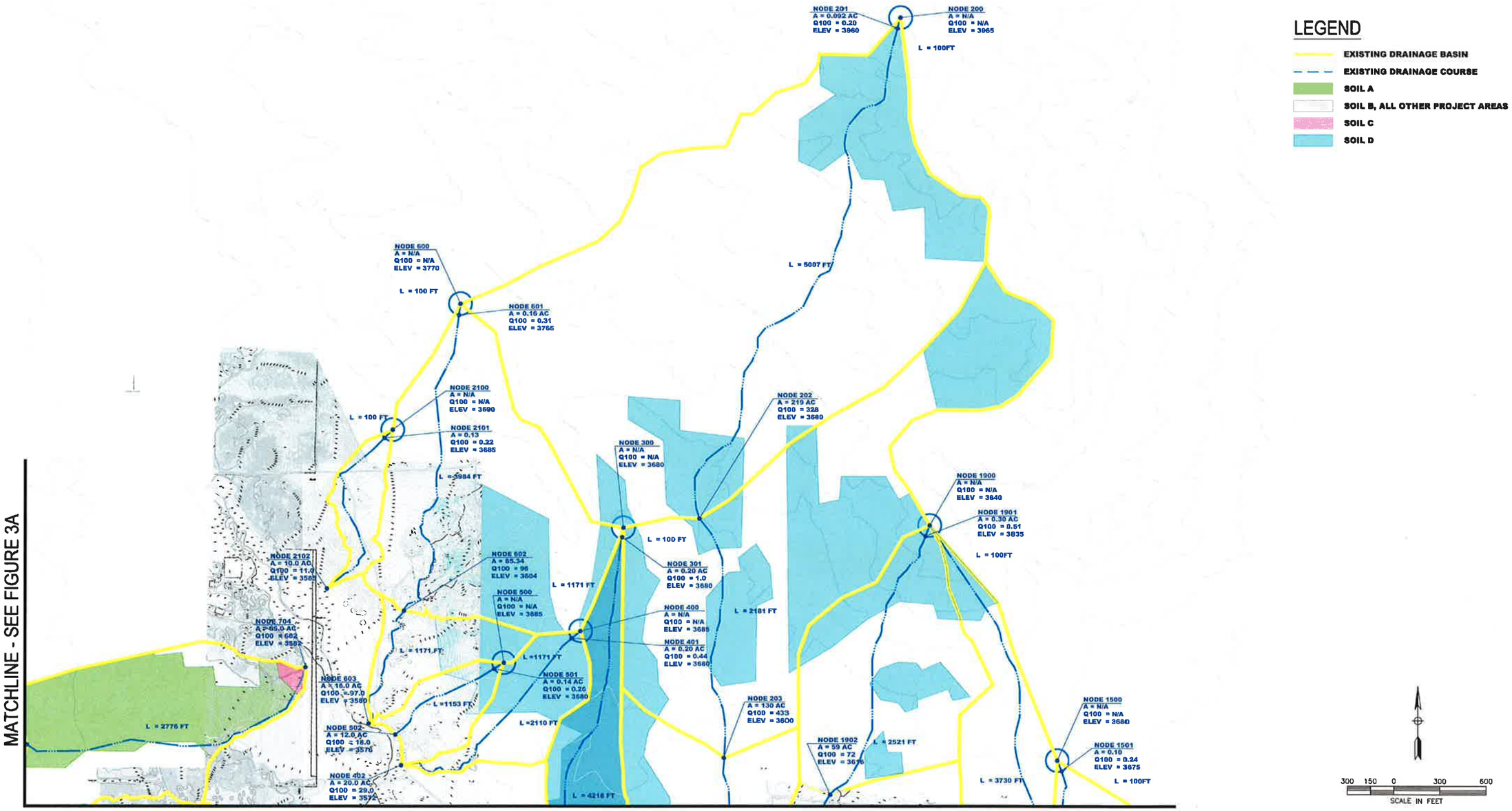
FIGURE
3B



MATCHLINE - SEE FIGURE 3A

MATCHLINE - SEE FIGURE 3D

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EXISTING HYDROLOGY

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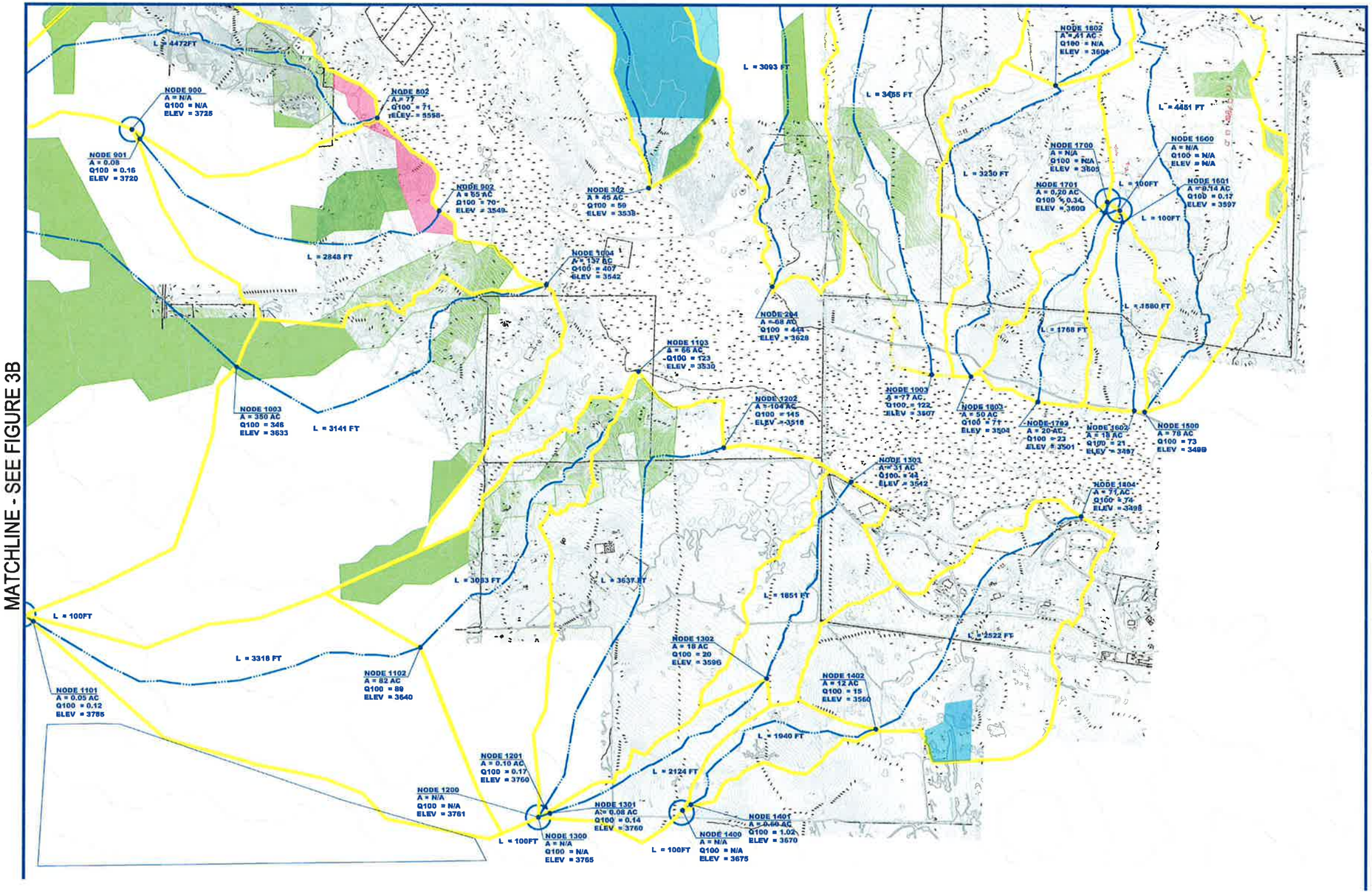
FIGURE
3C

MATCHLINE - SEE FIGURE 3C

MATCHLINE - SEE FIGURE 3B

MATCHLINE - SEE FIGURE 3E



LEGEND

- EXISTING DRAINAGE BASIN
- EXISTING DRAINAGE COURSE
- SOIL A
- SOIL B, ALL OTHER PROJECT AREAS
- SOIL C
- SOIL D

300 150 0 300 600

SCALE IN FEET

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EXISTING HYDROLOGY

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FIGURE
3D

MATCHLINE - SEE FIGURE 3D

NODE 2000
A = 0.10
Q100 = N/A
ELEV = 4000

NODE 2001
A = 0.10
Q100 = 0.17
ELEV = 3985

L = 2584 FT

NODE 2002
A = 42 AC
Q100 = 46
ELEV = 3860

L = 4073 FT

NODE 2003
A = 288 AC
Q100 = 288
ELEV = 3636

L = 3980 FT

NODE 2004
A = 174
Q100 = 374
ELEV = 3492

LEGEND

- EXISTING DRAINAGE BASIN
- EXISTING DRAINAGE COURSE
- SOIL A
- SOIL B, ALL OTHER PROJECT AREAS
- SOIL C
- SOIL D

300 150 0 300 600
SCALE IN FEET

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EXISTING HYDROLOGY

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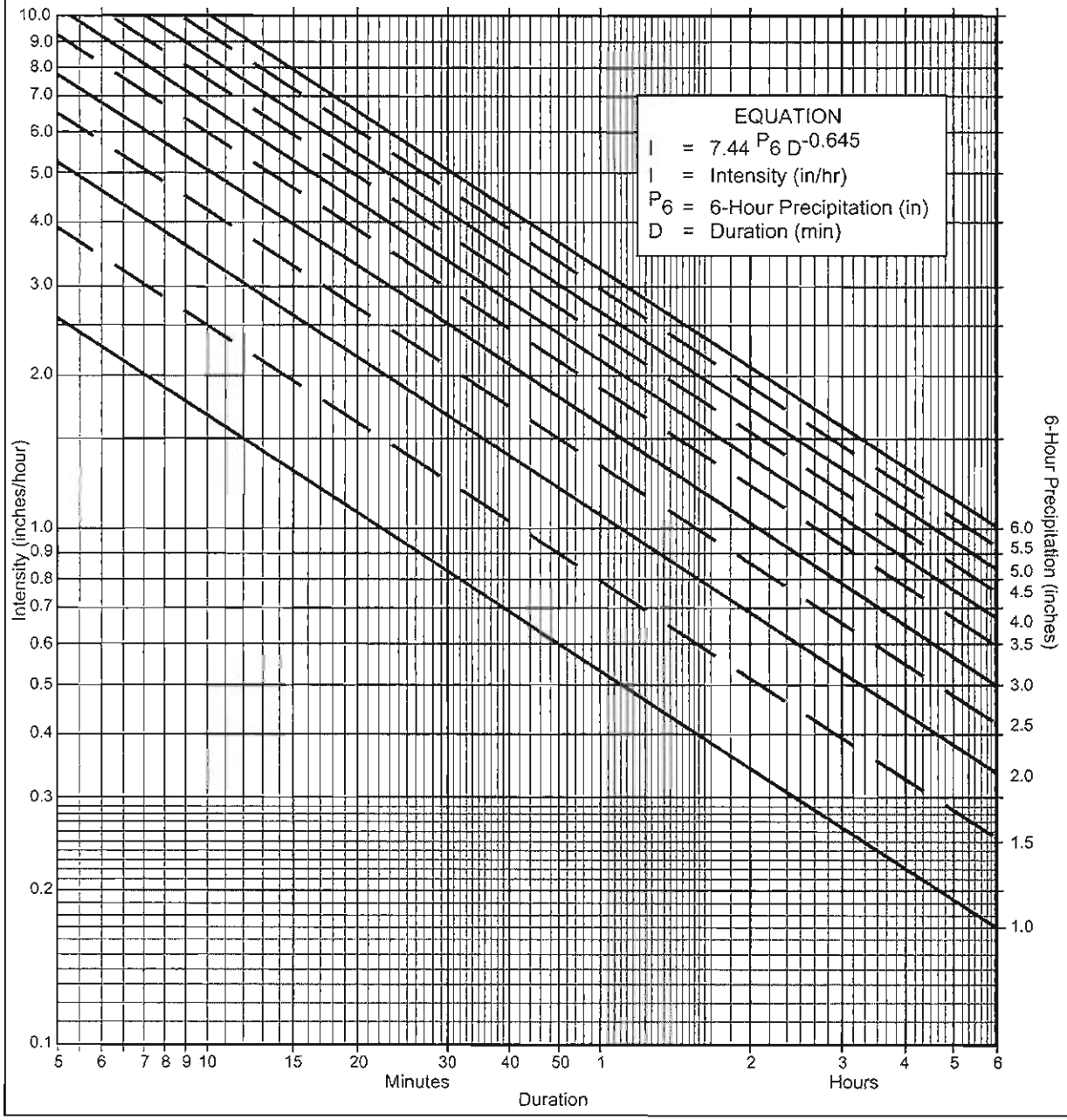
FIGURE
3E



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 3.75 in., P_{24} = 6.5, $\frac{P_6}{P_{24}}$ = 58 %(2)

(c) Adjusted P_6(2) = 3.75 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M) & INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

Post-Project Soil Type Areas - Site Plan

The C Values of the A - D Soil Types are From Table 3-1 in the SDCHM

Sub Basins Area (ft^2)	Soil Type - Area 200					Soil Type - Area 300					Soil Type - Area 400				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1				1491385		92656			1758526					496043	
2				10035068											0.01
3	380925			388236											
Sub Basin Total Area		18216792					1941278					869048			
Soil Type Total Area (ft^2)	380925	5921178	0	11914689	0	92656	90096	0	1758526	0	0	373004.99	0	496043	0.01
Soil Type Total Area (acres)	8.74	135.93	0.00	273.52	0.00	2.13	2.07	0.00	40.37	0.00	0.00	8.56	0.00	11.39	0.00
Total Sub Basin Drainage Area (acres)	418.20					44.57					19.95				
Percentage of Total	2.09%	32.50%	0.00%	65.40%	0	4.77%	4.64%	0.00%	90.59%	0	0.00%	42.92%	0.00%	57.08%	1.15068E-08
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C	0.31					0.34					0.31				

Sub Basins Area (ft^2)	Soil Type - Area 500					Soil Type - Area 600					Soil Type - Area 700				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1				111868					1108692						
2					0.1				286553	0.27	492077			943778	
3															
4											1729840		46296		
Sub Basin Total Area		538376					4431740					31989001			
Total Area (ft^2)	0	426507.9	0	111868	0.1	0	3036495	0	1395245	0.27	2221917	28777010	46296	943778	0
Total Area (acres)	0.00	9.79	0.00	2.57	0.00	0.00	69.71	0.00	32.03	0.00	51.01	660.63	1.06	21.67	0.00
Total Drainage Area (acres)	12.36					101.74					734.37				
Percentage of Total	0.00%	79.22%	0.00%	20.78%	0.000	0.00%	68.52%	0.00%	31.48%	6.1E-08	6.95%	89.96%	0.14%	2.95%	0
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C	0.27					0.28					0.25				

Sub Basins Area (ft^2)	Soil Type - Area 800					Soil Type - Area 900					Soil Type - Area 1000				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1	567382		75674		555	546061		204220							
2										0.02	4264965				
3											1032521				
Sub Basin Total Area		3370837					2829585					25221680			
Total Area (ft^2)	567382	2727226	75674	0	555	546061	2079304	204220	0	0.02	5297486	19924194	0	0	0
Total Area (acres)	13.03	62.61	1.74	0.00	0.01	12.54	47.73	4.69	0.00	0.00	121.61	457.40	0.00	0.00	0.00
Total Drainage Area (acres)	77.38					64.96					579.01				
Percentage of Total	16.83%	80.91%	2.24%	0.00%	0.000	19.30%	73.48%	7.22%	0.00%	0.000	21.00%	79.00%	0.00%	0.00%	0.000
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C	0.24					0.24					0.24				

Sub Basins Area (ft^2)	Soil Type - Area 1100					Soil Type - Area 1200					Soil Type - Area 1300				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1						350799									
2	689098									0.14					0.03
															0.31
Sub Basin Total Area		6378111					4534240					2115366			
Total Area (ft^2)	689098	5689013	0	0	0	350799	4183441	0	0	0.14	0	2115366	0	0	0.34
Total Area (acres)	15.82	130.60	0.00	0.00	0.00	8.05	96.04	0.00	0.00	0.00	0.00	48.56	0.00	0.00	0.00
Total Drainage Area (acres)			146.42					104.09					48.56		
Percentage of Total	10.80%	89.20%	0.00%	0.00%	0.00%	7.74%	92.26%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C			0.24					0.25					0.25		

Sub Basins Area (ft^2)	Soil Type - Area 1400					Soil Type - Area 1500					Soil Type - Area 1600				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1						175929									
2				143549											
Sub Basin Total Area		3604567					3407610					762658			
Total Area (ft^2)	0	3461018	0	143549	0	175929	3231681	0	0	0	0	762658	0	0	0
Total Area (acres)	0.00	79.45	0.00	3.30	0.00	4.04	74.19	0.00	0.00	0.00	0.00	17.51	0.00	0.00	0.00
Total Drainage Area (acres)			82.75					78.23					17.51		
Percentage of Total	0.00%	96.02%	0.00%	3.98%	0.00%	5.16%	94.84%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C			0.25					0.25					0.25		

Sub Basins Area (ft^2)	Soil Type - Area 1700					Soil Type - Area 1800					Soil Type - Area 1900				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1									152719					869383	
2				143549							479380				
Sub Basin Total Area		856606					3957652					5921062			
Total Area (ft^2)	0	713057	0	143549	0	0	3804933	0	152719	0	479380	4572299	0	869383	0
Total Area (acres)	0.00	16.37	0.00	3.30	0.00	0.00	87.35	0.00	3.51	0.00	11.01	104.97	0.00	19.96	0.00
Total Drainage Area (acres)			19.66					90.86					135.93		
Percentage of Total	0.00%	83.24%	0.00%	16.76%	0.00%	0.00%	96.14%	0.00%	3.86%	0.00%	8.10%	77.22%	0.00%	14.68%	0.00%
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C			0.27					0.25					0.25		

Sub Basins Area (ft^2)	Soil Type - Area 2000					Soil Type - Area 2100				
	A	B	C	D	IMP	A	B	C	D	IMP
1	359398									
2	1235700									
3										
Sub Basin Total Area		21925103					420395			
Total Area (ft^2)	1595098	20330005	0	0	0	0	420395	0	0	0
Total Area (acres)	36.62	466.71	0.00	0.00	0.00	0.00	9.65	0.00	0.00	0.00
Total Drainage Area (acres)	503.33					9.65				
Percentage of Total	7.28%	92.72%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C	0.25					0.25				

POST-PROJECT AES 2011 RATSCx Inputs - Site Plan

P6 (in) 3.75
P24 (in) 6.5

Subarea		Upstream Elevation (ft)	Downstream Elevation (ft)	Flow Length (ft)	Land Cover	% Impervious	C Value	Area (ft^2)	Area (Ac)	Slope
From Node	To node									
200	**201**	3965	3960	100	35	0	0.31	4,007	0.09	5.0%
201	**202**	3960	3680	5007	35	0		9,554,102	219.33	5.6%
202	**203**	3680	3628	2181	35	0		5,682,929	130.46	2.4%
203	**204**	3628	3528	3093	35	0		2,976,659	68.33	3.2%
300	**301**	3725	3720	100	35	0	0.34	1,724	0.04	5.0%
301	**302**	3720	3538	4218	35	0		1,941,278	44.57	4.3%
400	**401**	3685	3680	100	35	0	0.31	8,712	0.20	5.0%
401	**402**	3680	3572	2110	35	0		869,048	19.95	5.1%
500	**501**	3685	3680	100	35	0	0.27	6,098	0.14	5.0%
501	**502**	3680	3576	1153	35	0		538,376	12.36	9.0%
600	**601**	3770	3765	100	35	0	0.28	6,969	0.16	5.0%
601	**602**	3765	3604	3984	35	0		3,717,418	85.34	4.0%
602	**603**	3604	3580	3074	35	0		714,322	16.40	0.8%
700	**701**	4320	4310	100	35	0	0.25	4,356	0.10	10.0%
701	**702**	4310	3993	4039	35	0		3,759,756	86.31	7.8%
702	**703**	3993	3760	3902	35	0		12,691,033	291.35	6.0%
703	**704**	3760	3659	3507	35	0		12,715,308	291.90	2.9%
704	**705**	3659	3582	2776	35	0		2,821,904	64.78	2.8%
800	**801**	3805	3800	100	35	0	0.24	4,380	0.101	5.0%
801	**802**	3800	3558	4472	35	0		3,370,837	77.384	5.4%
900	**901**	3725	3720	100	35	0	0.24	3,512	0.081	5.0%
901	**902**	3720	3549	2848	35	0		2,831,456	65.00	6.0%
1000	**1001**	4080	4075	100	35	0	0.24	4,355	0.10	5.0%
1001	**1002**	4075	3796	3953	35	0		2,829,585	64.96	7.1%
1002	**1003**	3796	3633	3963	35	0		16,422,460	377.01	4.1%
1003	**1004**	3633	3518	3141	35	0		5,969,455	137.04	3.7%
1100	**1101**	3760	3755	100	35	0	0.25	3,262	0.07	5.0%
1101	**1102**	3755	3640	3318	35	0		3,712,600	85.23	3.5%
1102	**1103**	3600	3530	3083	35	0		2,868,937	65.86	2.3%
1200	**1201**	3760	3755	100	35	0	0.25	4,324	0.10	5.0%
1201	**1202**	3755	3518	3637	35	0		4,531,006	104.02	6.5%
1300	**1301**	3765	3760	100	35	0	0.25	3,314	0.08	5.0%
1301	**1302**	3760	3596	2124	35	0		762,014	17.49	7.7%
1302	**1303**	3596	3512	1851	35	0		1,253,352	28.77	4.5%
1400	**1401**	3775	3770	100	35	0	0.25	2,765	0.06	5.0%
1401	**1402**	3770	3560	1940	35	0		535,670	12.30	10.8%
1402	**1403**	3560	3498	2522	35	0		3,070,897	70.50	2.5%

Subarea		Upstream Elevation (ft)	Downstream Elevation (ft)	Flow Length (ft)	Land Cover	% Impervious	C Value	Area (ft^2)	Area (Ac)	Slope
From Node	To node									
1500	**1501**	3680	3675	100	35	0	0.25	6,030	0.14	5.0%
1501	**1502**	3675	3499	4451	35	0		3,407,610	78.23	4.0%
1600	**1601**	3600	3595	100	35	0	0.25	4,324	0.10	5.0%
1601	**1602**	3595	3497	1580	35	0		762,658	17.51	6.2%
1700	**1701**	3605	3600	100	35	0	0.25	8,600	0.20	5.0%
1701	**1702**	3600	3501	1768	35	0		856,606	19.66	5.6%
1800	**1801**	3840	3835	100	35	0	0.25	1,367	0.03	5.0%
1801	**1802**	3835	3601	3730	35	0		1,763,661	40.49	6.3%
1802	**1803**	3601	3504	3230	35	0		2,193,991	50.37	3.0%
1900	**1901**	3840	3835	100	35	0	0.25	12,867	0.30	5.0%
1901	**1902**	3835	3616	2521	35	0		2,558,457	58.73	8.7%
1902	**1903**	3616	3507	3455	35	0		3,362,605	77.19	3.2%
2000	**2001**	4000	3995	100	35	0	0.25	4,344	0.10	5.0%
2001	**2002**	3995	3860	2594	35	0		1,808,495	41.52	5.2%
2002	**2003**	3860	3636	4073	35	0		12,526,845	287.58	5.5%
2003	**2004**	3636	3492	3980	35	0		7,589,847	174.24	3.6%
2100	**2101**	3690	3685	100	35	0	0.25	5,822	0.13	5.0%
2101	**2102**	3685	3585	1727	35	0		420,395	9.65	5.8%

Appendix D

Pre-Project & Post-Project Hydrology (Tule Creek)
AES 2011 FLOODSCx Output

September 2012

AECOM

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              F L O O D    R O U T I N G     A N A L Y S I S

                      ACCORDING TO COUNTY OF SAN DIEGO
   DEPARTMENT OF PUBLIC WORKS FLOOD CONTROL DIVISION HYDROLOGY
MANUAL(2003)
          (c) Copyright 1989-2011 Advanced Engineering Software (aes)
              Ver. 18.0  Release Date: 05/01/2011  License ID 1395

                           Analysis prepared by:




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   FILE NAME: C:\aes2011\hydrosft\floodX\Tule Trial.fld
   TIME/DATE OF STUDY: 10:23 09/05/2012



**********************************************************************
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   FLOW PROCESS FROM NODE   100.00 TO NODE   101.00 IS CODE =   1
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   >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<

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

       (UNIT-HYDROGRAPH ADDED TO STREAM #1)

          WATERCOURSE LENGTH =   55176.000 FEET
          LENGTH FROM CONCENTRATION POINT TO CENTROID =   22726.000
FEET
          ELEVATION VARIATION ALONG WATERCOURSE =    2125.000 FEET
          BASIN FACTOR = 0.045
          WATERSHED AREA =   15522.000 ACRES
          BASEFLOW =   0.000 CFS/SQUARE-MILE
          WATERCOURSE "LAG" TIME =    1.671 HOURS
          * Instantaneous Unit-Hydrograph Option Selected.
          S.C.S. S-GRAPH SELECTED
          WATERSHED RUNOFF CURVE NUMBER =  79.00
```

SPECIFIED PEAK 5-MINUTES RAINFALL(INCH)= 0.82
SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)= 1.56
SPECIFIED PEAK 1-HOUR RAINFALL(INCH) = 1.99
SPECIFIED PEAK 3-HOUR RAINFALL(INCH) = 2.94
SPECIFIED PEAK 6-HOUR RAINFALL(INCH) = 3.75
SPECIFIED PEAK 24-HOUR RAINFALL(INCH) = 6.50

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
  5-MINUTE FACTOR = 0.806
 30-MINUTE FACTOR = 0.806
  1-HOUR FACTOR = 0.882
  3-HOUR FACTOR = 0.943
  6-HOUR FACTOR = 0.957
 24-HOUR FACTOR = 0.970

UNIT HYDROGRAPH TIME UNIT = 15.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 14.960

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UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"q/qp" GRAPH VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	0.081	663.911
2	0.246	2008.533
3	0.509	4148.951
4	0.811	6605.506
5	0.971	7908.969
6	0.996	8114.779
7	0.920	7493.712
8	0.789	6431.903
9	0.606	4936.076
10	0.435	3546.368
11	0.326	2652.566
12	0.250	2036.257
13	0.190	1549.790
14	0.141	1149.651
15	0.107	868.097
16	0.081	655.988
17	0.060	492.824
18	0.046	372.558
19	0.035	282.352
20	0.026	213.230

21	0.020	160.280
22	0.015	119.314
23	0.011	91.032
24	0.009	73.504
25	0.007	56.535
26	0.005	39.762
27	0.003	25.621
28	0.001	11.481
29	0.000	0.000

TOTAL STORM RAINFALL(INCHES) = 6.31
TOTAL SOIL-LOSS(INCHES) = 2.35
TOTAL EFFECTIVE RAINFALL(INCHES) = 3.96

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 3042.3389
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 5124.3921

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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS) VOLUME(AF) Q(CFS) 0. 3525.0 7050.0 10575.0 14100.0

0.083	0.0000	0.00	Q	.	.	.
0.167	0.0000	0.00	Q	.	.	.
0.250	0.0000	0.00	Q	.	.	.

0.333	0.0000	0.00	Q	.	.	.
0.417	0.0000	0.00	Q	.	.	.
0.500	0.0000	0.00	Q	.	.	.
0.583	0.0000	0.00	Q	.	.	.
0.667	0.0000	0.00	Q	.	.	.
0.750	0.0000	0.00	Q	.	.	.
0.833	0.0000	0.00	Q	.	.	.
0.917	0.0000	0.00	Q	.	.	.
1.000	0.0000	0.00	Q	.	.	.
1.083	0.0000	0.00	Q	.	.	.
1.167	0.0000	0.00	Q	.	.	.
1.250	0.0000	0.00	Q	.	.	.
1.333	0.0000	0.00	Q	.	.	.
1.417	0.0000	0.00	Q	.	.	.
1.500	0.0000	0.00	Q	.	.	.
1.583	0.0000	0.00	Q	.	.	.
1.667	0.0000	0.00	Q	.	.	.
1.750	0.0000	0.00	Q	.	.	.
1.833	0.0000	0.00	Q	.	.	.
1.917	0.0000	0.00	Q	.	.	.
2.000	0.0000	0.00	Q	.	.	.
2.083	0.0000	0.00	Q	.	.	.
2.167	0.0000	0.00	Q	.	.	.
2.250	0.0000	0.00	Q	.	.	.
2.333	0.0000	0.00	Q	.	.	.
2.417	0.0000	0.00	Q	.	.	.

2.500	0.0000	0.00	Q	.	.	.
2.583	0.0000	0.00	Q	.	.	.
2.667	0.0000	0.00	Q	.	.	.
2.750	0.0000	0.00	Q	.	.	.
2.833	0.0000	0.00	Q	.	.	.
2.917	0.0000	0.00	Q	.	.	.
3.000	0.0000	0.00	Q	.	.	.
3.083	0.0000	0.00	Q	.	.	.
3.167	0.0000	0.00	Q	.	.	.
3.250	0.0000	0.00	Q	.	.	.
3.333	0.0000	0.00	Q	.	.	.
3.417	0.0000	0.00	Q	.	.	.
3.500	0.0000	0.00	Q	.	.	.
3.583	0.0000	0.00	Q	.	.	.
3.667	0.0000	0.00	Q	.	.	.
3.750	0.0000	0.00	Q	.	.	.
3.833	0.0000	0.00	Q	.	.	.
3.917	0.0000	0.00	Q	.	.	.
4.000	0.0000	0.00	Q	.	.	.
4.083	0.0000	0.00	Q	.	.	.
4.167	0.0000	0.00	Q	.	.	.
4.250	0.0000	0.00	Q	.	.	.
4.333	0.0000	0.00	Q	.	.	.
4.417	0.0000	0.00	Q	.	.	.
4.500	0.0000	0.00	Q	.	.	.
4.583	0.0020	0.29	Q	.	.	.

4.667	0.0040	0.29	Q	.	.	.
4.750	0.0059	0.29	Q	.	.	.
4.833	0.0175	1.68	Q	.	.	.
4.917	0.0290	1.68	Q	.	.	.
5.000	0.0406	1.68	Q	.	.	.
5.083	0.0791	5.59	Q	.	.	.
5.167	0.1176	5.59	Q	.	.	.
5.250	0.1560	5.59	Q	.	.	.
5.333	0.2515	13.86	Q	.	.	.
5.417	0.3469	13.86	Q	.	.	.
5.500	0.4423	13.86	Q	.	.	.
5.583	0.6349	27.96	Q	.	.	.
5.667	0.8274	27.96	Q	.	.	.
5.750	1.0200	27.96	Q	.	.	.
5.833	1.3538	48.47	Q	.	.	.
5.917	1.6876	48.47	Q	.	.	.
6.000	2.0214	48.47	Q	.	.	.
6.083	2.5395	75.23	Q	.	.	.
6.167	3.0576	75.23	Q	.	.	.
6.250	3.5757	75.23	Q	.	.	.
6.333	4.3166	107.58	Q	.	.	.
6.417	5.0576	107.58	Q	.	.	.
6.500	5.7985	107.58	Q	.	.	.
6.583	6.7940	144.55	Q	.	.	.
6.667	7.7896	144.55	Q	.	.	.
6.750	8.7851	144.55	Q	.	.	.

6.833	10.0594	185.03	Q	.	.	.
6.917	11.3338	185.03	Q	.	.	.
7.000	12.6081	185.03	Q	.	.	.
7.083	14.1797	228.20	Q	.	.	.
7.167	15.7514	228.20	Q	.	.	.
7.250	17.3230	228.20	Q	.	.	.
7.333	19.2068	273.53	Q	.	.	.
7.417	21.0906	273.53	Q	.	.	.
7.500	22.9745	273.53	Q	.	.	.
7.583	25.1828	320.65	Q	.	.	.
7.667	27.3912	320.65	Q	.	.	.
7.750	29.5995	320.65	Q	.	.	.
7.833	32.1430	369.31	VQ	.	.	.
7.917	34.6864	369.31	VQ	.	.	.
8.000	37.2298	369.31	VQ	.	.	.
8.083	40.1177	419.31	VQ	.	.	.
8.167	43.0055	419.31	VQ	.	.	.
8.250	45.8933	419.31	VQ	.	.	.
8.333	49.1341	470.56	VQ	.	.	.
8.417	52.3749	470.56	VQ	.	.	.
8.500	55.6157	470.56	VQ	.	.	.
8.583	59.2178	523.02	VQ	.	.	.
8.667	62.8199	523.02	VQ	.	.	.
8.750	66.4220	523.02	VQ	.	.	.
8.833	70.3937	576.69	VQ	.	.	.
8.917	74.3654	576.69	VQ	.	.	.

```
    9.000     78.3371    576.69  VQ        .         .         .
.
    9.083     82.6871    631.61  VQ        .         .         .
.
    9.167     87.0371    631.61  VQ        .         .         .
.
    9.250     91.3870    631.61  VQ        .         .         .
.
    9.333     96.1243    687.86  VQ        .         .         .
.
    9.417    100.8616    687.86  VQ        .         .         .
.
    9.500    105.5990    687.86  VQ        .         .         .
.
    9.583    110.7334    745.53  V Q       .         .         .
.
    9.667    115.8679    745.53  V Q       .         .         .
.
    9.750    121.0024    745.53  V Q       .         .         .
.
    9.833    126.5448    804.75  V Q       .         .         .
.
    9.917    132.0872    804.75   VQ       .         .         .
.
   10.000    137.6296    804.75   VQ       .         .         .
.
   10.083    143.5917    865.69  .VQ       .         .         .
.
   10.167    149.5537    865.69  .VQ       .         .         .
.
   10.250    155.5158    865.69  .VQ       .         .         .
.
   10.333    161.9107    928.53  .VQ       .         .         .
.
   10.417    168.3056    928.53  .VQ       .         .         .
.
   10.500    174.7004    928.53  .VQ       .         .         .
.
   10.583    181.5427    993.50  .VQ       .         .         .
.
   10.667    188.3850    993.50  .VQ       .         .         .
.
   10.750    195.2272    993.50  .VQ       .         .         .
.
   10.833    202.5332   1060.83  .V Q      .         .         .
.
   10.917    209.8392   1060.83  .V Q      .         .         .
.
   11.000    217.1452   1060.83  .V Q      .         .         .
.
   11.083    224.9332   1130.82  .V Q      .         .         .
.
```

11.167	232.7212	1130.82	.V Q	.	.	.
11.250	240.5093	1130.82	.V Q	.	.	.
11.333	248.7999	1203.80	.V Q	.	.	.
11.417	257.0905	1203.80	. VQ	.	.	.
11.500	265.3811	1203.80	. VQ	.	.	.
11.583	274.1975	1280.15	. VQ	.	.	.
11.667	283.0140	1280.15	. VQ	.	.	.
11.750	291.8304	1280.15	. VQ	.	.	.
11.833	301.1990	1360.32	. VQ	.	.	.
11.917	310.5676	1360.32	. VQ	.	.	.
12.000	319.9362	1360.32	. VQ	.	.	.
12.083	329.8616	1441.17	. V Q	.	.	.
12.167	339.7870	1441.17	. V Q	.	.	.
12.250	349.7123	1441.17	. V Q	.	.	.
12.333	360.1952	1522.11	. V Q	.	.	.
12.417	370.6780	1522.11	. V Q	.	.	.
12.500	381.1609	1522.11	. V Q	.	.	.
12.583	392.1937	1601.96	. VQ	.	.	.
12.667	403.2265	1601.96	. VQ	.	.	.
12.750	414.2593	1601.96	. VQ	.	.	.
12.833	425.8477	1682.63	. VQ	.	.	.
12.917	437.4361	1682.63	. VQ	.	.	.
13.000	449.0244	1682.63	. VQ	.	.	.
13.083	461.2306	1772.34	. V Q	.	.	.
13.167	473.4368	1772.34	. V Q	.	.	.
13.250	485.6430	1772.34	. V Q	.	.	.

```
   13.333    498.5449   1873.36  .  V Q    .         .         .
.
   13.417    511.4469   1873.36  .  V Q    .         .         .
.
   13.500    524.3488   1873.36  .   VQ    .         .         .
.
   13.583    538.0363   1987.42  .   VQ    .         .         .
.
   13.667    551.7238   1987.42  .   VQ    .         .         .
.
   13.750    565.4113   1987.42  .   VQ    .         .         .
.
   13.833    579.9816   2115.61  .   V Q   .         .         .
.
   13.917    594.5519   2115.61  .   V Q   .         .         .
.
   14.000    609.1223   2115.61  .   V Q   .         .         .
.
   14.083    624.7540   2269.73  .   V Q   .         .         .
.
   14.167    640.3858   2269.73  .   V Q   .         .         .
.
   14.250    656.0176   2269.73  .    VQ   .         .         .
.
   14.333    672.9547   2459.27  .    VQ   .         .         .
.
   14.417    689.8918   2459.27  .    VQ   .         .         .
.
   14.500    706.8290   2459.27  .    VQ   .         .         .
.
   14.583    725.3989   2696.36  .    V Q  .         .         .
.
   14.667    743.9689   2696.36  .    V Q  .         .         .
.
   14.750    762.5388   2696.36  .    V Q  .         .         .
.
   14.833    783.1359   2990.70  .     V Q .         .         .
.
   14.917    803.7330   2990.70  .     V Q .         .         .
.
   15.000    824.3301   2990.70  .     V Q .         .         .
.
   15.083    847.3196   3338.06  .     V  Q.         .         .
.
   15.167    870.3090   3338.06  .     V  Q.         .         .
.
   15.250    893.2983   3338.06  .     V  Q.         .         .
.
   15.333    919.0483   3738.89  .      V  Q         .         .
.
   15.417    944.7982   3738.89  .      V  Q         .         .
.
```

```
   15.500    970.5482   3738.89  .      V  Q         .          .
.
   15.583    999.7552   4240.86  .      V  . Q       .          .
.
   15.667   1028.9622   4240.86  .       V . Q       .          .
.
   15.750   1058.1692   4240.86  .       V . Q       .          .
.
   15.833   1091.9021   4898.02  .       V .  Q      .          .
.
   15.917   1125.6350   4898.02  .       V .  Q      .          .
.
   16.000   1159.3679   4898.02  .        V.  Q      .          .
.
   16.083   1201.6648   6141.51  .        V.      Q  .          .
.
   16.167   1243.9617   6141.51  .        V.      Q  .          .
.
   16.250   1286.2585   6141.51  .         V      Q  .          .
.
   16.333   1341.1713   7973.32  .         V         . Q        .
.
   16.417   1396.0840   7973.32  .         V         . Q        .
.
   16.500   1450.9967   7973.32  .          V        . Q        .
.
   16.583   1521.8418  10286.70  .         .V        .         Q.
.
   16.667   1592.6869  10286.70  .         . V       .         Q.
.
   16.750   1663.5320  10286.70  .         . V       .         Q.
.
   16.833   1750.3419  12604.80  .         .  V      .          .    Q
.
   16.917   1837.1519  12604.80  .         .   V     .          .    Q
.
   17.000   1923.9618  12604.80  .         .    V    .          .    Q
.
   17.083   2019.5179  13874.75  .         .    V    .          .
Q.
   17.167   2115.0742  13874.75  .         .     V   .          .
Q.
   17.250   2210.6304  13874.75  .         .      V  .          .
Q.
   17.333   2307.2766  14033.05  .         .       V .          .
Q.
   17.417   2403.9229  14033.05  .         .       V .          .
Q.
   17.500   2500.5691  14033.05  .         .        V.          .
Q.
   17.583   2592.0938  13289.39  .         .         V          .
Q  .
```

```
   17.667   2683.6184  13289.39  .         .         V         .
Q  .
   17.750   2775.1431  13289.39  .         .          V        .
Q  .
   17.833   2857.7205  11990.24  .         .         . V       .   Q
.
   17.917   2940.2979  11990.24  .         .         . V       .   Q
.
   18.000   3022.8752  11990.24  .         .         .  V      .   Q
.
   18.083   3093.8372  10303.66  .         .         .   V    Q.
.
   18.167   3164.7991  10303.66  .         .         .   V    Q.
.
   18.250   3235.7610  10303.66  .         .         .    V   Q.
.
   18.333   3295.4690   8669.61  .         .         .   QV    .
.
   18.417   3355.1770   8669.61  .         .         .   Q V   .
.
   18.500   3414.8850   8669.61  .         .         .   Q V   .
.
   18.583   3465.9363   7412.63  .         .         .Q     V  .
.
   18.667   3516.9875   7412.63  .         .         .Q     V  .
.
   18.750   3568.0388   7412.63  .         .         .Q     V  .
.
   18.833   3612.3496   6433.93  .         .       Q .       V .
.
   18.917   3656.6604   6433.93  .         .       Q .       V .
.
   19.000   3700.9712   6433.93  .         .       Q .       V .
.
   19.083   3739.7634   5632.62  .         .    Q    .        V.
.
   19.167   3778.5557   5632.62  .         .    Q    .        V.
.
   19.250   3817.3479   5632.62  .         .    Q    .        V.
.
   19.333   3851.5479   4965.82  .         .   Q     .         V
.
   19.417   3885.7478   4965.82  .         .   Q     .         V
.
   19.500   3919.9478   4965.82  .         .   Q     .         V
.
   19.583   3950.5017   4436.44  .         . Q       .         V
.
   19.667   3981.0557   4436.44  .         . Q       .          V
.
   19.750   4011.6096   4436.44  .         . Q       .          V
.
```

19.833	4039.1924	4005.01	.	.Q	.	.V
19.917	4066.7751	4005.01	.	.Q	.	.V
20.000	4094.3579	4005.01	.	.Q	.	.V
20.083	4119.4775	3647.37	.	Q	.	. V
20.167	4144.5972	3647.37	.	Q	.	. V
20.250	4169.7168	3647.37	.	Q	.	. V
20.333	4192.8052	3352.40	.	Q.	.	. V
20.417	4215.8936	3352.40	.	Q.	.	. V
20.500	4238.9819	3352.40	.	Q.	.	. V
20.583	4260.3774	3106.63	.	Q .	.	. V
20.667	4281.7729	3106.63	.	Q .	.	. V
20.750	4303.1685	3106.63	.	Q .	.	. V
20.833	4323.1367	2899.36	.	Q .	.	. V
20.917	4343.1050	2899.36	.	Q .	.	. V
21.000	4363.0732	2899.36	.	Q .	.	. V
21.083	4381.8301	2723.47	.	Q .	.	. V
21.167	4400.5869	2723.47	.	Q .	.	. V
21.250	4419.3438	2723.47	.	Q .	.	. V
21.333	4437.0654	2573.20	.	Q .	.	. V
21.417	4454.7871	2573.20	.	Q .	.	. V
21.500	4472.5088	2573.20	.	Q .	.	. V
21.583	4489.3530	2445.76	.	Q .	.	. V
21.667	4506.1973	2445.76	.	Q .	.	. V
21.750	4523.0415	2445.76	.	Q .	.	. V
21.833	4539.1382	2337.24	.	Q .	.	. V
21.917	4555.2349	2337.24	.	Q .	.	. V

```
   22.000   4571.3315   2337.24  .     Q   .         .         .    V
.
   22.083   4586.7539   2239.30  .     Q   .         .         .    V
.
   22.167   4602.1763   2239.30  .     Q   .         .         .    V
.
   22.250   4617.5986   2239.30  .     Q   .         .         .     V
.
   22.333   4632.4038   2149.71  .     Q   .         .         .     V
.
   22.417   4647.2090   2149.71  .     Q   .         .         .     V
.
   22.500   4662.0142   2149.71  .     Q   .         .         .     V
.
   22.583   4676.2637   2069.04  .    Q    .         .         .     V
.
   22.667   4690.5132   2069.04  .    Q    .         .         .     V
.
   22.750   4704.7627   2069.04  .    Q    .         .         .     V
.
   22.833   4718.5068   1995.68  .    Q    .         .         .     V
.
   22.917   4732.2510   1995.68  .    Q    .         .         .     V
.
   23.000   4745.9951   1995.68  .    Q    .         .         .
V  .
   23.083   4759.2910   1930.53  .    Q    .         .         .
V  .
   23.166   4772.5869   1930.53  .    Q    .         .         .
V  .
   23.250   4785.8828   1930.53  .    Q    .         .         .
V  .
   23.333   4798.8184   1878.23  .    Q    .         .         .
V  .
   23.416   4811.7539   1878.23  .    Q    .         .         .
V  .
   23.500   4824.6895   1878.23  .    Q    .         .         .
V  .
   23.583   4837.3008   1831.20  .    Q    .         .         .
V  .
   23.666   4849.9121   1831.20  .    Q    .         .         .
V  .
   23.750   4862.5234   1831.20  .    Q    .         .         .
V  .
   23.833   4874.8379   1788.05  .    Q    .         .         .
V .
   23.916   4887.1523   1788.05  .    Q    .         .         .
V .
   24.000   4899.4668   1788.05  .    Q    .         .         .
V .
   24.083   4911.3950   1731.97  .   Q     .         .         .
V .
```

```
   24.166   4923.3232   1731.97  .   Q     .         .         .
V .
   24.250   4935.2515   1731.97  .   Q     .         .         .
V .
   24.333   4946.5874   1645.99  .   Q     .         .         .
V .
   24.416   4957.9233   1645.99  .   Q     .         .         .
V .
   24.500   4969.2593   1645.99  .   Q     .         .         .
V .
   24.583   4979.6646   1510.82  .   Q     .         .         .
V .
   24.666   4990.0698   1510.82  .   Q     .         .         .
V .
   24.750   5000.4751   1510.82  .   Q     .         .         .
V.
   24.833   5009.5610   1319.26  .  Q      .         .         .
V.
   24.916   5018.6470   1319.26  .  Q      .         .         .
V.
   25.000   5027.7329   1319.26  .  Q      .         .         .
V.
   25.083   5035.3101   1100.17  .  Q      .         .         .
V.
   25.166   5042.8872   1100.17  .  Q      .         .         .
V.
   25.250   5050.4644   1100.17  .  Q      .         .         .
V.
   25.333   5056.5293    880.63  . Q       .         .         .
V.
   25.416   5062.5942    880.63  . Q       .         .         .
V.
   25.500   5068.6592    880.63  . Q       .         .         .
V.
   25.583   5073.3467    680.64  .Q        .         .         .
V.
   25.666   5078.0342    680.64  .Q        .         .         .
V.
   25.750   5082.7217    680.64  .Q        .         .         .
V.
   25.833   5086.2373    510.49  .Q        .         .         .
V.
   25.916   5089.7529    510.49  .Q        .         .         .
V.
   26.000   5093.2686    510.49  .Q        .         .         .
V.
   26.083   5095.8867    380.15  .Q        .         .         .
V.
   26.166   5098.5049    380.15  .Q        .         .         .
V.
   26.250   5101.1230    380.15  .Q        .         .         .
V.
```

```
   26.333   5103.0947    286.27  Q         .         .         .
V.
   26.416   5105.0664    286.27  Q         .         .         .
V.
   26.500   5107.0381    286.27  Q         .         .         .
V.
   26.583   5108.5259    216.02  Q         .         .         .
V.
   26.666   5110.0137    216.02  Q         .         .         .
V.
   26.750   5111.5015    216.02  Q         .         .         .
V.
   26.833   5112.6187    162.18  Q         .         .         .
V.
   26.916   5113.7358    162.18  Q         .         .         .
V.
   27.000   5114.8530    162.18  Q         .         .         .
V.
   27.083   5115.6880    121.26  Q         .         .         .
V.
   27.166   5116.5229    121.26  Q         .         .         .
V.
   27.250   5117.3579    121.26  Q         .         .         .
V.
   27.333   5117.9839     90.89  Q         .         .         .
V.
   27.416   5118.6099     90.89  Q         .         .         .
V.
   27.500   5119.2358     90.89  Q         .         .         .
V.
   27.583   5119.7041     67.98  Q         .         .         .
V.
   27.666   5120.1724     67.98  Q         .         .         .
V.
   27.750   5120.6406     67.98  Q         .         .         .
V.
   27.833   5120.9897     50.68  Q         .         .         .
V.
   27.916   5121.3389     50.68  Q         .         .         .
V.
   28.000   5121.6880     50.68  Q         .         .         .
V.
   28.083   5121.9478     37.70  Q         .         .         .
V.
   28.166   5122.2075     37.70  Q         .         .         .
V.
   28.250   5122.4673     37.70  Q         .         .         .
V.
   28.333   5122.6597     27.90  Q         .         .         .
V.
   28.416   5122.8521     27.90  Q         .         .         .
V.
```

28.500	5123.0444	27.90	Q	.	.	.
V.						
28.583	5123.1855	20.49	Q	.	.	.
V.						
28.666	5123.3267	20.49	Q	.	.	.
V.						
28.750	5123.4678	20.49	Q	.	.	.
V.						
28.833	5123.5703	14.91	Q	.	.	.
V.						
28.916	5123.6729	14.91	Q	.	.	.
V.						
29.000	5123.7754	14.91	Q	.	.	.
V.						
29.083	5123.8491	10.73	Q	.	.	.
V.						
29.166	5123.9229	10.73	Q	.	.	.
V.						
29.250	5123.9966	10.73	Q	.	.	.
V.						
29.333	5124.0488	7.62	Q	.	.	.
V.						
29.416	5124.1011	7.62	Q	.	.	.
V.						
29.500	5124.1533	7.62	Q	.	.	.
V.						
29.583	5124.1895	5.26	Q	.	.	.
V.						
29.666	5124.2256	5.26	Q	.	.	.
V.						
29.750	5124.2617	5.26	Q	.	.	.
V.						
29.833	5124.2852	3.37	Q	.	.	.
V.						
29.916	5124.3086	3.37	Q	.	.	.
V.						
30.000	5124.3320	3.37	Q	.	.	.
V.						
30.083	5124.3452	1.93	Q	.	.	.
V.						
30.166	5124.3584	1.93	Q	.	.	.
V.						
30.250	5124.3716	1.93	Q	.	.	.
V.						
30.333	5124.3779	0.93	Q	.	.	.
V.						
30.416	5124.3843	0.93	Q	.	.	.
V.						
30.500	5124.3906	0.93	Q	.	.	.
V.						
30.583	5124.3926	0.29	Q	.	.	.
V						

```
   30.666   5124.3945      0.29  Q          .          .          .
V
   30.750   5124.3965      0.29  Q          .          .          .
V
   30.833   5124.3965      0.00  Q          .          .          .
V
   30.916   5124.3965      0.00  Q          .          .          .
V
   31.000   5124.3965      0.00  Q          .          .          .
V
-------------------------------------------------------------------------
----------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                Duration
        Peak Flow Rate                     (minutes)
    ======================                 =========
              0%                            1590.0
             10%                             765.0
             20%                             375.0
             30%                             255.0
             40%                             195.0
             50%                             150.0
             60%                             120.0
             70%                             105.0
             80%                              75.0
             90%                              45.0

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

   END OF FLOODSCx ROUTING ANALYSIS
```

Appendix E

Pre-Project & Post-Project Hydrology (Project Site)
AES 2011 RATSCx Output

September 2012

AECOM

```
_____
_____

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2012 Advanced Engineering Software (aes)
              Ver. 18.4 Release Date: 07/05/2012  License ID 1395

                              Analysis prepared by:




 ----------------------------------------------------------------------
-------
   FILE NAME: TULEXRAT.DAT
   TIME/DATE OF STUDY: 14:47 09/04/2012
 ----------------------------------------------------------------------
-------
   USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 ----------------------------------------------------------------------
-------
   2003 SAN DIEGO MANUAL CRITERIA

   USER SPECIFIED STORM EVENT(YEAR) = 100.00
   6-HOUR DURATION PRECIPITATION (INCHES) =   3.750
   SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
   SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE =
0.85
   SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
   NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE
ANALYSIS
   *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW
MODEL*
      HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:
MANNING
      WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE
FACTOR
 NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)
(n)
 ===  =====  =========  =================  ======  ===== ====== =====
=======
   1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167
0.0150
```

```
   GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
     1. Relative Flow-Depth =  0.00 FEET
        as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
     2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
   *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
    OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*


****************************************************************************
******
   FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3100
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3965.00
   DOWNSTREAM ELEVATION(FEET) =   3960.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.316
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.116
   SUBAREA RUNOFF(CFS) =      0.20
   TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.20


****************************************************************************
******
   FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  5007.00
   REPRESENTATIVE CHANNEL SLOPE =  0.1280
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.816
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3100
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     168.57
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.07
   AVERAGE FLOW DEPTH(FEET) =   1.35   TRAVEL TIME(MIN.) =   6.92
   Tc(MIN.) =   15.23
```

```
   SUBAREA AREA(ACRES) =   219.33       SUBAREA RUNOFF(CFS) =  327.47
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.310
   TOTAL AREA(ACRES) =      219.4         PEAK FLOW RATE(CFS) =
327.61

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.84   FLOW VELOCITY(FEET/SEC.) =  14.39
   LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    5107.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
 ----------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2181.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0170
   CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.993
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3100
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     408.49
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.08
   AVERAGE FLOW DEPTH(FEET) =   2.75   TRAVEL TIME(MIN.) =   5.14
   Tc(MIN.) =   20.37
   SUBAREA AREA(ACRES) =   130.46       SUBAREA RUNOFF(CFS) =  161.49
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.310
   TOTAL AREA(ACRES) =      349.9         PEAK FLOW RATE(CFS) =
433.10

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  2.83   FLOW VELOCITY(FEET/SEC.) =   7.19
   LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    7288.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
 ----------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3093.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0320
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.426
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3100
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     469.40
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.44
   AVERAGE FLOW DEPTH(FEET) =   2.96   TRAVEL TIME(MIN.) =   5.46
   Tc(MIN.) =   25.83
   SUBAREA AREA(ACRES) =    68.33       SUBAREA RUNOFF(CFS) =   72.57
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.310
   TOTAL AREA(ACRES) =      418.2         PEAK FLOW RATE(CFS) =
444.16

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  2.89   FLOW VELOCITY(FEET/SEC.) =   9.30
   LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =   10381

****************************************************************************
******
   FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
 ----------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

================================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3400
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3725.00
   DOWNSTREAM ELEVATION(FEET) =   3720.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.001
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.296
   SUBAREA RUNOFF(CFS) =      0.99
   TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      0.99


****************************************************************************
******
   FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
 ----------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
   CHANNEL LENGTH THRU SUBAREA(FEET) =  4218.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0430
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.841
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3400
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      31.95
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.16
   AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =  13.63
   Tc(MIN.) =   21.63
   SUBAREA AREA(ACRES) =    44.57       SUBAREA RUNOFF(CFS) =   58.21
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.340
   TOTAL AREA(ACRES) =       45.0         PEAK FLOW RATE(CFS) =
58.73

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.05   FLOW VELOCITY(FEET/SEC.) =   6.10
   LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =    4318.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

================================================================================
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3100
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3685.00
   DOWNSTREAM ELEVATION(FEET) =   3680.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.316
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.116
   SUBAREA RUNOFF(CFS) =      0.44
   TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.44


****************************************************************************
******
   FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
```

```
 ----------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2110.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0510
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.620
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .3100
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.24
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.43
   AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   7.93
   Tc(MIN.) =   16.25
   SUBAREA AREA(ACRES) =    19.95       SUBAREA RUNOFF(CFS) =   28.57
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.310
   TOTAL AREA(ACRES) =       20.2         PEAK FLOW RATE(CFS) =
28.86

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   5.31
   LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =    2210.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
 ----------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

======================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2700
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3685.00
   DOWNSTREAM ELEVATION(FEET) =   3680.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.737
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.893
   SUBAREA RUNOFF(CFS) =      0.26
   TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.26
```

```
****************************************************************************
******
   FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1153.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0900
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.353
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2700
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.32
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.58
   AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   4.19
   Tc(MIN.) =   12.93
   SUBAREA AREA(ACRES) =    12.36       SUBAREA RUNOFF(CFS) =   17.86
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.270
   TOTAL AREA(ACRES) =       12.5         PEAK FLOW RATE(CFS) =
18.07

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.47   FLOW VELOCITY(FEET/SEC.) =   5.61
   LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =    1253.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2800
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3770.00
   DOWNSTREAM ELEVATION(FEET) =   3765.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.632
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.947
```

```
   SUBAREA RUNOFF(CFS) =      0.31
   TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.31


****************************************************************************
******
   FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3984.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0400
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.008
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2800
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      50.62
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.72
   AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =  11.62
   Tc(MIN.) =   20.25
   SUBAREA AREA(ACRES) =    85.34       SUBAREA RUNOFF(CFS) =   95.78
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.280
   TOTAL AREA(ACRES) =       85.5         PEAK FLOW RATE(CFS) =
95.96

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   6.80
   LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =    4084.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1171.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0800
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.415
```

```
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2800
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     103.80
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.97
   AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   5.71
   Tc(MIN.) =   25.96
   SUBAREA AREA(ACRES) =    16.40       SUBAREA RUNOFF(CFS) =   15.68
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.280
   TOTAL AREA(ACRES) =      101.9         PEAK FLOW RATE(CFS) =
97.43

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   8.77
   LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =    7158.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   4320.00
   DOWNSTREAM ELEVATION(FEET) =   4310.00
   ELEVATION DIFFERENCE(FEET) =     10.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.102
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc
CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.879
   SUBAREA RUNOFF(CFS) =      0.20
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20


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******
   FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  51
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-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
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```
   CHANNEL LENGTH THRU SUBAREA(FEET) =  4039.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0780
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.616
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      52.40
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.34
   AVERAGE FLOW DEPTH(FEET) =   0.85   TRAVEL TIME(MIN.) =   9.17
   Tc(MIN.) =   16.27
   SUBAREA AREA(ACRES) =    86.31       SUBAREA RUNOFF(CFS) =   99.60
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       86.4         PEAK FLOW RATE(CFS) =
99.72

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.17   FLOW VELOCITY(FEET/SEC.) =   8.78
   LONGEST FLOWPATH FROM NODE    700.00 TO NODE    702.00 =    4139.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    702.00 TO NODE    703.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3902.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0600
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.716
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     235.86
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.01
   AVERAGE FLOW DEPTH(FEET) =   1.88   TRAVEL TIME(MIN.) =   6.50
   Tc(MIN.) =   22.77
   SUBAREA AREA(ACRES) =   291.35       SUBAREA RUNOFF(CFS) =  270.69
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =      377.8         PEAK FLOW RATE(CFS) =
350.97

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  2.26   FLOW VELOCITY(FEET/SEC.) =  11.05
```

```
   LONGEST FLOWPATH FROM NODE    700.00 TO NODE    703.00 =    8041.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    703.00 TO NODE    704.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3507.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0290
   CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.157
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     466.35
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.92
   AVERAGE FLOW DEPTH(FEET) =   2.58   TRAVEL TIME(MIN.) =   6.55
   Tc(MIN.) =   29.32
   SUBAREA AREA(ACRES) =   291.90       SUBAREA RUNOFF(CFS) =  230.37
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =      669.7         PEAK FLOW RATE(CFS) =
528.49

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  2.74   FLOW VELOCITY(FEET/SEC.) =   9.22
   LONGEST FLOWPATH FROM NODE    700.00 TO NODE    704.00 =   11548.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    704.00 TO NODE    705.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3074.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0280
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.827
```

```
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     551.39
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.36
   AVERAGE FLOW DEPTH(FEET) =   3.26   TRAVEL TIME(MIN.) =   5.47
   Tc(MIN.) =   34.80
   SUBAREA AREA(ACRES) =    64.78       SUBAREA RUNOFF(CFS) =   45.78
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =      734.4         PEAK FLOW RATE(CFS) =
682.49

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  3.21   FLOW VELOCITY(FEET/SEC.) =   9.24
   LONGEST FLOWPATH FROM NODE    700.00 TO NODE    705.00 =   14622.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2400
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3805.00
   DOWNSTREAM ELEVATION(FEET) =   3800.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.053
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.737
   SUBAREA RUNOFF(CFS) =      0.16
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16


****************************************************************************
******
   FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  4472.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0540
```

```
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.823
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2400
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.62
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.85
   AVERAGE FLOW DEPTH(FEET) =   0.79   TRAVEL TIME(MIN.) =  12.74
   Tc(MIN.) =   21.80
   SUBAREA AREA(ACRES) =    77.38       SUBAREA RUNOFF(CFS) =   70.99
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.240
   TOTAL AREA(ACRES) =       77.5         PEAK FLOW RATE(CFS) =
71.08

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   6.98
   LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =    4572.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2400
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3725.00
   DOWNSTREAM ELEVATION(FEET) =   3720.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.053
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.737
   SUBAREA RUNOFF(CFS) =      0.16
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16


****************************************************************************
******
   FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2848.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0600
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.499
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2400
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.32
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.03
   AVERAGE FLOW DEPTH(FEET) =   0.75   TRAVEL TIME(MIN.) =   7.88
   Tc(MIN.) =   16.93
   SUBAREA AREA(ACRES) =    65.00       SUBAREA RUNOFF(CFS) =   70.19
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.240
   TOTAL AREA(ACRES) =       65.1         PEAK FLOW RATE(CFS) =
70.29

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =   7.22
   LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    2948.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   1000.00 TO NODE   1001.00 IS CODE =  21
 ----------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

================================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2400
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   4080.00
   DOWNSTREAM ELEVATION(FEET) =   4075.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.053
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.737
   SUBAREA RUNOFF(CFS) =      0.16
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16


****************************************************************************
******
   FLOW PROCESS FROM NODE   1001.00 TO NODE   1002.00 IS CODE =  51
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 ----------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3953.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0710
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.092
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2400
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.49
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
   AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =  10.56
   Tc(MIN.) =   19.62
   SUBAREA AREA(ACRES) =    64.96       SUBAREA RUNOFF(CFS) =   63.79
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.240
   TOTAL AREA(ACRES) =       65.1         PEAK FLOW RATE(CFS) =
63.89

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.96   FLOW VELOCITY(FEET/SEC.) =   7.48
   LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1002.00 =    4053.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE   1002.00 TO NODE   1003.00 IS CODE =  51
 ----------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3963.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0410
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.297
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2400
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     214.05
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.47
   AVERAGE FLOW DEPTH(FEET) =   1.97   TRAVEL TIME(MIN.) =   7.80
   Tc(MIN.) =   27.42
```

```
   SUBAREA AREA(ACRES) =   377.01       SUBAREA RUNOFF(CFS) =  298.30
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.240
   TOTAL AREA(ACRES) =      442.1         PEAK FLOW RATE(CFS) =
349.78

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  2.46   FLOW VELOCITY(FEET/SEC.) =   9.58
   LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1003.00 =    8016.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE   1003.00 TO NODE   1004.00 IS CODE =  51
 ----------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3141.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0370
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.932
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2400
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     398.00
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.57
   AVERAGE FLOW DEPTH(FEET) =   2.66   TRAVEL TIME(MIN.) =   5.47
   Tc(MIN.) =   32.89
   SUBAREA AREA(ACRES) =   137.04       SUBAREA RUNOFF(CFS) =   96.42
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.240
   TOTAL AREA(ACRES) =      579.1         PEAK FLOW RATE(CFS) =
407.47

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  2.69   FLOW VELOCITY(FEET/SEC.) =   9.61
   LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1004.00 =   11157.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE   1100.00 TO NODE   1101.00 IS CODE =  21
 ----------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

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================================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3760.00
   DOWNSTREAM ELEVATION(FEET) =   3755.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      0.12
   TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.12


****************************************************************************
******
   FLOW PROCESS FROM NODE   1101.00 TO NODE   1102.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================================
======
    CHANNEL LENGTH THRU SUBAREA(FEET) =  3318.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0350
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.169
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      46.28
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.47
   AVERAGE FLOW DEPTH(FEET) =   1.23   TRAVEL TIME(MIN.) =  10.11
   Tc(MIN.) =   19.05
   SUBAREA AREA(ACRES) =    85.23       SUBAREA RUNOFF(CFS) =   88.82
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       85.3         PEAK FLOW RATE(CFS) =
88.90

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.62   FLOW VELOCITY(FEET/SEC.) =   6.46
   LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1102.00 =    3418.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   1102.00 TO NODE   1103.00 IS CODE =  51
```

```
 ----------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

======================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3083.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0230
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.261
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     115.83
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.82
   AVERAGE FLOW DEPTH(FEET) =   1.69   TRAVEL TIME(MIN.) =   8.82
   Tc(MIN.) =   27.88
   SUBAREA AREA(ACRES) =    65.86       SUBAREA RUNOFF(CFS) =   53.70
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =      151.2         PEAK FLOW RATE(CFS) =
123.25

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.74   FLOW VELOCITY(FEET/SEC.) =   5.91
   LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1103.00 =    6501.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE   1200.00 TO NODE   1201.00 IS CODE =  21
 ----------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

======================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3760.00
   DOWNSTREAM ELEVATION(FEET) =   3755.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      0.17
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17
```

```
****************************************************************************
******
   FLOW PROCESS FROM NODE   1201.00 TO NODE   1202.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3637.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0650
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.411
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      59.46
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.12
   AVERAGE FLOW DEPTH(FEET) =   0.95   TRAVEL TIME(MIN.) =   8.51
   Tc(MIN.) =   17.46
   SUBAREA AREA(ACRES) =   104.02       SUBAREA RUNOFF(CFS) =  114.71
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =      104.1         PEAK FLOW RATE(CFS) =
114.82

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.32   FLOW VELOCITY(FEET/SEC.) =   8.51
   LONGEST FLOWPATH FROM NODE   1200.00 TO NODE   1202.00 =    3737.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   1300.00 TO NODE   1301.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3765.00
   DOWNSTREAM ELEVATION(FEET) =   3760.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
```

```
   SUBAREA RUNOFF(CFS) =      0.14
   TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.14


****************************************************************************
******
   FLOW PROCESS FROM NODE   1301.00 TO NODE   1302.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2124.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0770
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.652
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.59
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.97
   AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   7.13
   Tc(MIN.) =   16.07
   SUBAREA AREA(ACRES) =    17.49       SUBAREA RUNOFF(CFS) =   20.34
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =
20.43

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   5.91
   LONGEST FLOWPATH FROM NODE   1300.00 TO NODE   1302.00 =    2224.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   1302.00 TO NODE   1303.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1851.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0450
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.814
```

```
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.21
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.32
   AVERAGE FLOW DEPTH(FEET) =   0.79   TRAVEL TIME(MIN.) =   5.80
   Tc(MIN.) =   21.87
   SUBAREA AREA(ACRES) =    28.77       SUBAREA RUNOFF(CFS) =   27.43
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       46.3         PEAK FLOW RATE(CFS) =
44.18

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.90   FLOW VELOCITY(FEET/SEC.) =   5.73
   LONGEST FLOWPATH FROM NODE   1300.00 TO NODE   1303.00 =    4075.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   1400.00 TO NODE   1401.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3775.00
   DOWNSTREAM ELEVATION(FEET) =   3770.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      1.02
   TOTAL AREA(ACRES) =      0.60   TOTAL RUNOFF(CFS) =      1.02


****************************************************************************
******
   FLOW PROCESS FROM NODE   1401.00 TO NODE   1402.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1940.00
   REPRESENTATIVE CHANNEL SLOPE =  0.1080
```

```
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.721
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.44
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.78
   AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   6.76
   Tc(MIN.) =   15.71
   SUBAREA AREA(ACRES) =    12.30       SUBAREA RUNOFF(CFS) =   14.52
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       12.9         PEAK FLOW RATE(CFS) =
15.23

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   5.74
   LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1402.00 =    2040.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE   1402.00 TO NODE   1403.00 IS CODE =  51
 ----------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2522.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0250
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.531
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      46.74
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.70
   AVERAGE FLOW DEPTH(FEET) =   1.07   TRAVEL TIME(MIN.) =   8.94
   Tc(MIN.) =   24.65
   SUBAREA AREA(ACRES) =    70.50       SUBAREA RUNOFF(CFS) =   62.23
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       83.4         PEAK FLOW RATE(CFS) =
73.61

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.34   FLOW VELOCITY(FEET/SEC.) =   5.31
   LONGEST FLOWPATH FROM NODE   1400.00 TO NODE   1403.00 =    4562.00
FEET.
```

```
****************************************************************************
******
   FLOW PROCESS FROM NODE   1500.00 TO NODE   1501.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3680.00
   DOWNSTREAM ELEVATION(FEET) =   3675.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      0.24
   TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.24


****************************************************************************
******
   FLOW PROCESS FROM NODE   1501.00 TO NODE   1502.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  4451.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0400
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.702
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      38.54
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.32
   AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =  13.96
   Tc(MIN.) =   22.90
   SUBAREA AREA(ACRES) =    78.23       SUBAREA RUNOFF(CFS) =   72.41
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       78.4         PEAK FLOW RATE(CFS) =
72.54

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
   DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   6.28
   LONGEST FLOWPATH FROM NODE   1500.00 TO NODE   1502.00 =    4551.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   1600.00 TO NODE   1601.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3600.00
   DOWNSTREAM ELEVATION(FEET) =   3595.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      0.17
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17


****************************************************************************
******
   FLOW PROCESS FROM NODE   1601.00 TO NODE   1602.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1580.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0620
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.842
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.01
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.28
   AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   6.16
   Tc(MIN.) =   15.11
   SUBAREA AREA(ACRES) =    17.51       SUBAREA RUNOFF(CFS) =   21.20
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
```

```
   TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =
21.32

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.56   FLOW VELOCITY(FEET/SEC.) =   5.24
   LONGEST FLOWPATH FROM NODE   1600.00 TO NODE   1602.00 =    1680.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   1700.00 TO NODE   1701.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3605.00
   DOWNSTREAM ELEVATION(FEET) =   3600.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      0.34
   TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.34


****************************************************************************
******
   FLOW PROCESS FROM NODE   1701.00 TO NODE   1702.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1768.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0560
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.699
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.18
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.28
   AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   6.88
```

```
   Tc(MIN.) =   15.83
   SUBAREA AREA(ACRES) =    19.66       SUBAREA RUNOFF(CFS) =   23.10
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       19.9         PEAK FLOW RATE(CFS) =
23.33

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   5.17
   LONGEST FLOWPATH FROM NODE   1700.00 TO NODE   1702.00 =    1868.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   1800.00 TO NODE   1801.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3840.00
   DOWNSTREAM ELEVATION(FEET) =   3835.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      0.51
   TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.51


****************************************************************************
******
   FLOW PROCESS FROM NODE   1801.00 TO NODE   1802.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3730.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0630
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.036
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
```

```
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.83
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.61
   AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =  11.09
   Tc(MIN.) =   20.04
   SUBAREA AREA(ACRES) =    40.49       SUBAREA RUNOFF(CFS) =   40.85
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       40.8         PEAK FLOW RATE(CFS) =
41.16

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.03   FLOW VELOCITY(FEET/SEC.) =   6.58
   LONGEST FLOWPATH FROM NODE   1800.00 TO NODE   1802.00 =    3830.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE   1802.00 TO NODE   1803.00 IS CODE =  51
 ----------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3230.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0300
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.112
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      60.84
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.41
   AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   9.95
   Tc(MIN.) =   29.99
   SUBAREA AREA(ACRES) =    50.37       SUBAREA RUNOFF(CFS) =   39.18
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       91.2         PEAK FLOW RATE(CFS) =
70.91

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.26   FLOW VELOCITY(FEET/SEC.) =   5.63
   LONGEST FLOWPATH FROM NODE   1800.00 TO NODE   1803.00 =    7060.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE   1900.00 TO NODE   1901.00 IS CODE =  21
```

```
 ------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

========================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3840.00
   DOWNSTREAM ELEVATION(FEET) =   3835.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      0.51
   TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.51


************************************************************************
******
   FLOW PROCESS FROM NODE   1901.00 TO NODE   1902.00 IS CODE =  51
 ------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

========================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2521.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0870
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.858
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.95
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.91
   AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   6.08
   Tc(MIN.) =   15.03
   SUBAREA AREA(ACRES) =    58.73       SUBAREA RUNOFF(CFS) =   71.33
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       59.0         PEAK FLOW RATE(CFS) =
71.69

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   8.30
   LONGEST FLOWPATH FROM NODE   1900.00 TO NODE   1902.00 =    2621.00
FEET.
```

```
****************************************************************************
******
   FLOW PROCESS FROM NODE   1902.00 TO NODE   1903.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3455.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0320
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.593
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     106.60
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.42
   AVERAGE FLOW DEPTH(FEET) =   1.51   TRAVEL TIME(MIN.) =   8.97
   Tc(MIN.) =   24.00
   SUBAREA AREA(ACRES) =    77.19       SUBAREA RUNOFF(CFS) =   69.33
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =      136.2         PEAK FLOW RATE(CFS) =
122.35

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  1.61   FLOW VELOCITY(FEET/SEC.) =   6.67
   LONGEST FLOWPATH FROM NODE   1900.00 TO NODE   1903.00 =    6076.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   2000.00 TO NODE   2001.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   4000.00
   DOWNSTREAM ELEVATION(FEET) =   3995.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
```

```
   SUBAREA RUNOFF(CFS) =      0.17
   TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.17


****************************************************************************
******
   FLOW PROCESS FROM NODE   2001.00 TO NODE   2002.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  2594.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0540
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.429
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.92
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.15
   AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   8.40
   Tc(MIN.) =   17.35
   SUBAREA AREA(ACRES) =    41.52       SUBAREA RUNOFF(CFS) =   45.98
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =       41.6         PEAK FLOW RATE(CFS) =
46.09

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.87   FLOW VELOCITY(FEET/SEC.) =   6.20
   LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2002.00 =    2694.00
FEET.


****************************************************************************
******
   FLOW PROCESS FROM NODE   2002.00 TO NODE   2003.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  4073.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0550
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.502
```

```
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     173.09
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.91
   AVERAGE FLOW DEPTH(FEET) =   1.67   TRAVEL TIME(MIN.) =   7.62
   Tc(MIN.) =   24.97
   SUBAREA AREA(ACRES) =   287.58       SUBAREA RUNOFF(CFS) =  251.77
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =      329.2         PEAK FLOW RATE(CFS) =
288.21

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  2.11   FLOW VELOCITY(FEET/SEC.) =  10.17
   LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2003.00 =    6767.00
FEET.


****************************************************************
******
   FLOW PROCESS FROM NODE   2003.00 TO NODE   2004.00 IS CODE =  51
 ----------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  3980.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0360
   CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.972
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     353.01
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.18
   AVERAGE FLOW DEPTH(FEET) =   2.54   TRAVEL TIME(MIN.) =   7.22
   Tc(MIN.) =   32.19
   SUBAREA AREA(ACRES) =   174.24       SUBAREA RUNOFF(CFS) =  129.48
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =      503.4         PEAK FLOW RATE(CFS) =
374.11

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  2.61   FLOW VELOCITY(FEET/SEC.) =   9.31
   LONGEST FLOWPATH FROM NODE   2000.00 TO NODE   2004.00 =   10747.00
FEET.
```

```
****************************************************************************
******
   FLOW PROCESS FROM NODE   2100.00 TO NODE   2101.00 IS CODE =  21
 ----------------------------------------------------------------------------
-------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

============================================================================
======
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   3690.00
   DOWNSTREAM ELEVATION(FEET) =   3685.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.948
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.788
   SUBAREA RUNOFF(CFS) =      0.22
   TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.22


****************************************************************************
******
   FLOW PROCESS FROM NODE   2101.00 TO NODE   2102.00 IS CODE =  51
 ----------------------------------------------------------------------------
-------
   >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

============================================================================
======
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1727.00
   REPRESENTATIVE CHANNEL SLOPE =  0.0580
   CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   4.000
   MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.592
   *USER SPECIFIED(SUBAREA):
   USER-SPECIFIED RUNOFF COEFFICIENT = .2500
   S.C.S. CURVE NUMBER (AMC II) =   0
   TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.90
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.86
   AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   7.45
   Tc(MIN.) =   16.40
   SUBAREA AREA(ACRES) =     9.65       SUBAREA RUNOFF(CFS) =   11.08
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.250
   TOTAL AREA(ACRES) =        9.8         PEAK FLOW RATE(CFS) =
11.23

   END OF SUBAREA CHANNEL FLOW HYDRAULICS:
   DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   4.54
```

```
   LONGEST FLOWPATH FROM NODE   2100.00 TO NODE   2102.00 =    1827.00
FEET.

============================================================================
======
   END OF STUDY SUMMARY:
   TOTAL AREA(ACRES)     =        9.8  TC(MIN.) =     16.40
   PEAK FLOW RATE(CFS)   =      11.23

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

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

Appendix F

Post-Project Watershed (Tule Creek) C Calculations

September 2012

AECOM

Post-Project Soil Type Areas for Tule Creek

Sub Basins Area (ft^2)	Soil Type - Area 100				
	A	B	C	D	IMP
1	87631401	0	17697306	24105750	130680
2					
3					
4					
5					
6					
7					
Sub Basin Total Area		676102604			
Total Area (ft^2)	87631401	570643217	17697306	24105750	130680
Total Area (acres)	2011.74	13100.17	406.27	553.39	3.00
Total Sub Basin Drainage Area (acres)	15521.18				
Percentage of Total	12.96%	84.40%	2.62%	3.57%	0.02%
CN for Desert Shrub (Fair)	55	72	81	86	1
Watershed Weighted CN	70				
Adjusted PZN for Q100 (Table 4-10)	79				

PZN (Figure C-1) 3.5
PZN Adjustment Factor (Table 4-6, Page 4-20) 2.5

Appendix G

Proposed Hydrology Map – Project Site

Post-Project Watershed (Project Site) Sub-Area C Calculations

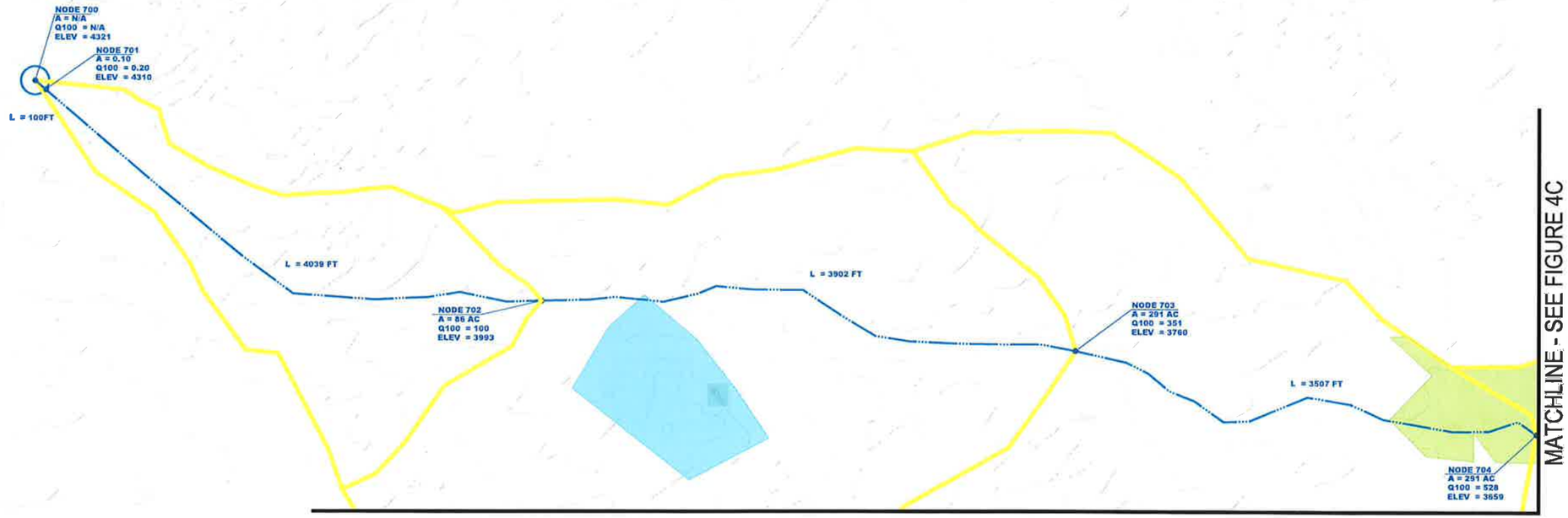
Proposed Roadway Crossing Calculations

September 2012

AECOM

LEGEND

- PROPOSED DRAINAGE BASIN
- EXISTING DRAINAGE COURSE
- SOIL A
- SOIL B, ALL OTHER PROJECT AREAS
- SOIL C
- SOIL D
- DIP CROSSING
- PROPERTY BOUNDARY



300 150 0 300 600
SCALE IN FEET

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AECOM USA, Inc.
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SAN DIEG, CA
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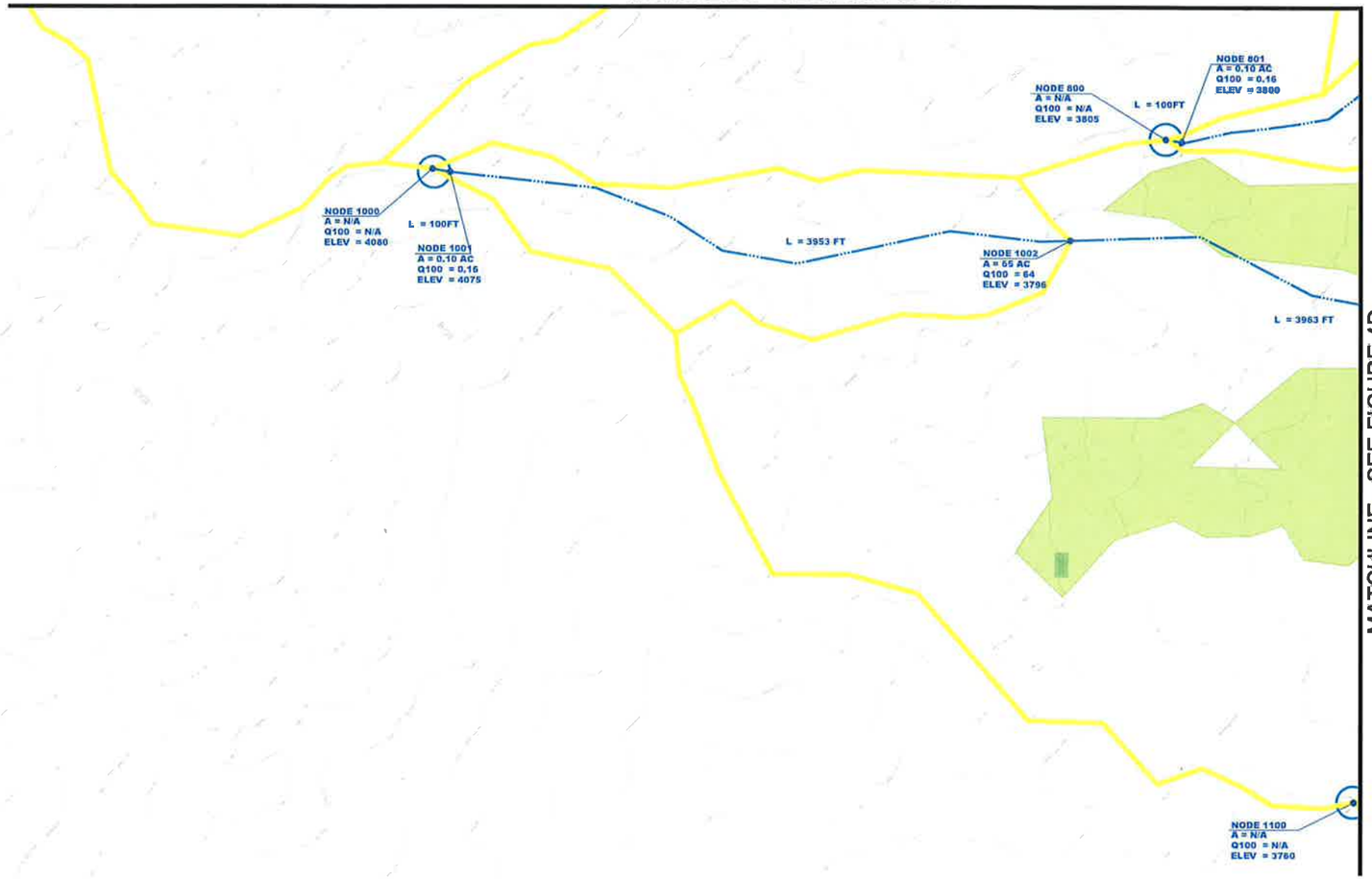
www.aecom.com

RUGGED ACRES PROJECT SITE DRAINAGE BASIN	AECOM PROJECT NO.	FIGURE
PROPOSED HYDROLOGY	60212653	4A

MATCHLINE - SEE FIGURE 4A



MATCHLINE - SEE FIGURE 4D

LEGEND

- PROPOSED DRAINAGE BASIN
- EXISTING DRAINAGE COURSE
- SOIL A
- SOIL B, ALL OTHER PROJECT AREAS
- SOIL C
- SOIL D
- DIP CROSSING
- PROPERTY BOUNDARY

300 150 0 300 600
SCALE IN FEET

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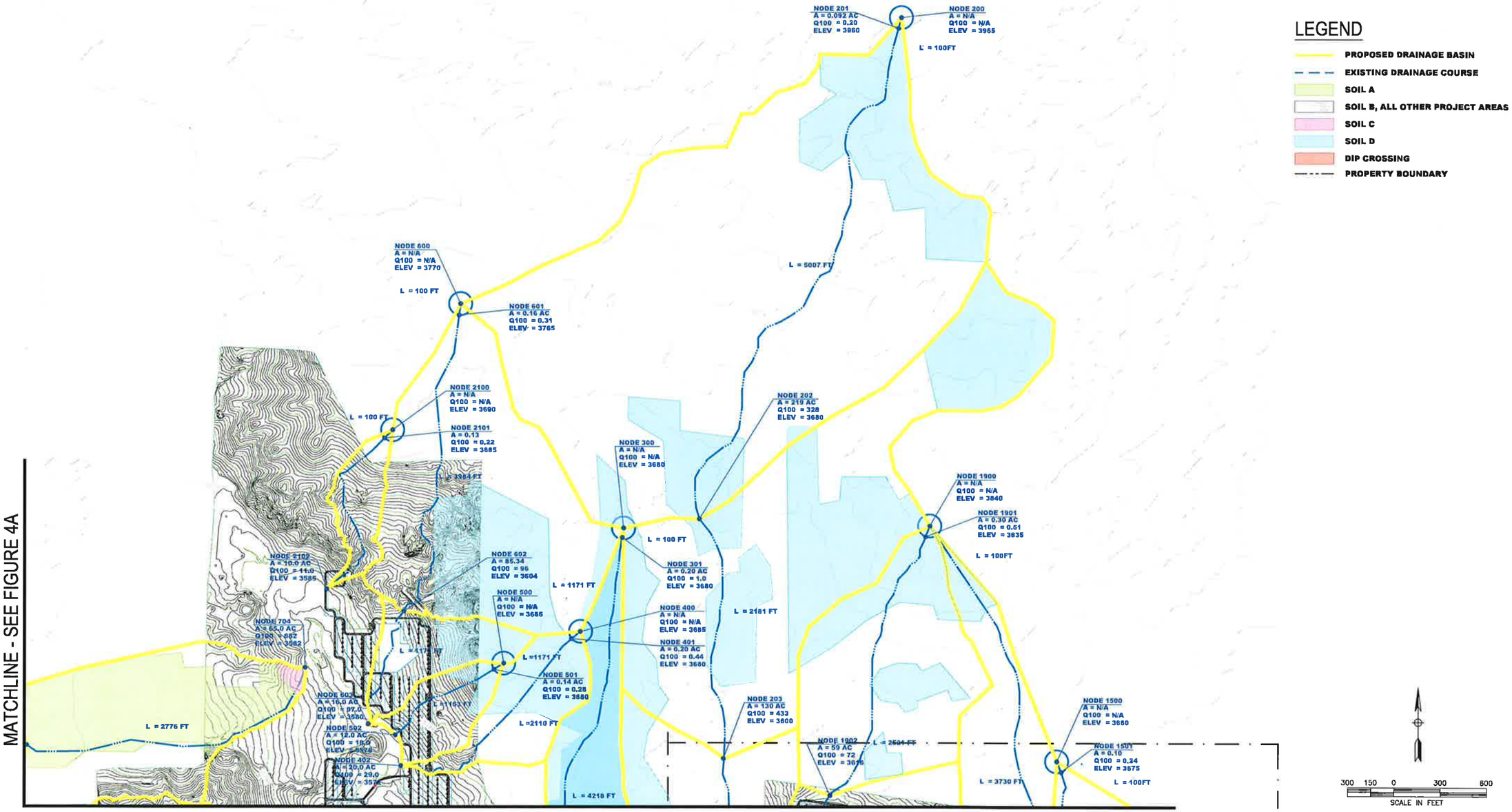
RUGGED ACRES
PROJECT SITE DRAINAGE BASIN

PROPOSED HYDROLOGY

AECOM PROJECT NO.
60212653

FIGURE
4B



MATCHLINE - SEE FIGURE 4A

MATCHLINE - SEE FIGURE 4D

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RUGGED ACRES
PROJECT SITE DRAINAGE BASIN

PROPOSED HYDROLOGY

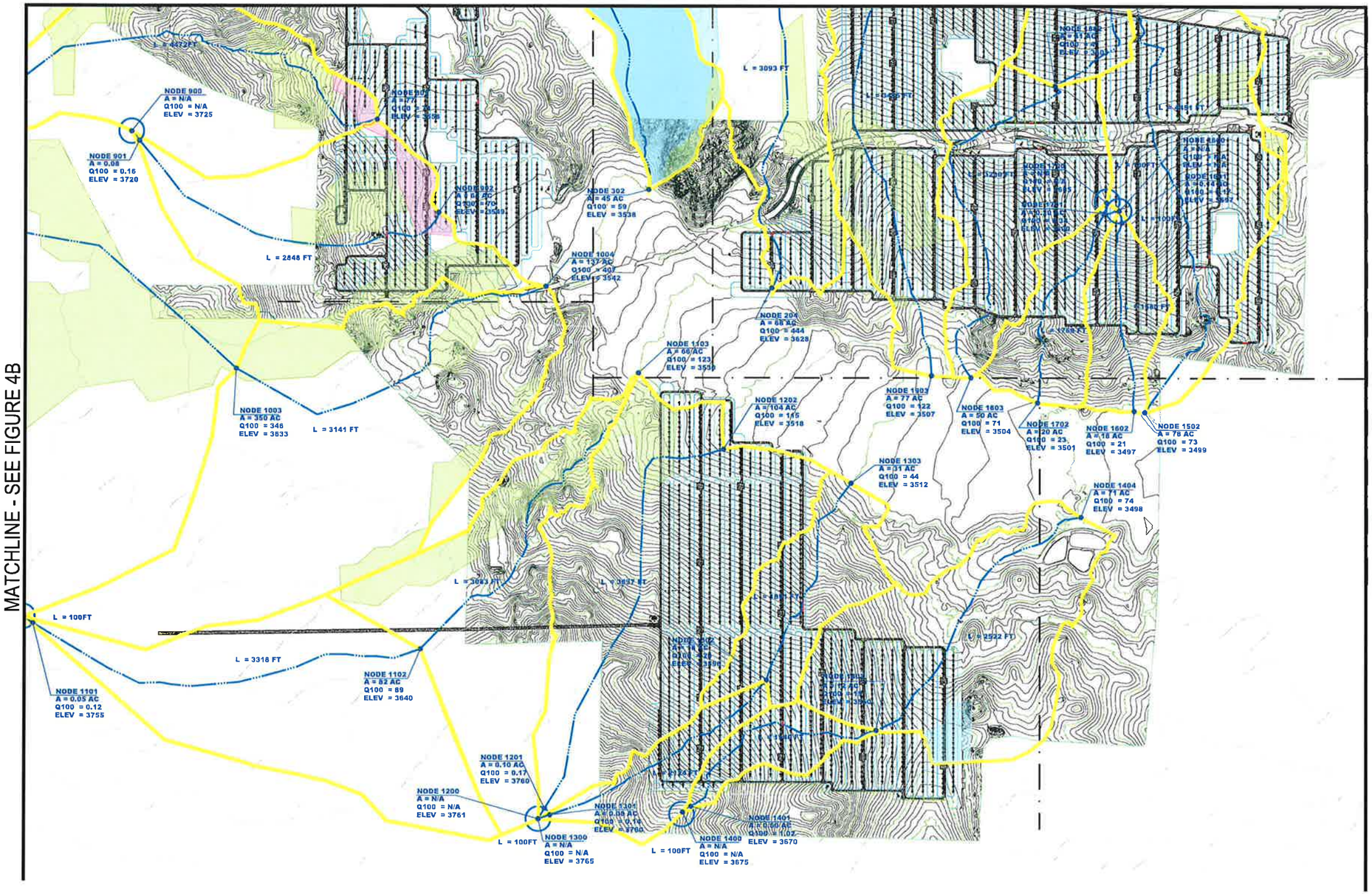
AECOM PROJECT NO.
60212653

FIGURE
4C

MATCHLINE - SEE FIGURE 4C

MATCHLINE - SEE FIGURE 4B

MATCHLINE - SEE FIGURE 4E



LEGEND

- PROPOSED DRAINAGE BASIN
- EXISTING DRAINAGE COURSE
- SOIL A
- SOIL B, ALL OTHER PROJECT AREAS
- SOIL C
- SOIL D
- DIP CROSSING
- PROPERTY BOUNDARY

300 150 0 300 600
SCALE IN FEET

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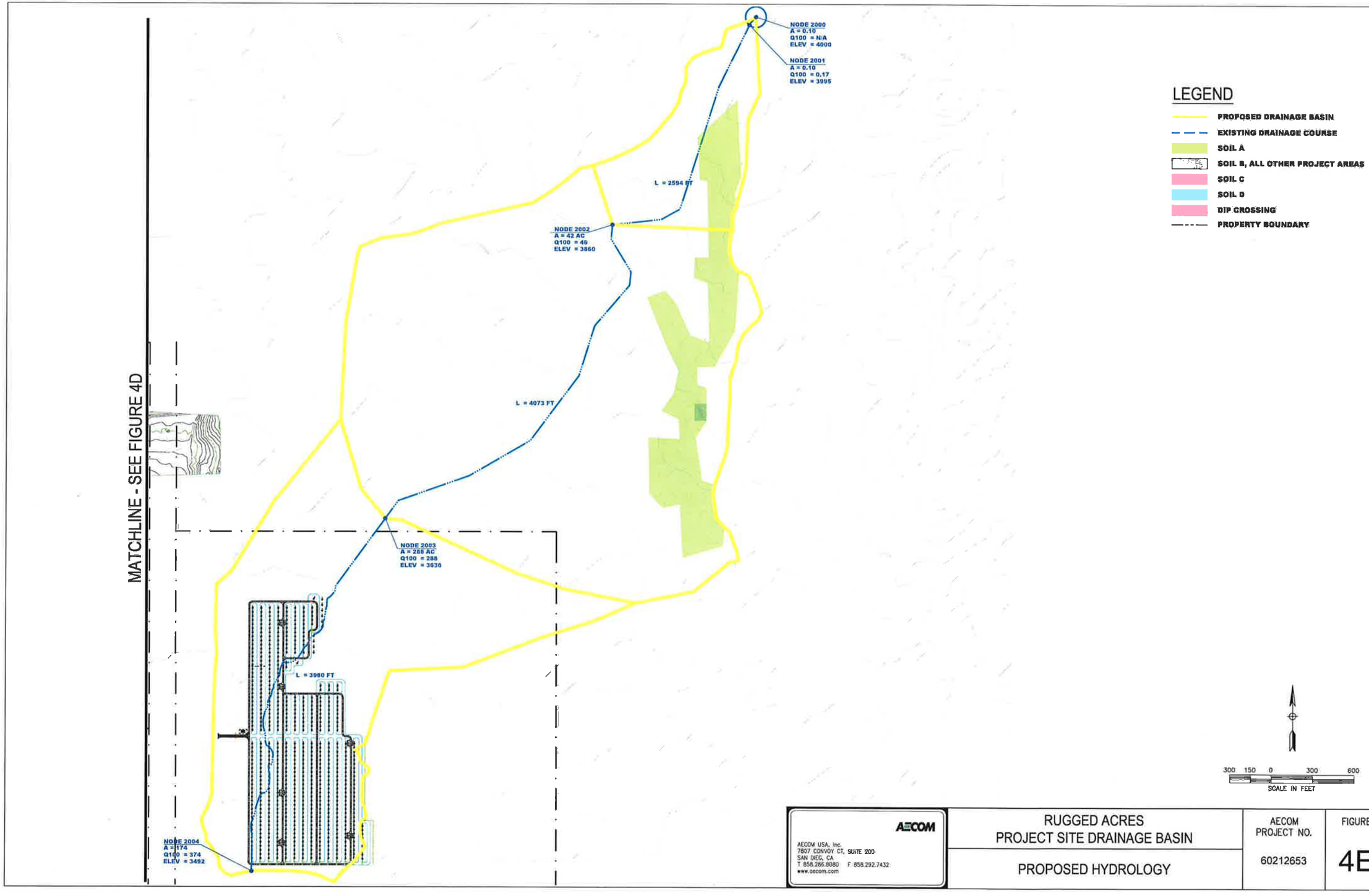
RUGGED ACRES
PROJECT SITE DRAINAGE BASIN

PROPOSED HYDROLOGY

AECOM PROJECT NO. 60212653

FIGURE 4D



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RUGGED ACRES
PROJECT SITE DRAINAGE BASIN

PROPOSED HYDROLOGY

AECOM PROJECT NO.
60212653

FIGURE
4E

Post-Project Soil Type Areas - Site Plan

The C Values of the A - D Soil Types are From Table 3-1 in the SDCHM

Sub Basins Area (ft^2)	Soil Type - Area 200					Soil Type - Area 300					Soil Type - Area 400				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1				1491385		92656			1758526					496043	
2				10035068											0.01
3	380925			388236											
Sub Basin Total Area		18216792					1941278					869048			
Soil Type Total Area (ft^2)	380925	5921178	0	11914689	0	92656	90096	0	1758526	0	0	373004.99	0	496043	0.01
Soil Type Total Area (acres)	8.74	135.93	0.00	273.52	0.00	2.13	2.07	0.00	40.37	0.00	0.00	8.56	0.00	11.39	0.00
Total Sub Basin Drainage Area (acres)	418.20					44.57					19.95				
Percentage of Total	2.09%	32.50%	0.00%	65.40%	0	4.77%	4.64%	0.00%	90.59%	0	0.00%	42.92%	0.00%	57.08%	1.15068E-08
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C	0.31					0.34					0.31				

Sub Basins Area (ft^2)	Soil Type - Area 500					Soil Type - Area 600					Soil Type - Area 700				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1				111868					1108692						
2					0.1				286553	0.27	492077			943778	
3															
4											1729840		46296		
Sub Basin Total Area		538376					4431740					31989001			
Total Area (ft^2)	0	426507.9	0	111868	0.1	0	3036495	0	1395245	0.27	2221917	28777010	46296	943778	0
Total Area (acres)	0.00	9.79	0.00	2.57	0.00	0.00	69.71	0.00	32.03	0.00	51.01	660.63	1.06	21.67	0.00
Total Drainage Area (acres)	12.36					101.74					734.37				
Percentage of Total	0.00%	79.22%	0.00%	20.78%	0.000	0.00%	68.52%	0.00%	31.48%	6.1E-08	6.95%	89.96%	0.14%	2.95%	0
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C	0.27					0.28					0.25				

Sub Basins Area (ft^2)	Soil Type - Area 800					Soil Type - Area 900					Soil Type - Area 1000				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1	567382		75674		555	546061		204220							
2										0.02	4264965				
3											1032521				
Sub Basin Total Area		3370837					2829585					25221680			
Total Area (ft^2)	567382	2727226	75674	0	555	546061	2079304	204220	0	0.02	5297486	19924194	0	0	0
Total Area (acres)	13.03	62.61	1.74	0.00	0.01	12.54	47.73	4.69	0.00	0.00	121.61	457.40	0.00	0.00	0.00
Total Drainage Area (acres)	77.38					64.96					579.01				
Percentage of Total	16.83%	80.91%	2.24%	0.00%	0.000	19.30%	73.48%	7.22%	0.00%	0.000	21.00%	79.00%	0.00%	0.00%	0.000
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C	0.24					0.24					0.24				

Sub Basins Area (ft^2)	Soil Type - Area 1100					Soil Type - Area 1200					Soil Type - Area 1300				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1						350799									
2	689098									0.14					0.03
															0.31
Sub Basin Total Area		6378111					4534240					2115366			
Total Area (ft^2)	689098	5689013	0	0	0	350799	4183441	0	0	0.14	0	2115366	0	0	0.34
Total Area (acres)	15.82	130.60	0.00	0.00	0.00	8.05	96.04	0.00	0.00	0.00	0.00	48.56	0.00	0.00	0.00
Total Drainage Area (acres)			146.42					104.09					48.56		
Percentage of Total	10.80%	89.20%	0.00%	0.00%	0.00%	7.74%	92.26%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C			0.24					0.25					0.25		

Sub Basins Area (ft^2)	Soil Type - Area 1400					Soil Type - Area 1500					Soil Type - Area 1600				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1						175929									
2				143549											
Sub Basin Total Area		3604567					3407610					762658			
Total Area (ft^2)	0	3461018	0	143549	0	175929	3231681	0	0	0	0	762658	0	0	0
Total Area (acres)	0.00	79.45	0.00	3.30	0.00	4.04	74.19	0.00	0.00	0.00	0.00	17.51	0.00	0.00	0.00
Total Drainage Area (acres)			82.75					78.23					17.51		
Percentage of Total	0.00%	96.02%	0.00%	3.98%	0.00%	5.16%	94.84%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C			0.25					0.25					0.25		

Sub Basins Area (ft^2)	Soil Type - Area 1700					Soil Type - Area 1800					Soil Type - Area 1900				
	A	B	C	D	IMP	A	B	C	D	IMP	A	B	C	D	IMP
1									152719					869383	
2				143549							479380				
Sub Basin Total Area		856606					3957652					5921062			
Total Area (ft^2)	0	713057	0	143549	0	0	3804933	0	152719	0	479380	4572299	0	869383	0
Total Area (acres)	0.00	16.37	0.00	3.30	0.00	0.00	87.35	0.00	3.51	0.00	11.01	104.97	0.00	19.96	0.00
Total Drainage Area (acres)			19.66					90.86					135.93		
Percentage of Total	0.00%	83.24%	0.00%	16.76%	0.00%	0.00%	96.14%	0.00%	3.86%	0.00%	8.10%	77.22%	0.00%	14.68%	0.00%
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C			0.27					0.25					0.25		

Sub Basins Area (ft^2)	Soil Type - Area 2000					Soil Type - Area 2100				
	A	B	C	D	IMP	A	B	C	D	IMP
1	359398									
2	1235700									
3										
Sub Basin Total Area		21925103					420395			
Total Area (ft^2)	1595098	20330005	0	0	0	0	420395	0	0	0
Total Area (acres)	36.62	466.71	0.00	0.00	0.00	0.00	9.65	0.00	0.00	0.00
Total Drainage Area (acres)	503.33					9.65				
Percentage of Total	7.28%	92.72%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
C for Natural Terrain	0.2	0.25	0.3	0.35	1.0	0.2	0.25	0.3	0.35	1.0
Watershed Weighted C	0.25					0.25				

Proposed Road Crossings of Existing Watercourses

Watercourse No.	Dip Crosing Down Stream Node.	Design Flow Rate	Depth	Flooded Width	n	Crossing Length	z1*	z2*	Area	wp	r	r^2/3	s	s^.5	VEL
		cfs	ft	ft		20	10	10	sf	ft	ft	ft^2/3	0.01	0.1	ft/sec
200	**204**	444	1.37	47.4	0.015	20	10	10	46.17	47.54	0.97	0.98	0.01	0.10	9.72
	204	444	1.37	47.4	0.015	20	10	10	46.17	47.54	0.97	0.98	0.01	0.10	9.72
600	**602**	96	0.61	32.2	0.015	20	10	10	15.92	32.26	0.49	0.62	0.01	0.10	6.19
	602	96	0.61	32.2	0.015	20	10	10	15.92	32.26	0.49	0.62	0.01	0.10	6.19
900	**902**	70	0.51	30.2	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
1300	**1303**	44	0.39	27.80	0.015	20	10	10	9.32	27.84	0.33	0.48	0.01	0.10	4.78
	1303	44	0.39	27.80	0.015	20	10	10	9.32	27.84	0.33	0.48	0.01	0.10	4.78
1400	**1402**	15	0.21	24.20	0.015	20	10	10	4.64	24.22	0.19	0.33	0.01	0.10	3.29
	1402	15	0.21	24.20	0.015	20	10	10	4.64	24.22	0.19	0.33	0.01	0.10	3.29
	1402	15	0.21	24.20	0.015	20	10	10	4.64	24.22	0.19	0.33	0.01	0.10	3.29
1500	**1502**	73	0.51	30.20	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
	1502	73	0.51	30.20	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
	1502	73	0.51	30.20	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
1800	**1803**	71	0.51	30.20	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
	1803	71	0.51	30.20	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
	1803	71	0.51	30.20	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
	1803	71	0.51	30.20	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
	1803	71	0.51	30.20	0.015	20	10	10	12.80	30.25	0.42	0.56	0.01	0.10	5.58
1900	**1902**	122	0.69	33.8	0.015	20	10	10	18.56	33.87	0.55	0.67	0.01	0.10	6.63
	1902	122	0.69	33.80	0.015	20	10	10	18.56	33.87	0.55	0.67	0.01	0.10	6.63
2000	**2004**	374	1.25	45.00	0.015	20	10	10	40.63	45.12	0.90	0.93	0.01	0.10	9.24
	2004	374	1.25	45.00	0.015	20	10	10	40.63	45.12	0.90	0.93	0.01	0.10	9.24
	2004	374	1.25	45.00	0.015	20	10	10	40.63	45.12	0.90	0.93	0.01	0.10	9.24
	2004	374	1.25	45.00	0.015	20	10	10	40.63	45.12	0.90	0.93	0.01	0.10	9.24

*Assume a 10% road slope down into the crossing

Appendix H

CPV Tracker Diagram & Runoff Calculations

September 2012

AECOM

6.3.3. The Module DC Cabling (105 m² tracker)

All modules are connected in parallel. The Tracker

The modules are mounted on a precision dual axis tracking system in order to continuously capture the Direct Radiation.

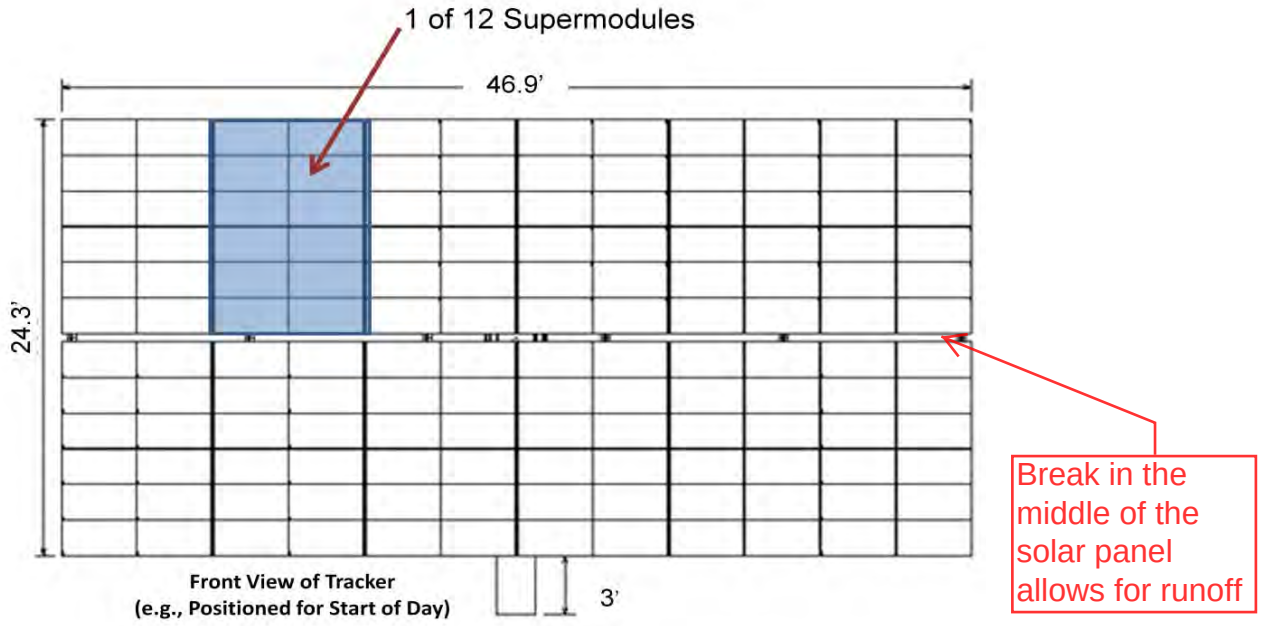


Fig. 6.3: Front Side Drawing of the Concentrix Solar CX-22 CPV System Showing the Tracker Table with the 12 Supermodules, and the Mast.

6.3.4. The Tracker

The FLATCON modules are mounted on a precision dual axis tracking system in order to continuously capture the Direct Radiation.

6.3.4.1. CX-C22, Tracker: Tracking structure and mechanical parts

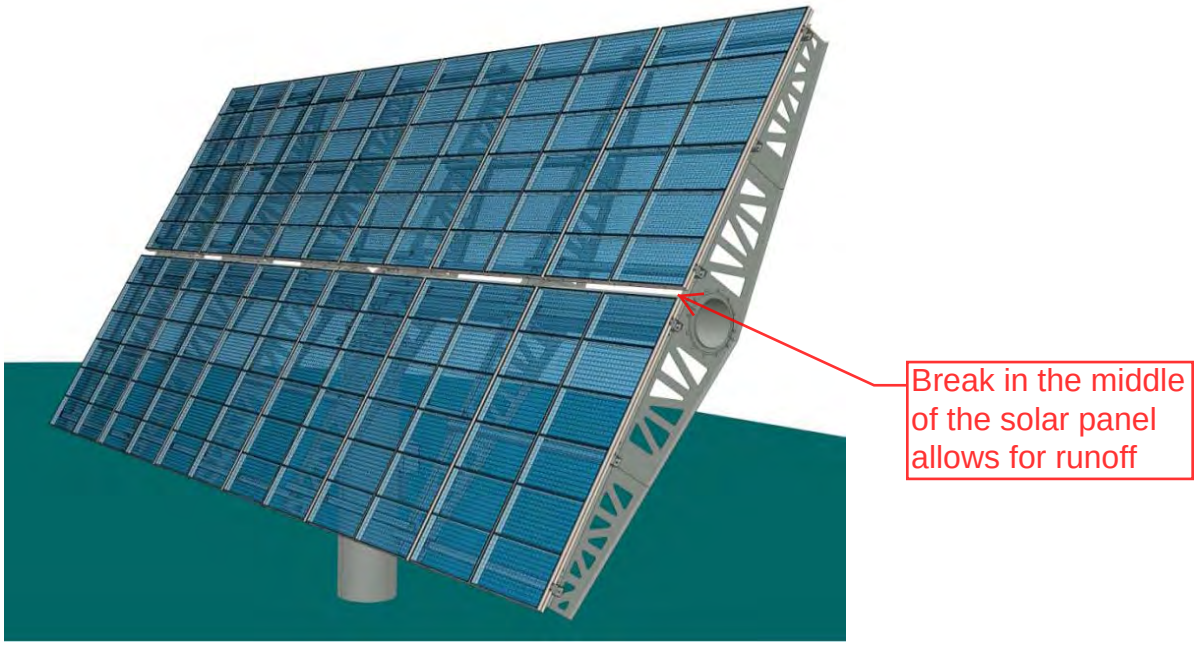


Figure 6.3: Sketch of the Cosma CX-C22 Tracker

Mass of System (kg)	8283
Mass of Steel Structure ONLY (kg)	4725
Total # of Loose Bolts:	552
Total # of Loose Nuts:	300
Total # of Loose Fasteners:	852
Thickness of mast steel (mm)	8.33

Table 6.2: Technical Data of the CX-C22 tracker steel structure

Runoff From CPV Tracker

	Frequency					
	100 Year	**50 year**	**25 Year**	**10 Year**	**5 Year**	**2 year**
Length (ft)	46.90	46.90	46.90	46.90	46.90	46.90
Height (ft)	24.30	24.30	24.30	24.30	24.30	24.30
Area (sf)	1139.67	1139.67	1139.67	1139.67	1139.67	1139.67
Area (ac)	0.03	0.03	0.03	0.03	0.03	0.03
C	1.0	1.0	1.0	1.0	1.0	1.0
t_c (min)	5.0	5.0	5.0	5.0	5.0	5.0
P_6 (in)	3.75	3.25	2.9	2.3	1.9	1.4
I (in/hr)	9.88	8.56	7.64	6.06	5.01	3.69
Total Q (cfs)	0.258	0.224	0.200	0.159	0.131	0.097
*** Q per Panel (cfs)**	0.129	0.112	0.100	0.079	0.065	0.048
**** Q per foot (cfs)**	**0.0028**	**0.0024**	**0.0021**	**0.0017**	**0.0014**	**0.0010**

* The panel is divided into two panels by a horizontal opening in the middle of the panel.
This means half of the Q runs off the panel in the middle and half at the bottom.
** The length is 46.9' and so the runoff can be broken down into the amount that runs off in 1 foot.

1 tablespoon is equal to .00052 cf
The number of tablespoons of runoff that cascade over one foot of the solar panels in a 2 year storm is = .001cf/.00052cf = 1.92 tablespoons

Appendix I

Existing and Proposed Inundation Limits

Difference in Existing and Proposed Inundation Conditions Upstream and Downstream of the Project

September 2012

AECOM

RIVER STATION 1100

EXTENT OF AERIAL SURVEY (TYPICAL)

LINE OF INUNDATION (100 YR EVENT)

RIVER STATION 100

ENGINEERING SCALE: NTS

VICINITY MAP

AECOM
AECOM USA, Inc.
7807 CONVOY CT, SUITE 200
SAN DIEG, CA
T 858.286.8080 F 858.292.7432
www.aecom.com

RUGGED ACRES
100-YEAR INUNDATION

EXISTING INUNDATION

AECOM PROJECT NO.
60212653

FIGURE
5A

RIVER STATION 1100

PROPERTY BOUNDARY

UNDEVELOPED AREA (TYPICAL)

EXTENT OF AERIAL SURVEY (TYPICAL)

SECURITY FENCING

3600.00
3595.00
3590.00
3585.00
3580.00
3575.00
3570.00
3565.00
3560.00
3555.00
3550.00
3545.00
3540.00
3535.00
3530.00
3525.00
3520.00
3515.00
3510.00
3505.00
3500.00

LINE OF INUNDATION (100 YR EVENT)

RIVER STATION 100

ENGINEERING SCALE: NTS

VICINITY MAP

COUNTY OF SAN DIEGO

AECOM
AECOM USA, Inc.
7807 CONVOY CT, SUITE 200
SAN DIEG, CA
T 858.286.8080 F 858.292.7432
www.aecom.com

RUGGED ACRES
100-YEAR INUNDATION

PROPOSED INUNDATION

AECOM PROJECT NO.
60212653

FIGURE
5B

Difference in Pre- and Post-Project Flow HEC-RAS Anlysis

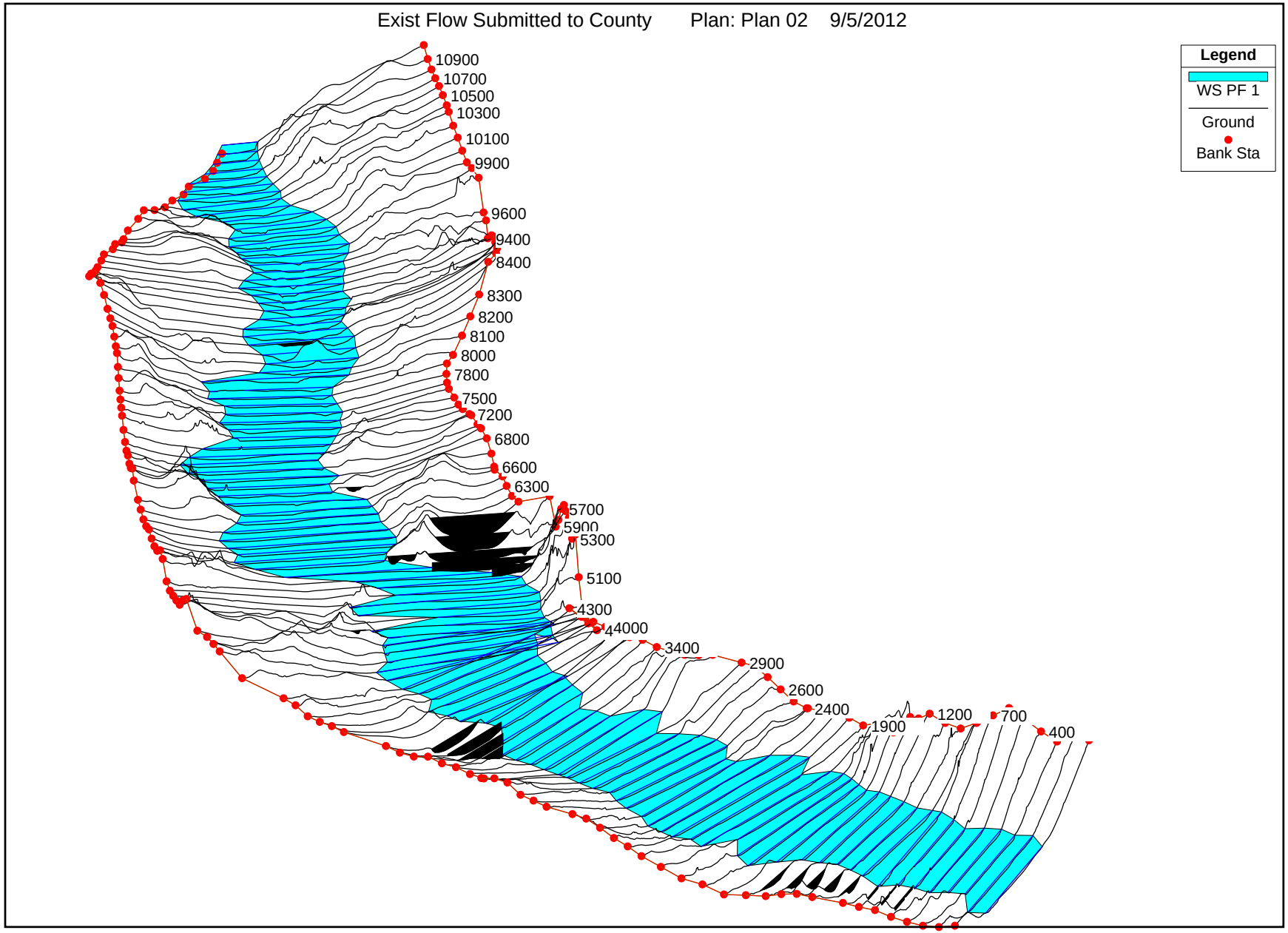
Reach	River Sta	Profile	Existing W.S. Elev	Proposed W.S. Elev	Difference in W.S.	Existing Flow Depth	Proposed Flow Depth	Difference in Depth	Existing Vel Chnl	Proposed Vel Chnl	Difference in Vel.
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(ft/s)	(ft/s)
UPSTREAM PROPERTY											
Tule Creek	11000	PF 1	3604.27	3604.42	**0.15**	8.55	8.56	**0.01**	8.55	8.94	**0.39**
Tule Creek	10900	PF 1	3602.38	3602.29	**-0.09**	7.59	7.44	**-0.15**	8.98	9.26	**0.28**
Tule Creek	10800	PF 1	3600.63	3600.5	**-0.13**	7.09	7.1	**0.01**	8.24	8.03	**-0.21**
Tule Creek	10700	PF 1	3598.86	3598.95	**0.09**	6.38	6.46	**0.08**	7.81	7.39	**-0.42**
Tule Creek	10600	PF 1	3597.84	3598	**0.16**	6.34	6.5	**0.16**	6.18	6.26	**0.08**
Tule Creek	10500	PF 1	3597.09	3597.4	**0.31**	6.81	7.06	**0.25**	5.73	5.41	**-0.32**
Tule Creek	10400	PF 1	3596.44	3596.72	**0.28**	6.46	6.74	**0.28**	5.68	5.35	**-0.33**
Tule Creek	10300	PF 1	3595.72	3595.79	**0.07**	5.79	5.86	**0.07**	5.69	5.59	**-0.1**
Tule Creek	10200	PF 1	3594.88	3594.92	**0.04**	7.02	6.96	**-0.06**	5.53	5.5	**-0.03**
Tule Creek	10100	PF 1	3593.37	3593.29	**-0.08**	5.92	5.84	**-0.08**	6.72	7.02	**0.3**
Tule Creek	10000	PF 1	3591.68	3591.56	**-0.12**	6.48	6	**-0.48**	6.23	6.58	**0.35**
Tule Creek	9900	PF 1	3590.61	3590.5	**-0.11**	5.8	5.69	**-0.11**	5.37	5.56	**0.19**
Tule Creek	9800	PF 1	3589.66	3589.29	**-0.37**	5.98	5.09	**-0.89**	5.39	6.06	**0.67**
Tule Creek	9700	PF 1	3588.98	3588.55	**-0.43**	6.51	6.09	**-0.42**	4.93	5.46	**0.53**
Tule Creek	9600	PF 1	3588.52	3588.06	**-0.46**	8.52	8.06	**-0.46**	4.89	5.54	**0.65**
Tule Creek	9500	PF 1	3588.17	3587.73	**-0.44**	8.24	7.8	**-0.44**	4.92	5.35	**0.43**
Tule Creek	9400	PF 1	3587.74	3587.22	**-0.52**	7.93	7.41	**-0.52**	5.29	6.07	**0.78**
Tule Creek	9300	PF 1	3587.36	3586.93	**-0.43**	9.86	9.43	**-0.43**	4.96	5.49	**0.53**
Tule Creek	9200	PF 1	3586.98	3586.58	**-0.4**	10.46	10.06	**-0.4**	4.82	5.35	**0.53**
Tule Creek	9100	PF 1	3586.38	3586.04	**-0.34**	9.15	9.54	**0.39**	5.63	5.94	**0.31**
Tule Creek	9000	PF 1	3585.26	3585.15	**-0.11**	7.77	7.66	**-0.11**	7.36	7.42	**0.06**
DOWNSTREAM PROPERTY											
Tule Creek	3000	PF 1	3518.08	3518.08	**0**	3.08	3.08	**0**	9.02	9.51	**0.49**
Tule Creek	2900	PF 1	3517.4	3517.96	**0.56**	2.53	3.05	**0.52**	8.8	7.05	**-1.75**
Tule Creek	2800	PF 1	3516.79	3517.26	**0.47**	2.85	3.26	**0.41**	8.62	8.13	**-0.49**
Tule Creek	2700	PF 1	3515.7	3515.54	**-0.16**	2.7	2.54	**-0.16**	9.59	11.09	**1.5**
Tule Creek	2600	PF 1	3514.36	3514.41	**0.05**	1.96	2	**0.04**	10.31	10.24	**-0.07**
Tule Creek	2500	PF 1	3513.74	3513.77	**0.03**	2.17	2.16	**-0.01**	8.72	8.76	**0.04**
Tule Creek	2400	PF 1	3512.43	3512.5	**0.07**	1.97	1.99	**0.02**	10.06	9.96	**-0.1**
Tule Creek	2300	PF 1	3511.52	3511.54	**0.02**	2	1.99	**-0.01**	9.64	9.7	**0.06**
Tule Creek	2200	PF 1	3510.45	3510.5	**0.05**	1.8	1.81	**0.01**	9.42	9.39	**-0.03**
Tule Creek	2100	PF 1	3509.26	3509.29	**0.03**	1.76	1.79	**0.03**	8.96	9.04	**0.08**
Tule Creek	2000	PF 1	3509.66	3509.68	**0.02**	2.21	2.2	**-0.01**	4.91	4.89	**-0.02**
Tule Creek	1900	PF 1	3508.84	3508.87	**0.03**	2.15	2.15	**0**	7.42	7.37	**-0.05**
Tule Creek	1800	PF 1	3507.58	3507.67	**0.09**	2.44	2.45	**0.01**	9.09	8.89	**-0.2**
Tule Creek	1700	PF 1	3506.94	3506.95	**0.01**	2.09	2.1	**0.01**	7.97	8.11	**0.14**
Tule Creek	1600	PF 1	3506.24	3506.3	**0.06**	1.96	1.98	**0.02**	7.8	7.62	**-0.18**
Tule Creek	1500	PF 1	3505.6	3505.57	**-0.03**	2.6	2.57	**-0.03**	6.92	7.24	**0.32**
Tule Creek	1400	PF 1	3505.23	3505.25	**0.02**	2.73	2.75	**0.02**	6.24	6.29	**0.05**
Tule Creek	1300	PF 1	3504.94	3504.96	**0.02**	2.68	2.67	**-0.01**	6.18	6.16	**-0.02**
Tule Creek	1200	PF 1	3504.68	3504.71	**0.03**	3.08	3.08	**0**	6.21	6.14	**-0.07**
Tule Creek	1100	PF 1	3503.97	3504	**0.03**	3.1	3.1	**0**	7.77	7.74	**-0.03**
Tule Creek	1000	PF 1	3503.09	3503.15	**0.06**	2.96	2.99	**0.03**	8.82	8.72	**-0.1**
Tule Creek	900	PF 1	3503.27	3503.3	**0.03**	3.31	3.34	**0.03**	5.47	5.45	**-0.02**
Tule Creek	800	PF 1	3503.2	3503.24	**0.04**	3.69	3.65	**-0.04**	4.86	4.76	**-0.1**
Tule Creek	700	PF 1	3502.24	3502.27	**0.03**	2.67	2.62	**-0.05**	8.13	8.15	**0.02**
Tule Creek	600	PF 1	3501.15	3501.19	**0.04**	2.7	2.73	**0.03**	9.59	9.52	**-0.07**
Tule Creek	500	PF 1	3500.1	3500.15	**0.05**	2.26	2.22	**-0.04**	9.85	9.84	**-0.01**
Tule Creek	400	PF 1	3499.97	3500	**0.03**	2.98	2.97	**-0.01**	6.58	6.6	**0.02**
Tule Creek	300	PF 1	3499.27	3499.28	**0.01**	2.77	2.78	**0.01**	7.98	8.04	**0.06**
Tule Creek	200	PF 1	3498.96	3498.27	**-0.69**	2.94	2.21	**-0.73**	5.93	9.07	**3.14**
Tule Creek	100	PF 1	3498.14	3498.14	**0**	2.74	2.72	**-0.02**	7.68	7.64	**-0.04**

Appendix J

Existing HEC-RAS Model Run

September 2012

AECOM


Exist Flow Submitted to County Plan: Plan 02 9/5/2012
Legend
WS PF 1
Ground
Bank Sta
10900
10700
10500
10300
10100
9900
9600
9400
8400
8300
8200
8100
8000
7800
7500
7200
6800
6600
6300
5700
5900
5300
5100
4300
4000
3400
2900
2600
2400
1900
1200
700
400

Pre-Project Flow HEC-RAS Analysis

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Flow Depth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tule Creek	11000	PF 1	14033	3595.72	3604.27	**8.55**	3601.65	3605.41	0.015328	**8.55**	1640.99	217.96	0.55
Tule Creek	10900	PF 1	14033	3594.79	3602.38	**7.59**		3603.63	0.020608	**8.98**	1562.37	244.03	0.63
Tule Creek	10800	PF 1	14033	3593.54	3600.63	**7.09**		3601.69	0.017281	**8.24**	1702.47	278.25	0.59
Tule Creek	10700	PF 1	14033	3592.48	3598.86	**6.38**		3599.81	0.019794	**7.81**	1796.16	350.91	0.61
Tule Creek	10600	PF 1	14033	3591.5	3597.84	**6.34**		3598.43	0.00883	**6.18**	2272.16	471.99	0.5
Tule Creek	10500	PF 1	14033	3590.28	3597.09	**6.81**		3597.6	0.00733	**5.73**	2448.07	543.06	0.48
Tule Creek	10400	PF 1	14033	3589.98	3596.44	**6.46**		3596.94	0.005998	**5.68**	2470.42	622.91	0.5
Tule Creek	10300	PF 1	14033	3589.93	3595.72	**5.79**		3596.22	0.00874	**5.69**	2468.22	603.07	0.5
Tule Creek	10200	PF 1	14033	3587.86	3594.88	**7.02**		3595.35	0.008478	**5.53**	2537.83	583.27	0.47
Tule Creek	10100	PF 1	14033	3587.45	3593.37	**5.92**		3594.07	0.020585	**6.72**	2088.38	550.27	0.61
Tule Creek	10000	PF 1	14033	3585.2	3591.68	**6.48**		3592.29	0.015088	**6.23**	2252.67	557.99	0.55
Tule Creek	9900	PF 1	14033	3584.81	3590.61	**5.8**		3591.05	0.009585	**5.37**	2614.62	658.43	0.47
Tule Creek	9800	PF 1	14033	3583.68	3589.66	**5.98**		3590.11	0.009214	**5.39**	2604.67	673.95	0.48
Tule Creek	9700	PF 1	14033	3582.47	3588.98	**6.51**		3589.36	0.005933	**4.93**	2844.2	681.41	0.43
Tule Creek	9600	PF 1	14033	3580	3588.52	**8.52**		3588.89	0.003841	**4.89**	2869.55	636.62	0.41
Tule Creek	9500	PF 1	14033	3579.93	3588.17	**8.24**		3588.55	0.003014	**4.92**	2850.17	557.33	0.38
Tule Creek	9400	PF 1	14033	3579.81	3587.74	**7.93**		3588.18	0.004522	**5.29**	2653.5	542.48	0.42
Tule Creek	9300	PF 1	14033	3577.5	3587.36	**9.86**		3587.74	0.003869	**4.96**	2831.33	589.41	0.4
Tule Creek	9200	PF 1	14033	3576.52	3586.98	**10.46**		3587.35	0.003954	**4.82**	2910.11	628.83	0.4
Tule Creek	9100	PF 1	14033	3577.23	3586.38	**9.15**		3586.88	0.005331	**5.63**	2492.49	543.46	0.46
Tule Creek	9000	PF 1	14033	3577.49	3585.26	**7.77**		3586.11	0.010757	**7.36**	1905.79	484.76	0.65
Tule Creek	8900	PF 1	14033	3577.45	3584.32	**6.87**		3585.25	0.006854	**7.73**	1815.33	485.92	0.7
Tule Creek	8800	PF 1	14033	3575.82	3583.7	**7.88**		3584.4	0.009059	**6.71**	2089.85	512.06	0.59
Tule Creek	8700	PF 1	14033	3575	3583.19	**8.19**		3583.69	0.004881	**5.68**	2469.72	589.41	0.49
Tule Creek	8600	PF 1	14033	3574.96	3583	**8.04**		3583.28	0.002534	**4.26**	3296.33	632.89	0.33
Tule Creek	8500	PF 1	14033	3574.09	3581.42	**7.33**	3581.33	3582.59	0.028417	**8.68**	1616.43	639.73	0.96
Tule Creek	8400	PF 1	14033	3570	3577.34	**7.34**	3577.32	3579.05	0.043396	**10.51**	1335.62	385.7	0.99
Tule Creek	8300	PF 1	14033	3569.78	3575.05	**5.27**	3575.05	3576.4	0.016729	**9.32**	1506.16	559.52	1
Tule Creek	8200	PF 1	14033	3569	3573.22	**4.22**	3573.65	3575.07	0.010109	**10.91**	1285.68	550.17	1.26
Tule Creek	8100	PF 1	14033	3568.5	3573.38	**4.88**	3573.38	3574.38	0.004641	**8.02**	1748.91	878.24	1
Tule Creek	8000	PF 1	14033	3565.56	3569.33	**3.77**	3570.43	3573.21	0.023384	**15.8**	888.43	570.09	2.23
Tule Creek	7900	PF 1	14033	3564.97	3568.19	**3.22**	3568.97	3570.8	0.0178	**12.97**	1082.3	734.87	1.88
Tule Creek	7800	PF 1	14033	3564.28	3567.02	**2.74**	3567.69	3569.22	0.012	**11.91**	1178.71	666.12	1.58
Tule Creek	7700	PF 1	14033	3562.49	3565.71	**3.22**	3566.38	3567.97	0.013042	**12.05**	1164.71	692	1.64
Tule Creek	7600	PF 1	14033	3561.94	3564.38	**2.44**	3565.02	3566.57	0.014623	**11.89**	1179.98	712.43	1.63
Tule Creek	7500	PF 1	14033	3560.29	3564.33	**4.04**	3564.34	3565.54	0.004524	**8.83**	1589.29	670.66	1.01
Tule Creek	7400	PF 1	14033	3560	3563.12	**3.12**	3563.54	3564.91	0.00744	**10.74**	1307.19	609.75	1.29
Tule Creek	7300	PF 1	14033	3559.9	3561.71	**1.81**	3562.35	3563.86	0.014814	**11.76**	1193.09	760.28	1.65
Tule Creek	7200	PF 1	14033	3557.49	3560.55	**3.06**	3561.06	3562.34	0.013385	**10.73**	1308.2	809.29	1.49
Tule Creek	7100	PF 1	14033	3557.47	3560.58	**3.11**	3560.58	3561.63	0.00631	**8.21**	1709.11	817.32	1
Tule Creek	7000	PF 1	14033	3556.42	3559.3	**2.88**	3559.64	3560.81	0.009778	**9.87**	1421.4	808.87	1.31
Tule Creek	6900	PF 1	14033	3555.29	3558.39	**3.1**	3558.76	3559.92	0.008163	**9.91**	1416.57	814.9	1.32
Tule Creek	6800	PF 1	14033	3554.97	3557.36	**2.39**	3557.81	3559.07	0.008496	**10.48**	1338.45	705.66	1.34

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Flow Depth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tule Creek	6700	PF 1	14033	3553.41	3556.24	**2.83**	3556.75	3558.14	0.009772	**11.04**	1270.82	682.04	1.43
Tule Creek	6600	PF 1	14033	3551.43	3554.96	**3.53**	3555.58	3557.05	0.011729	**11.59**	1211.19	808.03	1.67
Tule Creek	6500	PF 1	14033	3550.61	3553.92	**3.31**	3554.44	3555.77	0.012363	**10.94**	1282.85	782.54	1.51
Tule Creek	6400	PF 1	14033	3550	3553.2	**3.2**	3553.54	3554.67	0.008094	**9.73**	1441.81	847.59	1.32
Tule Creek	6300	PF 1	14033	3549.48	3551.87	**2.39**	3552.37	3553.6	0.014237	**10.56**	1328.63	942.77	1.57
Tule Creek	6200	PF 1	14033	3548.34	3550.88	**2.54**	3551.24	3552.27	0.010745	**9.46**	1483.77	1015.95	1.38
Tule Creek	6100	PF 1	14033	3547.5	3549.83	**2.33**	3550.18	3551.23	0.010042	**9.5**	1476.43	1005.3	1.38
Tule Creek	6000	PF 1	14033	3547.49	3549.94	**2.45**	3549.48	3550.56	0.00268	**6.33**	2216.08	951.33	0.73
Tule Creek	5900	PF 1	14033	3546.64	3549.46	**2.82**		3550.21	0.004438	**6.93**	2024.01	916.39	0.82
Tule Creek	5800	PF 1	14033	3545.57	3548.53	**2.96**	3548.53	3549.62	0.006969	**8.38**	1674.61	779.14	1.01
Tule Creek	5700	PF 1	14033	3542.05	3545.62	**3.57**	3546.33	3547.99	0.05244	**12.37**	1134.38	882.66	1.92
Tule Creek	5600	PF 1	14033	3539.54	3543.77	**4.23**	3543.48	3544.58	0.011874	**7.23**	1940.5	823.73	0.83
Tule Creek	5500	PF 1	14033	3538.54	3542.7	**4.16**		3543.43	0.010732	**6.84**	2051.58	865.66	0.78
Tule Creek	5400	PF 1	14033	3537.49	3541.3	**3.81**	3541.15	3542.26	0.012076	**7.89**	1779.65	787.29	0.92
Tule Creek	5300	PF 1	14033	3536.34	3540.17	**3.83**	3540.17	3541.05	0.01172	**7.52**	1865.73	1036.09	0.99
Tule Creek	5200	PF 1	14033	3534.9	3538.59	**3.69**	3538.66	3539.78	0.013092	**8.77**	1600.97	736.64	1.05
Tule Creek	5100	PF 1	14033	3533.49	3537.44	**3.95**	3537.62	3538.77	0.007868	**9.25**	1517.46	618.94	1.04
Tule Creek	5000	PF 1	14033	3532.49	3536.06	**3.57**	3536.56	3537.89	0.008731	**10.86**	1292.55	660.68	1.37
Tule Creek	4900	PF 1	14033	3532.5	3535.46	**2.96**	3535.9	3536.95	0.007997	**9.8**	1432.46	799.96	1.29
Tule Creek	4800	PF 1	14033	3532.5	3535.58	**3.08**	3535.6	3536.48	0.00497	**7.61**	1843.09	1051.01	1.01
Tule Creek	4700	PF 1	14033	3531.78	3534.68	**2.9**	3534.92	3535.87	0.007237	**8.75**	1603.36	983.52	1.21
Tule Creek	4600	PF 1	14033	3530.64	3533.44	**2.8**	3533.92	3534.98	0.010319	**9.97**	1408.06	927.81	1.43
Tule Creek	4500	PF 1	14033	3529.8	3532.55	**2.75**	3532.92	3533.89	0.01021	**9.28**	1512.57	1157.51	1.43
Tule Creek	4400	PF 1	14033	3529.79	3532.86	**3.07**	3532.4	3533.39	0.002247	**5.83**	2404.97	1152.26	0.71
Tule Creek	4300	PF 1	14033	3529.73	3532.15	**2.42**	3532.15	3533.01	0.005762	**7.46**	1881.46	1110.53	1.01
Tule Creek	4200	PF 1	14033	3528.54	3530.7	**2.16**	3531.09	3532.18	0.010635	**9.74**	1440.43	998.48	1.43
Tule Creek	4100	PF 1	14033	3527.5	3529.66	**2.16**	3530.09	3531.18	0.009357	**9.89**	1419.06	887.29	1.38
Tule Creek	4000	PF 1	14033	3526.31	3528.58	**2.27**	3529.07	3530.2	0.010006	**10.21**	1373.97	896.29	1.45
Tule Creek	3900	PF 1	14033	3524.84	3527.1	**2.26**	3527.67	3529.01	0.013514	**11.11**	1263.11	887.83	1.64
Tule Creek	3800	PF 1	14033	3523.81	3526.23	**2.42**	3526.63	3527.74	0.009848	**9.85**	1424.76	905.94	1.38
Tule Creek	3700	PF 1	14033	3522.97	3526.24	**3.27**	3526.25	3527.3	0.004648	**8.25**	1701.73	819.14	1.01
Tule Creek	3600	PF 1	14033	3521.31	3524.6	**3.29**	3525.14	3526.53	0.011128	**11.13**	1261.24	744.46	1.51
Tule Creek	3500	PF 1	14033	3519.76	3522.72	**2.96**	3523.46	3525.16	0.015611	**12.56**	1117.71	707.85	1.76
Tule Creek	3400	PF 1	14033	3518.81	3521.72	**2.91**	3522.25	3523.52	0.013436	**10.77**	1303.39	804.63	1.49
Tule Creek	3300	PF 1	14033	3517.86	3521.04	**3.18**	3521.33	3522.34	0.008187	**9.16**	1531.94	852.01	1.2
Tule Creek	3200	PF 1	14033	3517.47	3520.14	**2.67**	3520.47	3521.49	0.00864	**9.32**	1506.2	837.14	1.22
Tule Creek	3100	PF 1	14033	3516.21	3519.15	**2.94**	3519.49	3520.49	0.011614	**9.31**	1507.76	1044.95	1.37
Tule Creek	3000	PF 1	14033	3515	3518.08	**3.08**	3518.38	3519.34	0.010779	**9.02**	1556.42	1092.32	1.33
Tule Creek	2900	PF 1	14033	3514.87	3517.4	**2.53**	3517.64	3518.6	0.006363	**8.8**	1594.77	824.52	1.12
Tule Creek	2800	PF 1	14033	3513.94	3516.79	**2.85**	3516.94	3517.94	0.006606	**8.62**	1627.54	919.01	1.14
Tule Creek	2700	PF 1	14033	3513	3515.7	**2.7**	3516.08	3517.12	0.00943	**9.59**	1463.89	955.58	1.36
Tule Creek	2600	PF 1	14033	3512.4	3514.36	**1.96**	3514.82	3516.01	0.01257	**10.31**	1360.53	987.34	1.55
Tule Creek	2500	PF 1	14033	3511.57	3513.74	**2.17**	3513.96	3514.92	0.00744	**8.72**	1609.5	1026.03	1.23
Tule Creek	2400	PF 1	14033	3510.46	3512.43	**1.97**	3512.85	3514	0.010417	**10.06**	1395.53	920.12	1.44
Tule Creek	2300	PF 1	14033	3509.52	3511.52	**2**	3511.89	3512.96	0.009684	**9.64**	1455.22	965.9	1.38

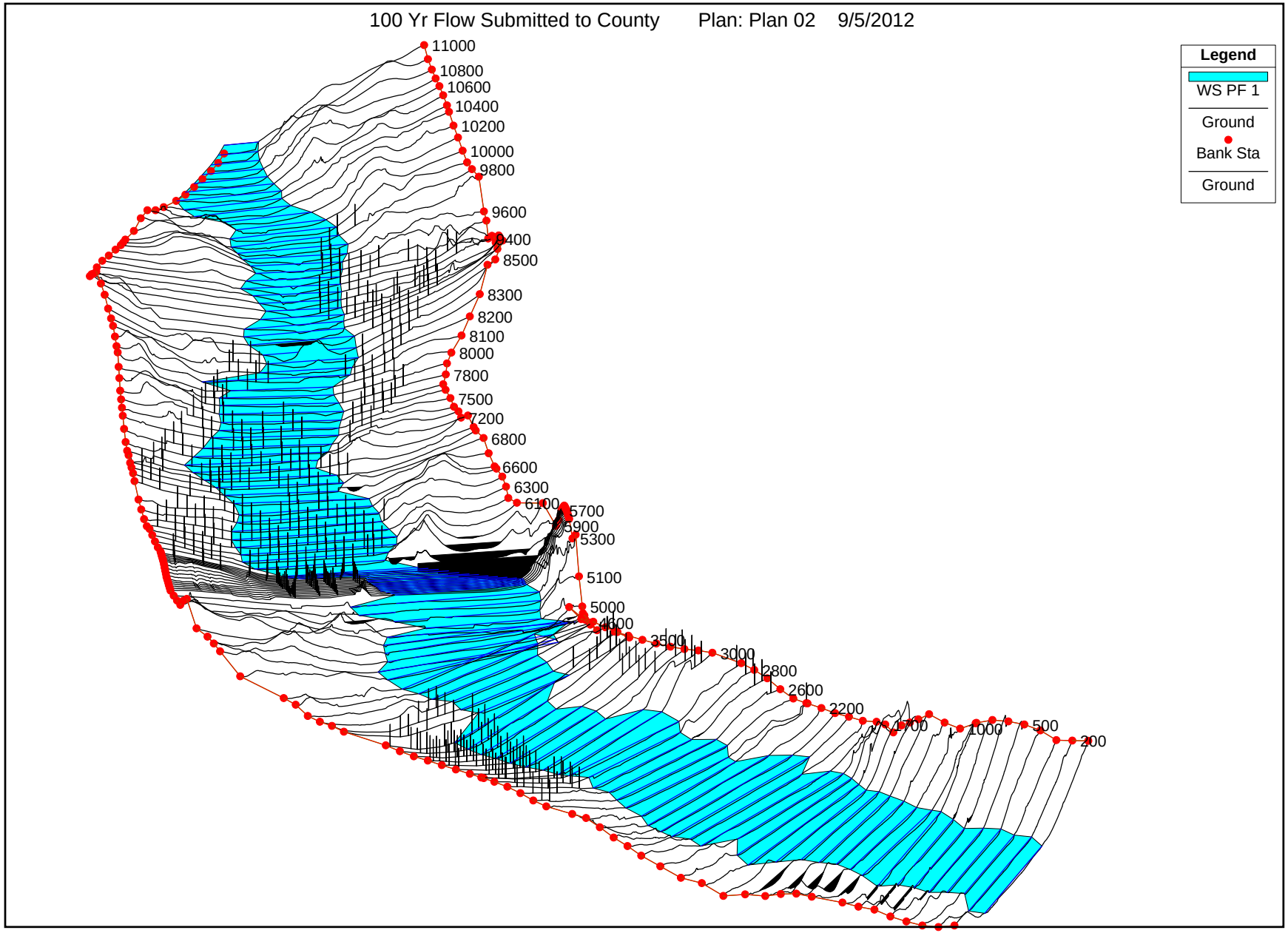
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Flow Depth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tule Creek	2200	PF 1	14033	3508.65	3510.45	**1.8**	3510.83	3511.83	0.012962	**9.42**	1489.31	1245.29	1.52
Tule Creek	2100	PF 1	14033	3507.5	3509.26	**1.76**	3509.59	3510.51	0.012576	**8.96**	1565.85	1347.22	1.46
Tule Creek	2000	PF 1	14033	3507.45	3509.66	**2.21**	3509.06	3510.04	0.001808	**4.91**	2857.38	1401.52	0.61
Tule Creek	1900	PF 1	14033	3506.69	3508.84	**2.15**	3508.84	3509.7	0.005517	**7.42**	1892.04	1132.32	1.01
Tule Creek	1800	PF 1	14033	3505.14	3507.58	**2.44**	3507.93	3508.86	0.012359	**9.09**	1544.18	1322.32	1.48
Tule Creek	1700	PF 1	14033	3504.85	3506.94	**2.09**	3507.06	3507.92	0.00626	**7.97**	1761.18	1134.94	1.13
Tule Creek	1600	PF 1	14033	3504.28	3506.24	**1.96**	3506.38	3507.18	0.008582	**7.8**	1799.96	1295.09	1.17
Tule Creek	1500	PF 1	14033	3503	3505.6	**2.6**	3505.59	3506.35	0.0069	**6.92**	2026.79	1337.26	0.99
Tule Creek	1400	PF 1	14033	3502.5	3505.23	**2.73**		3505.84	0.003387	**6.24**	2248.42	1159.13	0.79
Tule Creek	1300	PF 1	14033	3502.26	3504.94	**2.68**		3505.54	0.002654	**6.18**	2271.29	1077.14	0.75
Tule Creek	1200	PF 1	14033	3501.6	3504.68	**3.08**		3505.28	0.00246	**6.21**	2258.59	1040.41	0.74
Tule Creek	1100	PF 1	14033	3500.87	3503.97	**3.1**	3503.97	3504.91	0.00479	**7.77**	1806.99	981.43	1.01
Tule Creek	1000	PF 1	14033	3500.13	3503.09	**2.96**	3503.31	3504.29	0.007208	**8.82**	1590.44	974.54	1.22
Tule Creek	900	PF 1	14033	3499.96	3503.27	**3.31**	3502.53	3503.74	0.001558	**5.47**	2564.9	1024.41	0.61
Tule Creek	800	PF 1	14033	3499.51	3503.2	**3.69**		3503.57	0.001306	**4.86**	2888.85	1114.06	0.53
Tule Creek	700	PF 1	14033	3499.57	3502.24	**2.67**	3502.24	3503.27	0.005179	**8.13**	1725.46	845.74	1
Tule Creek	600	PF 1	14033	3498.45	3501.15	**2.7**	3501.48	3502.57	0.008601	**9.59**	1463.46	876.91	1.31
Tule Creek	500	PF 1	14033	3497.84	3500.1	**2.26**	3500.49	3501.61	0.010651	**9.85**	1423.98	981.94	1.44
Tule Creek	400	PF 1	14033	3496.99	3499.97	**2.98**	3499.61	3500.65	0.002733	**6.58**	2132.11	961.49	0.78
Tule Creek	300	PF 1	14033	3496.5	3499.27	**2.77**	3499.27	3500.26	0.004751	**7.98**	1758.98	890.45	1
Tule Creek	200	PF 1	14033	3496.02	3498.96	**2.94**	3498.57	3499.5	0.002894	**5.93**	2367.81	1172.77	0.74
Tule Creek	100	PF 1	14033	3495.4	3498.14	**2.74**	3498.14	3499.06	0.006229	**7.68**	1827.99	1011.42	1.01

Appendix K

Proposed HEC-RAS Model Run

September 2012

AECOM


100 Yr Flow Submitted to County Plan: Plan 02 9/5/2012
Legend
WS PF 1
Ground
Bank Sta
Ground
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10800
10600
10400
10200
10000
9800
9600
9400
8500
8300
8200
8100
8000
7800
7500
7200
6800
6600
6300
6100
5700
5300
5100
5000
3500
3000
2800
2600
2200
1700
1000
500
200

Post-Project Flow HEC-RAS Analysis

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Flow Depth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tule Creek	11000	PF 1	14033	3595.86	3604.42	**8.56**	3601.92	3605.66	0.018385	**8.94**	1569.76	208.59	0.57
Tule Creek	10900	PF 1	14033	3594.85	3602.29	**7.44**		3603.62	0.022616	**9.26**	1516.18	241	0.65
Tule Creek	10800	PF 1	14033	3593.4	3600.5	**7.1**		3601.5	0.018273	**8.03**	1748.22	293.63	0.58
Tule Creek	10700	PF 1	14033	3592.49	3598.95	**6.46**		3599.8	0.01494	**7.39**	1898.18	369.5	0.57
Tule Creek	10600	PF 1	14033	3591.5	3598	**6.5**		3598.61	0.008719	**6.26**	2240.54	444.06	0.49
Tule Creek	10500	PF 1	14033	3590.34	3597.4	**7.06**		3597.86	0.005866	**5.41**	2596.25	537.65	0.43
Tule Creek	10400	PF 1	14033	3589.98	3596.72	**6.74**		3597.16	0.008256	**5.35**	2624.18	638.47	0.46
Tule Creek	10300	PF 1	14033	3589.93	3595.79	**5.86**		3596.28	0.009433	**5.59**	2508.45	601.44	0.48
Tule Creek	10200	PF 1	14033	3587.96	3594.92	**6.96**		3595.39	0.00819	**5.5**	2551.63	591.94	0.47
Tule Creek	10100	PF 1	14033	3587.45	3593.29	**5.84**		3594.05	0.024308	**7.02**	2000.13	541.68	0.64
Tule Creek	10000	PF 1	14033	3585.56	3591.56	**6**		3592.24	0.013723	**6.58**	2132.67	551.05	0.59
Tule Creek	9900	PF 1	14033	3584.81	3590.5	**5.69**		3590.98	0.010618	**5.56**	2522.71	651.19	0.5
Tule Creek	9800	PF 1	14033	3584.2	3589.29	**5.09**		3589.87	0.011469	**6.06**	2314	658.03	0.57
Tule Creek	9700	PF 1	14033	3582.46	3588.55	**6.09**		3589.01	0.006139	**5.46**	2568.03	664.77	0.49
Tule Creek	9600	PF 1	14033	3580	3588.06	**8.06**		3588.53	0.003852	**5.54**	2532.81	621.5	0.48
Tule Creek	9500	PF 1	14033	3579.93	3587.73	**7.8**		3588.18	0.00315	**5.35**	2622.57	544.2	0.43
Tule Creek	9400	PF 1	14033	3579.81	3587.22	**7.41**		3587.79	0.004389	**6.07**	2311.57	513.09	0.5
Tule Creek	9300	PF 1	14033	3577.5	3586.93	**9.43**		3587.39	0.00313	**5.49**	2557.48	561.07	0.45
Tule Creek	9200	PF 1	14033	3576.52	3586.58	**10.06**		3587.02	0.004333	**5.35**	2625.4	592.69	0.45
Tule Creek	9100	PF 1	14033	3576.5	3586.04	**9.54**		3586.59	0.004052	**5.94**	2363.95	524.92	0.49
Tule Creek	9000	PF 1	14033	3577.49	3585.15	**7.66**		3586	0.008091	**7.42**	1891.32	485.17	0.66
Tule Creek	8900	PF 1	14033	3577.45	3584.18	**6.73**		3585.31	0.005596	**8.52**	1647.32	445.23	0.78
Tule Creek	8800	PF 1	14033	3575.95	3583.71	**7.76**		3584.48	0.009648	**7.06**	1987.19	499.76	0.62
Tule Creek	8700	PF 1	14033	3575	3583.16	**8.16**		3583.69	0.005559	**5.82**	2411.79	599.5	0.51
Tule Creek	8600	PF 1	14033	3574.96	3582.96	**8**		3583.26	0.002532	**4.36**	3218.7	608.4	0.33
Tule Creek	8500	PF 1	14033	3574.46	3581.45	**6.99**	3581.32	3582.59	0.025368	**8.58**	1634.95	638.62	0.95
Tule Creek	8400	PF 1	14033	3570	3577.45	**7.45**	3577.45	3579.19	0.046	**10.58**	1326.12	382.99	1
Tule Creek	8300	PF 1	14033	3569.88	3575.01	**5.13**	3575.14	3576.52	0.016662	**9.86**	1422.66	534.08	1.07
Tule Creek	8200	PF 1	14033	3569	3573.22	**4.22**	3573.7	3575.13	0.011244	**11.09**	1265.49	551.51	1.29
Tule Creek	8100	PF 1	14033	3568.5	3573.32	**4.82**	3573.32	3574.34	0.004838	**8.07**	1738.23	874.49	1.01
Tule Creek	8000	PF 1	14033	3565.74	3569.5	**3.76**	3570.55	3573.14	0.024441	**15.31**	916.58	604.8	2.19
Tule Creek	7900	PF 1	14033	3564.97	3568.62	**3.65**	3569.33	3570.96	0.013669	**12.29**	1142.21	677.69	1.67
Tule Creek	7800	PF 1	14033	3564.61	3567.56	**2.95**	3568.15	3569.62	0.011573	**11.52**	1218.3	703.37	1.54
Tule Creek	7700	PF 1	14033	3562.49	3566.07	**3.58**	3566.74	3568.31	0.014224	**12.02**	1167.15	738.26	1.69
Tule Creek	7600	PF 1	14033	3562.21	3564.56	**2.35**	3565.24	3566.86	0.014779	**12.17**	1152.94	707.78	1.68
Tule Creek	7500	PF 1	14033	3560.38	3563.75	**3.37**	3564.22	3565.53	0.00951	**10.72**	1309.56	704.44	1.39
Tule Creek	7400	PF 1	14033	3560.15	3563.56	**3.41**	3563.58	3564.7	0.005003	**8.57**	1636.88	749.89	1.02
Tule Creek	7300	PF 1	14033	3559.44	3561.82	**2.38**	3562.42	3563.84	0.013474	**11.39**	1231.99	757.76	1.57
Tule Creek	7200	PF 1	14033	3557.96	3561.02	**3.06**	3561.42	3562.61	0.009119	**10.12**	1387.04	795.54	1.35
Tule Creek	7100	PF 1	14033	3557.36	3560.18	**2.82**	3560.56	3561.75	0.008021	**10.05**	1395.97	770.05	1.32
Tule Creek	7000	PF 1	14033	3556.54	3559.51	**2.97**	3559.8	3560.97	0.006954	**9.72**	1444.38	721.47	1.21
Tule Creek	6900	PF 1	14033	3555.79	3558.69	**2.9**	3559.06	3560.21	0.008269	**9.91**	1416.45	776.68	1.29
Tule Creek	6800	PF 1	14033	3555.08	3557.77	**2.69**	3558.14	3559.36	0.008477	**10.12**	1386.4	749.82	1.31

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Flow Depth	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tule Creek	6700	PF 1	14033	3553.93	3556.75	**2.82**	3557.17	3558.5	0.008453	**10.62**	1321.79	673.91	1.34
Tule Creek	6600	PF 1	14033	3552.69	3555.3	**2.61**	3555.93	3557.42	0.012968	**11.69**	1200.64	799.54	1.68
Tule Creek	6500	PF 1	14033	3551.18	3554.02	**2.84**	3554.6	3556.01	0.014444	**11.3**	1242.17	793.26	1.59
Tule Creek	6400	PF 1	14033	3550.35	3553.47	**3.12**	3553.73	3554.81	0.007399	**9.29**	1510.78	843.65	1.22
Tule Creek	6300	PF 1	14033	3549.7	3552.04	**2.34**	3552.54	3553.81	0.01263	**10.68**	1314.43	889.99	1.55
Tule Creek	6200	PF 1	14033	3548.87	3550.9	**2.03**	3551.36	3552.55	0.0119	**10.3**	1362.79	936.06	1.5
Tule Creek	6100	PF 1	14033	3548.03	3550.11	**2.08**	3550.41	3551.45	0.008773	**9.29**	1510.24	957.87	1.3
Tule Creek	6000	PF 1	14033	3547.42	3549.5	**2.08**	3549.64	3550.63	0.006542	**8.53**	1645.86	921.35	1.12
Tule Creek	5900	PF 1	14033	3546.76	3549.38	**2.62**	3549.16	3550.21	0.003503	**7.31**	1919.58	866.62	0.87
Tule Creek	5800	PF 1	14033	3545.96	3548.64	**2.68**	3548.64	3549.74	0.005895	**8.41**	1667.9	772.11	1.01
Tule Creek	5700	PF 1	14033	3542.6	3546.51	**3.91**	3547.11	3548.54	0.027075	**11.43**	1227.62	803	1.63
Tule Creek	5680.*	PF 1	14033	3542.09	3546.18	**4.09**	3546.68	3547.95	0.024011	**10.67**	1315.33	842.44	1.5
Tule Creek	5660.*	PF 1	14033	3541.59	3545.78	**4.19**	3546.25	3547.46	0.02239	**10.41**	1347.97	827.43	1.44
Tule Creek	5640.*	PF 1	14033	3540.72	3545.11	**4.39**	3545.76	3546.97	0.024797	**10.92**	1284.55	574.3	1.29
Tule Creek	5620.*	PF 1	14033	3539.98	3544.23	**4.25**	3544.83	3546.36	0.034429	**11.7**	1199.6	551.62	1.4
Tule Creek	5600	PF 1	14033	3539.59	3543.65	**4.06**	3544.14	3545.61	0.035794	**11.22**	1250.75	616.03	1.39
Tule Creek	5580.*	PF 1	14033	3539.36	3543.69	**4.33**	3543.71	3544.92	0.018296	**8.92**	1573.65	661.41	1.02
Tule Creek	5560.*	PF 1	14033	3539.13	3543.08	**3.95**	3543.29	3544.48	0.024484	**9.51**	1475.85	701.7	1.16
Tule Creek	5540.*	PF 1	14033	3538.89	3543.01	**4.12**	3542.9	3544.03	0.015555	**8.1**	1732.67	746.15	0.94
Tule Creek	5520.*	PF 1	14033	3538.66	3542.84	**4.18**		3543.7	0.012573	**7.43**	1888.49	789.6	0.85
Tule Creek	5500	PF 1	14033	3538.43	3542.72	**4.29**		3543.43	0.010004	**6.79**	2066.16	833.43	0.76
Tule Creek	5480.*	PF 1	14033	3538.24	3542.52	**4.28**		3543.23	0.010215	**6.74**	2081.92	865.36	0.77
Tule Creek	5460.*	PF 1	14033	3538.05	3542.29	**4.24**		3543.02	0.010748	**6.85**	2047.62	862.45	0.78
Tule Creek	5440.*	PF 1	14033	3537.88	3542.01	**4.13**		3542.79	0.011585	**7.1**	1975.64	834.32	0.81
Tule Creek	5420.*	PF 1	14033	3537.68	3541.7	**4.02**		3542.55	0.012791	**7.41**	1894.23	808.88	0.85
Tule Creek	5400	PF 1	14033	3537.49	3541.37	**3.88**	3541.18	3542.3	0.011627	**7.75**	1811.81	789.76	0.9
Tule Creek	5300	PF 1	14033	3536.39	3540.19	**3.8**	3540.19	3541.1	0.012301	**7.67**	1830.48	999.49	1
Tule Creek	5200	PF 1	14033	3534.96	3538.6	**3.64**	3538.75	3539.78	0.0138	**8.72**	1608.63	867.76	1.13
Tule Creek	5100	PF 1	14033	3533.54	3536.68	**3.14**	3537.1	3538.34	0.014039	**10.33**	1358.31	770.16	1.37
Tule Creek	5000	PF 1	14033	3531.37	3534.69	**3.32**	3535.35	3536.92	0.01299	**11.99**	1170.55	694.2	1.63
Tule Creek	4900	PF 1	14033	3530	3535.78	**5.78**	3535.1	3536.3	0.002113	**5.8**	2419.7	1092.52	0.69
Tule Creek	4800	PF 1	14033	3530	3535.42	**5.42**		3536.04	0.002887	**6.32**	2219.93	1109.78	0.79
Tule Creek	4700	PF 1	14033	3531.83	3534.77	**2.94**	3534.77	3535.64	0.004963	**7.49**	1874.33	1095.18	1.01
Tule Creek	4600	PF 1	14033	3530.68	3533.57	**2.89**	3533.95	3534.95	0.009008	**9.41**	1491.29	967.26	1.34
Tule Creek	4500	PF 1	14033	3529.86	3532.56	**2.7**	3532.95	3533.95	0.010935	**9.48**	1480.38	1148.1	1.47
Tule Creek	4400	PF 1	14033	3529.68	3532.91	**3.23**	3532.37	3533.4	0.002013	**5.65**	2485.5	1149.59	0.68
Tule Creek	4300	PF 1	14033	3529.77	3532.19	**2.42**	3532.19	3533.05	0.005742	**7.44**	1886.39	1112.74	1.01
Tule Creek	4200	PF 1	14033	3528.6	3530.74	**2.14**	3531.13	3532.22	0.010663	**9.74**	1441.05	1002.03	1.43
Tule Creek	4100	PF 1	14033	3527.48	3529.7	**2.22**	3530.14	3531.22	0.009363	**9.89**	1419.57	887.94	1.38
Tule Creek	4000	PF 1	14033	3526.39	3528.76	**2.37**	3529.18	3530.32	0.008586	**10.03**	1399.06	795.43	1.33
Tule Creek	3900	PF 1	14033	3524.88	3527.22	**2.34**	3527.82	3529.24	0.012713	**11.4**	1231.48	776.01	1.59
Tule Creek	3800	PF 1	14033	3523.85	3526.56	**2.71**	3527.01	3528.11	0.008065	**9.99**	1404.05	765.64	1.3
Tule Creek	3700	PF 1	14033	3523.01	3525.23	**2.22**	3525.76	3527	0.015358	**10.67**	1314.8	1043.77	1.68
Tule Creek	3600	PF 1	14033	3520.59	3523.34	**2.75**	3524.06	3525.44	0.015256	**11.62**	1208.1	833.22	1.7
Tule Creek	3500	PF 1	14033	3519.57	3522.41	**2.84**	3523.01	3524.11	0.009907	**10.47**	1340.37	785.09	1.41

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			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tule Creek	3400	PF 1	14033	3519	3521.98	**2.98**	3522.17	3523.17	0.006543	**8.75**	1604.02	903.93	1.16
Tule Creek	3300	PF 1	14033	3518.23	3521.05	**2.82**	3521.39	3522.42	0.008208	**9.38**	1495.54	901.18	1.28
Tule Creek	3200	PF 1	14033	3516.43	3519.95	**3.52**	3520.43	3521.52	0.009232	**10.05**	1396.12	835.17	1.37
Tule Creek	3100	PF 1	14033	3516.26	3519.19	**2.93**	3519.52	3520.51	0.009501	**9.24**	1517.91	1052.25	1.36
Tule Creek	3000	PF 1	14033	3515	3518.08	**3.08**	3518.45	3519.48	0.010956	**9.51**	1476.01	1091.47	1.44
Tule Creek	2900	PF 1	14033	3514.91	3517.96	**3.05**	3517.79	3518.73	0.003684	**7.05**	1990.47	1017.28	0.89
Tule Creek	2800	PF 1	14033	3514	3517.26	**3.26**	3517.26	3518.29	0.004603	**8.13**	1726.65	842.99	1
Tule Creek	2700	PF 1	14033	3513	3515.54	**2.54**	3516.09	3517.45	0.014333	**11.09**	1264.94	908.06	1.66
Tule Creek	2600	PF 1	14033	3512.41	3514.41	**2**	3514.87	3516.04	0.012311	**10.24**	1370.78	990.47	1.53
Tule Creek	2500	PF 1	14033	3511.61	3513.77	**2.16**	3514	3514.96	0.007557	**8.76**	1601.64	1021.47	1.23
Tule Creek	2400	PF 1	14033	3510.51	3512.5	**1.99**	3512.91	3514.04	0.010353	**9.96**	1408.36	938.29	1.43
Tule Creek	2300	PF 1	14033	3509.55	3511.54	**1.99**	3511.92	3513	0.009769	**9.7**	1447.28	961.92	1.39
Tule Creek	2200	PF 1	14033	3508.69	3510.5	**1.81**	3510.87	3511.87	0.012667	**9.39**	1494.04	1234.84	1.5
Tule Creek	2100	PF 1	14033	3507.5	3509.29	**1.79**	3509.63	3510.56	0.01282	**9.04**	1552.84	1347.82	1.48
Tule Creek	2000	PF 1	14033	3507.48	3509.68	**2.2**	3509.06	3510.05	0.001785	**4.89**	2868.28	1405.07	0.6
Tule Creek	1900	PF 1	14033	3506.72	3508.87	**2.15**	3508.87	3509.71	0.005481	**7.37**	1905.25	1141.87	1
Tule Creek	1800	PF 1	14033	3505.22	3507.67	**2.45**	3508	3508.9	0.01172	**8.89**	1578.79	1321.87	1.43
Tule Creek	1700	PF 1	14033	3504.85	3506.95	**2.1**	3507.1	3507.97	0.006681	**8.11**	1730.52	1129.76	1.15
Tule Creek	1600	PF 1	14033	3504.32	3506.3	**1.98**	3506.41	3507.2	0.008041	**7.62**	1840.54	1294.26	1.13
Tule Creek	1500	PF 1	14033	3503	3505.57	**2.57**	3505.62	3506.38	0.007779	**7.24**	1939.15	1331.49	1.06
Tule Creek	1400	PF 1	14033	3502.5	3505.25	**2.75**	3504.96	3505.86	0.003511	**6.29**	2231.84	1162.84	0.8
Tule Creek	1300	PF 1	14033	3502.29	3504.96	**2.67**		3505.55	0.002648	**6.16**	2279.63	1079.24	0.75
Tule Creek	1200	PF 1	14033	3501.63	3504.71	**3.08**		3505.3	0.002404	**6.14**	2283.85	1041.98	0.73
Tule Creek	1100	PF 1	14033	3500.9	3504	**3.1**	3504	3504.93	AVERAGE	**8.66145**	1812.02	988.05	1.01
Tule Creek	1000	PF 1	14033	3500.16	3503.15	**2.99**	3503.36	3504.33	0.006885	**8.72**	1609.57	971.92	1.19
Tule Creek	900	PF 1	14033	3499.96	3503.3	**3.34**	3502.54	3503.76	0.001549	**5.45**	2573.26	1024.11	0.61
Tule Creek	800	PF 1	14033	3499.59	3503.24	**3.65**		3503.59	0.001224	**4.76**	2950.63	1117.74	0.52
Tule Creek	700	PF 1	14033	3499.65	3502.27	**2.62**	3502.27	3503.3	0.005292	**8.15**	1722.36	840.21	1
Tule Creek	600	PF 1	14033	3498.46	3501.19	**2.73**	3501.51	3502.6	0.008401	**9.52**	1474.44	877.09	1.29
Tule Creek	500	PF 1	14033	3497.93	3500.15	**2.22**	3500.54	3501.65	0.010571	**9.84**	1425.9	978.96	1.44
Tule Creek	400	PF 1	14033	3497.03	3500	**2.97**	3499.65	3500.68	0.002775	**6.6**	2126.55	964.38	0.78
Tule Creek	300	PF 1	14033	3496.5	3499.28	**2.78**	3499.28	3500.28	0.00486	**8.04**	1746.12	890.39	1.01
Tule Creek	200	PF 1	14033	3496.06	3498.27	**2.21**	3498.6	3499.55	0.010853	**9.07**	1547.42	1128.92	1.37
Tule Creek	100	PF 1	14033	3495.42	3498.14	**2.72**	3498.14	3499.05	0.006317	**7.64**	1836.61	1024.74	1.01