Preliminary CEQA Drainage Study

For

Rugged Solar

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County of San Diego

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August 25, 2020

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Section 1 Project Description and Scope

1.1 Project Location

The proposed development consists of five (5) project areas A-E, located east of Ribbonwood Road and north of Interstate 8 in unincorporated eastern San Diego. The "project site," herein refers to all respective "project areas" collectively.

The project site is located east of the Salton Sea Divide and thus is subjected to different storm water standards, as compared to projects draining to the Pacific Ocean within the County of San Diego.

1.2 Scope of Report

This report addresses the existing and proposed hydrologic and hydraulic properties of each project area (A-E) under 100-year peak flow conditions. This report includes an analysis of the respective tributary watersheds and develops 100-year limits of inundation, depth, and velocity. This report also addresses threshold of significance as defined by the California Environmental Quality Act (CEQA).

Temporary Best Management Practices (BMPs) will be discussed in the project specific Storm Water Pollution Prevention Plan (SWPPP), developed during final engineering. Permanent BMPs are addressed in the project specific Standard Development Storm Water Quality Management plan (SDP SWQMP), found under separate cover.

1.3 Project Site Information

Proposed development includes a total of 88.1 million-watt (W) photovoltaic (PV) electricity generating facility on five (5) project areas. Development at each project area will be consistent and includes photovoltaic modules mounted on steel structures, substations, inverter pads & main transformers, electrical equipment, infrastructure improvements, decomposed granite (DG) driveways, chain link fencing, and on-site DG access roads. Proposed improvements also include a new at-grade access road connecting project areas B and E.

Project Site Areas:	Area A:	66.21 ac
	Area B:	141.41 ac
	Area C:	21.08 ac
	Area D:	25.73 ac
	Area E:	138.88 ac
	Total Area:	393.3 ac

Based on the Natural Resources Conservation Service's (NRCS) Websoil Survey, the project site is comprised primarily of hydrologic soil type A. In some cases, project areas also contain hydrologic soil type C. Refer to Appendix A for project area soil maps.

The Federal Emergency Management Agency (FEMA) has not mapped a Special Flood Hazard Areas (SFHAs) for the project site, or respective project areas. The entire project site lies within a "Not Printed" area.

1.4 Pre-Development Conditions

The respective project areas are undeveloped and consist of scattered desert brush. Each project area receives run-on from tributary watersheds. Based on a site visit performed by MBI in June of 2019, the entire 393.3-acre project site is prone to minor rill erosion and contains defined flow paths subject to minor shifts based on rainfall intensity and duration. The site is not located within an alluvial fan; however, it is located within a 30 square mile tributary watershed, most of which is undeveloped. Runoff from all project areas confluences within a southeasterly-flowing, unnamed tributary to the Salton Sea. Project area site photographs are included in Appendix A.

1.5 Post-Development Conditions

Proposed improvements at each project area will include minor grading limited to at-grade access roads, small pads for electrical equipment, and the softening of contours where existing rills occur. Clearing and grubbing will be required only for proposed foundations and access roads; and will be re-established to the maximum extent prior to project completion, and in accordance with the CA. Construction General Permit.

New impervious area will be limited and scattered throughout each respective project area. Access roads will be constructed with decomposed granite; except where noticeable concentrated flow crosses over, concrete will be used for short lengths. Proposed impervious areas include concrete pads for electrical equipment, solar panel posts, and water tanks. More detail including quantities and overall impact to 100-year hydrologic calculations is provided herein.

Storm drain pipes and inlets are not proposed. There are no existing public or private storm drain systems within the project site vicinity for connection. Project site runoff will convey as sheet flow and shallow-concentrated flow under proposed conditions as it does under existing conditions.

Section 2 Study Objectives

The specific objectives of this study are as follows:

- Quantify the pre- and post-development 100-year peak flow rates for each respective project area;
- Quantify 100-year tributary peak flow rates for each project area;
- Develop 100-year limits of inundation, including depth and velocity, for project areas with tributary areas greater than 25 acres;
- Document compliance with CEQA thresholds of significance.

Section 3 Methodology

3.1 Hydrology

Advanced Engineering Solutions (AES – HydroWIN 2013) has been used to develop the anticipated 100-year peak flow runoff from each of the six (6) project areas and off-site tributary areas under pre and post development conditions, where watersheds do not exceed 640 acres (1 square mile).

This software utilizes the Rational Method and conforms to the hydrologic methodologies outlined in the San Diego County Hydrology Manual (SDCHM, June 2003). The Rational Method is a physically based model that calculates peak flow rates (Q) as a function of runoff coefficients (C), rainfall intensities (I), and drainage areas (A):

$$Q = C * I * A$$

Runoff coefficients (c) where established based upon guidance found in Table 3-1 from page 3-6 of the SDCHM (June 2003). Under existing conditions, runoff coefficients are based on soil type and land-use. Under proposed conditions, weighted runoff coefficients have been developed based on soil type, land-use, and proposed impervious cover. Refer to Appendix B.

Time of concentration and rainfall intensities are developed internally within the AES software. The 'San Diego' AES module has been used for this analysis and conforms to the methodologies described in the SDCHM (June 2003). Refer to Appendices B and C for AES output.

Area delineations have been developed using a combination of on-site 1' contour topography and off-site 40' and 200' contour topography obtained from aerial imaging and SanGIS.

Where tributary watersheds exceed 640 acres, the San Diego Unit Hydrology (SDUH) software has been used to develop the anticipated 100-year peak flow. This software requires input for rainfall depth, area, lag time, and adjusted curve number; and is an appropriate modeling approach based on no existing or proposed attenuation occurring via regional or on-site detention basins. Area and flow path have been determined using 40' and 200' contour topography obtained from

SanGIS. An adjusted curved number based on project location and precipitation zone index has been developed using guidance found in Section 4 of the SDCHM.

3.2 Hydraulics

Bentley's Flowmaster software has been used to develop the anticipated limits, depth, and velocity of 100-year peak flow across the respective project areas and project site. Flowmaster utilizes Manning's equation under steady state, normal depth flow conditions. Cross sections have been developed using the contour topography described above.

3.3 Hydromodification

The project site is considered exempt from hydromodification mitigation based on location (east of the Salton Sea Divide).

Section 4 Results

4.1 Hydrologic Results

The tables below summarize the hydrologic results under pre- and post-development conditions for the project areas. Table 4-1 includes the respective tributary area for each project area. These results are used for 100-year inundation limits and flow velocity. Tables 4-2 and 4-3 are intentionally limited to the specific project area boundary. These results are used to show no increase to 100-year peak flow, as a result of proposed improvements. Calculations are included in Appendices B and C.

Table 4-1. Summary of Project-Area Tributary Peak Flow Rates

Project Area	Drainage Node	C	I (in/hr)	A (ac)	Q100 (cfs)	Velocity (ft/sec)
A	130	0.2	2.01	514.5	207.01	7.44
E	125	0.2	2.10	340.3	142.57	5.31

Table 4-2. Summary of Total Project Site Peak Flow Rates

Location	Area (sq-mi)	CN	Lag Time (hrs)	P6/P24 (in)	Q100 (cfs)
West of Area B	30.4	68	1.48	3.1/5.2	9,720
East of Area B	5.0	68	0.96	3.1/5.2	2,015

Table 4-3. Summary of Pre - Development Project Area Peak Flow Rates

Project Area	Node	C	I (in/hr)	A (ac)	Q100 (cfs)
A	115	0.2	2.93	62.6	39.48
A	215	0.2	3.33	3.7	2.45
B	115	0.2	2.75	13.2	7.04
B	215	0.2	2.97	26.0	15.45
B	315	0.2	2.71	40.3	21.88
B	415	0.2	3.19	13.0	8.28
B	515	0.2	3.03	37.8	22.82
B	615	0.2	2.57	10.7	5.50
C	115	0.2	3.75	12.2	9.27
C	215	0.2	3.40	8.9	6.07
D	115	0.2	3.55	20.8	14.76
D	210	0.2	4.96	3.0	2.93
D	310	0.2	5.43	2.0	2.17
E	115	0.2	1.79	46.3	16.56
E	215	0.2	2.95	21.4	12.62
E	315	0.2	2.66	30.4	16.01
E	415	0.2	2.66	27.2	14.49
E	515	0.2	2.80	14.6	8.17
Total		-		393.3	229.07

Table 4-4. Summary of Post - Development Project Area Peak Flow Rates

Project Area	Node	C	I (in/hr)	A (ac)	Q100 (cfs)
A	115	0.2	2.93	62.6	39.48
A	215	0.2	3.33	3.7	2.45
B	115	0.2	2.75	13.2	7.04
B	215	0.2	2.97	26.0	15.45
B	315	0.2	2.71	40.3	21.88
B	415	0.2	3.19	13.0	8.28
B	515	0.2	3.03	37.8	22.82
B	615	0.2	2.57	10.7	5.50
C	115	0.2	3.75	12.2	9.27
C	215	0.2	3.40	8.9	6.07
D	115	0.2	3.55	20.8	14.76
D	210	0.2	4.96	3.0	2.93
D	310	0.2	5.43	2.0	2.17
E	115	0.2	1.79	46.3	16.56
E	215	0.2	2.95	21.4	12.62
E	315	0.2	2.66	30.4	16.01
E	415	0.2	2.66	27.2	14.49
E	515	0.2	2.80	14.6	8.17
Total	-	-	-	393.3	229.07

Impervious surfaces have been accounted for and itemized as part of the weighted runoff coefficient determination; and have been determined to not increase as a result of the proposed development. Refer to Appendix B for calculations.

It is understood that the DG access roads will likely result in less absorption, as compared to native ground, during the initial onset of rainfall; however, these access roads are not anticipated to impact peak flow within the confines of 100-year Rational Method hydrology. Proposed access-road width and length have been reduced to the maximum extent. Based on the limited area of non-paved road, the non-condensed layout (i.e. *spread out over the entire site, not condensed like a parking lot),* and the immediately adjacent native ground; access roads are not expected to impact the time of concentration or weighted runoff coefficient, as compared to pre-development conditions. As such, the post-development runoff coefficients are expected to remain unchanged, as they relate to determining peak flow runoff between pre and post-development conditions for 100-year conditions.

Re-establishment of existing vegetation density will be critical to substantiating no increase in post-development runoff coefficient as compared to existing conditions. The contractor shall re-establish vegetation density throughout each respective project area, consistent with pre-development conditions, prior to project completion.

On-site DG roads will be protected with concrete and riprap in isolated locations where concentrated flow crosses over. Riprap on the order of ¼ ton to ½ ton will be installed a minimum of 10' upstream and downstream of each location. Riprap installation is proposed flush with surrounding ground and will include a permeable liner. In some cases, based on similar approaches throughout the watershed, a small length of concrete is proposed to further protect against erosion and roadway washout. Proposed concrete is limited in nature and insignificant when considering watershed hydrology.

Grading is limited in nature and will not impact the flow path length or time of concentration across each respective project area, as compared to pre-development conditions. On-site roughness coefficients are not expected to be impacted by proposed improvements, within the confines of the Rational Method. The addition of on-site solar posts could theoretically increase the roughness coefficient, effectively increasing the Tc and reducing the peak flow; however, this has been conservatively omitted from the hydrologic analyses.

Proposed grading is limited and will not result in the diversion of flow, as compared to pre-development conditions. Runoff will discharge from each respective project area as shallow concentrated flow, consistent with pre-development conditions.

4.2 Hydraulic Results

The table below summarizes the 100-year limits of inundation. Cross section A1 is located within project area A, E1 within project area E. Cross Sections A-E are located within the southeasterly-flowing wash (unnamed tributary to the Salton Sea), where all project-area runoff confluences.

Cross sections F and G are located between project areas A and B. Refer to Appendix D for calculations and an inundation exhibit.

Table 4-5. On-Site Cross Sections and 100-Year Inundation

Cross Section	Q100 (cfs)	Top Width (ft)	Velocity (ft/sec)	Depth (ft)
A1	207	73.85	3.93	0.93
A2	207	374.6	2.05	0.26
E1	143	329.19	2.05	0.30
E2	143	302.79	1.87	0.25
A	9,720	733.14	5.39	4.16
B	9,720	680.86	5.57	3.14
C	9,720	912.41	4.67	2.43
D	9,720	904.93	5.61	1.82
E	9,720	1087.17	4.46	2.11
F	2,015	413.98	4.09	1.45
G	2,015	533.03	3.69	1.06

Section 5 CEQA Thresholds of Significance

1. **Will the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?**

   The project will not alter the existing drainage pattern across the site. Minor grading is proposed for at-grade, non-paved access roads and small, at-grade pads for electrical equipment. Existing contours will be softened to reduce the potential for rill erosion, without diverting flow, as compared to pre-development conditions.

2. **Will the project increase water surface elevation in a watercourse within a watershed equal to or greater than 1 square mile, by 1 foot or more in height and in the case of the San Luis Rey River, San Dieguito River, San Diego River, Sweetwater River and Otay River, 2/10 of a foot or more?**

The project will not increase water surface elevations across the site or downstream. Proposed improvements will not alter the existing hydrologic and hydraulic properties of the site. No increase in peak flow discharge is anticipated as a result of the proposed project.

3. **Will the project result in increased velocities and peak flow rates exiting the project site that could cause flooding downstream or exceed the storm water drainage system capacity serving the site?**

   The project will not increase runoff velocities or peak flow rates leaving the site. Runoff will continue to flow as it does under existing conditions. The project will not cause flooding downstream, nor will it hydraulically impact downstream storm water infrastructure.

4. **Will the project result in placing housing, habitable structures, or unanchored impediments to flow in a 100-year floodplain area or other special flood hazard area, as shown on a FIRM, a County Flood Plain Map or County Alluvial Fan Map, which would subsequently endanger health, safety and property due to flooding?**

   There are no proposed habitable structures as part of the project. The project site is located in a FEMA Zone D, correlating with an unstudied, or "Not Printed" area.

   The project site does contain a tributary watershed over 25 acres (County standard for 100-year limits of inundation determination). Limits of inundation have been determined and will not be impacted as a result of proposed improvements.

5. **Will the project place structures within a 100-year flood hazard or alter the floodway in a manner that would redirect or impede flow resulting in any of the following:**

   a) **Alter the line of inundation resulting in the placement of other housing in a 100 year flood hazard**

   b) **Increase water surface elevation in a watercourse with a watershed equal to or greater than 1 square mile by 1 foot or more in height and in the case of the San Luis Rey River, San Dieguito River, San Diego River, Sweetwater River and Otay River, 2/10 of a foot or more?**

   Proposed improvements will not impact 100-yaer limits of inundation.

   The project will not increase water surface elevations across the site or downstream. Proposed improvements will not alter the existing hydrologic and hydraulic properties of the site. No increase in peak flow discharge, as compared to pre development conditions, is anticipated as a result of the proposed project.

Section 6 Conclusions

Proposed improvements are not anticipated to have any measurable impact on peak flow runoff. This assertion is substantiated by no change to flow path length, time of concentration, drainage area, or runoff coefficients; as compared to pre-development conditions.

The 100-year limits of inundation have been determined using SDCHM methodology for determining Q100, normal depth, and contour topography. Results from these analyses are used to assess the panel layout.

CEQA thresholds of significance have been addressed.

Section 7 Declaration of Responsible Charge

I, hereby declare that I am the Civil Engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with current design.

I understand that the check of project drawings and specifications by the City of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for the project design.

8/25/2020

Stefani Barlow RCE 88581 Date

Section 8 References

County, S. D. (2014). Hydraulic Design Manual.

County, S. D. (June 2003). *San Diego County Hydrology Manual.*

Diego, C. o. (April 1984). *Drainage Design Manual.* San Diego.

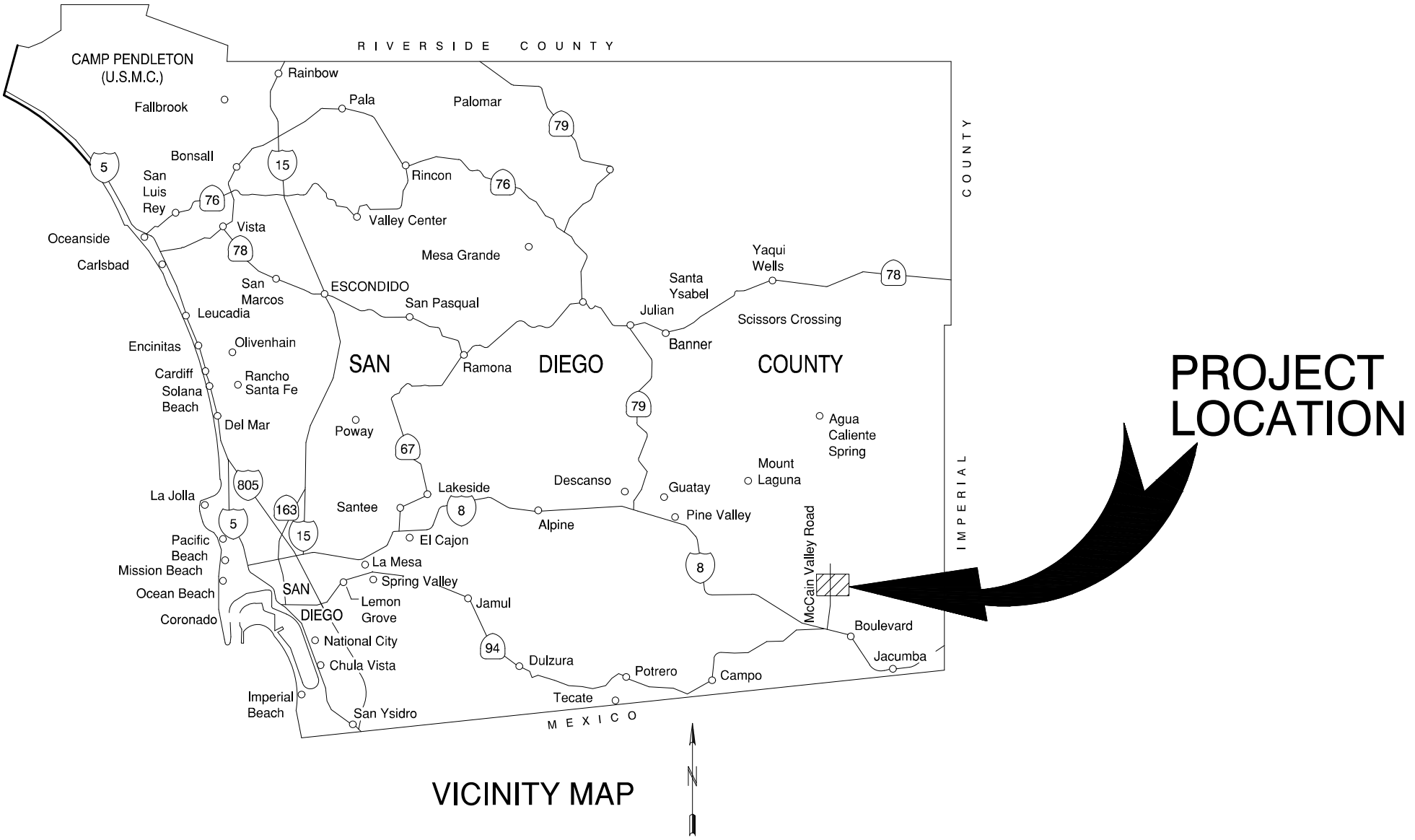
Engineering, G. &. (June 2015). *Model BMP Design Manual.* San Diego.

FEMA. (1997). *Flood Insurance Rate Map.* San Diego.

Michael Baker
INTERNATIONAL

Appendix A – Site Information

Vicinity Map
Rainfall Isopluvials
San Diego County Hydrology Manual Excerpts
San Diego County Hydraulic Manual Excerpts
FEMA FIRM
NRCS WebSoil Survey



PROJECT LOCATION

VICINITY MAP

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

Project Site:
P24(100YR) = 3.1"

Orange County

Riverside County

Pacific Ocean

Mexico

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
SD
CHULA VISTA
IMPERIAL BEACH

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'
33°30' 33°15' 33°00' 32°45' 32°30'

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Project Site:
P24(100YR) = 5.2"

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

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'

DPW GIS
Department of Public Works
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N W E S

3 0 3 Miles

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

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

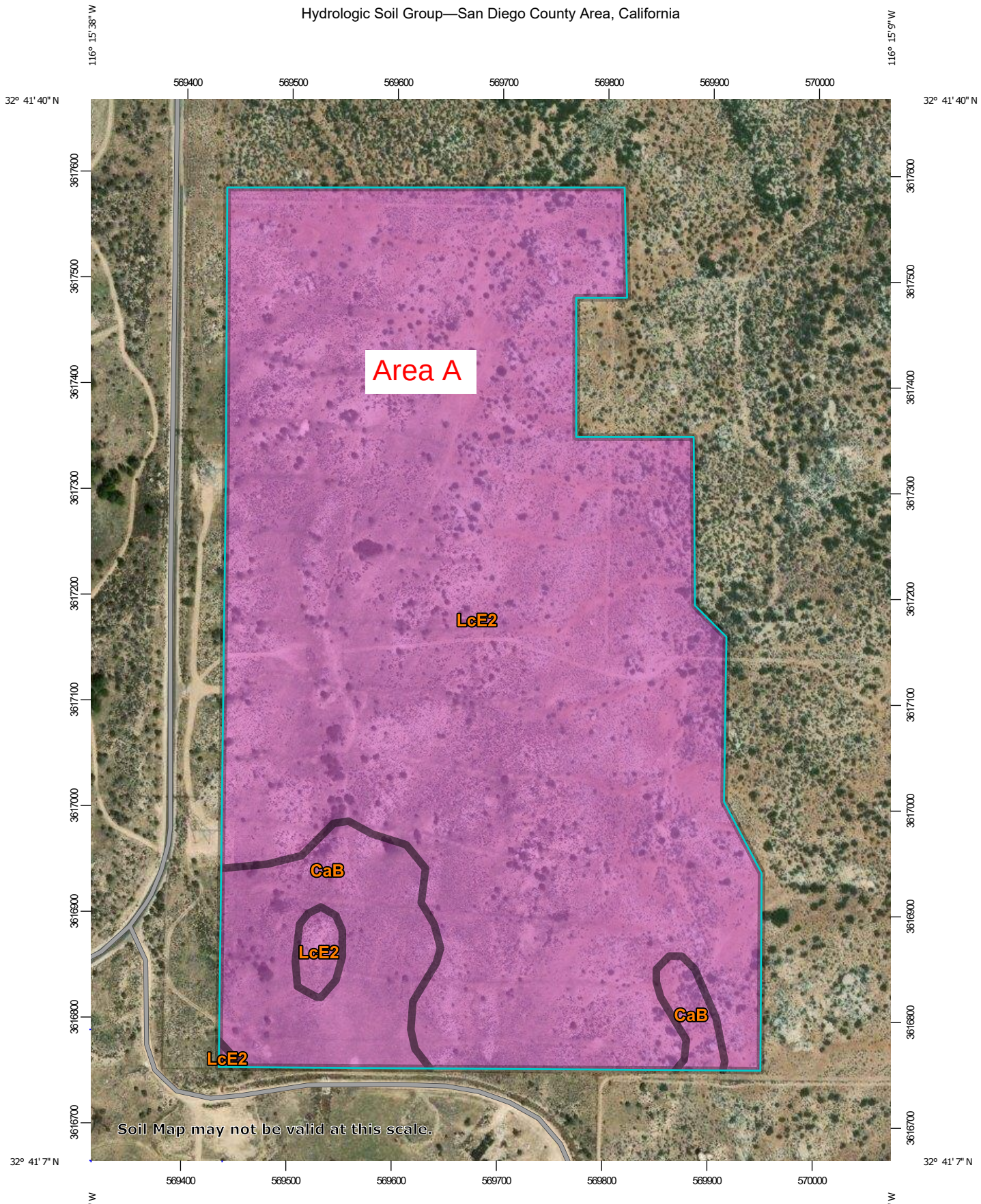
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/8/2019 at 4:15:43 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Map Scale: 1:4,900 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 13, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Oct 25, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CaB	Calpine coarse sandy loam, 2 to 5 percent slopes	A	10.2	11.1%
LcE2	La Posta rocky loamy coarse sand, 5 to 30 percent slopes, eroded	A	81.8	88.9%
Totals for Area of Interest			**92.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

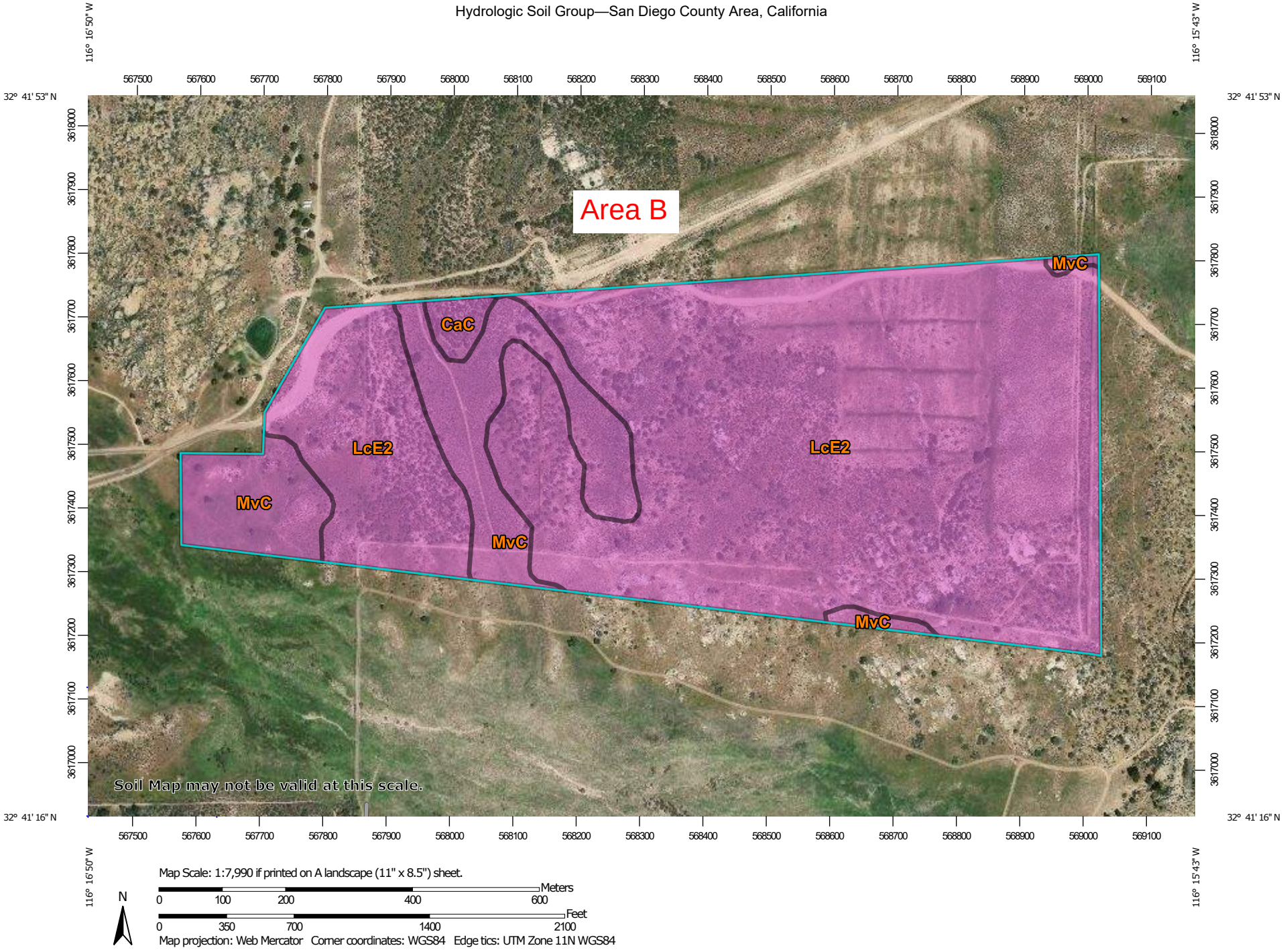
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Hydrologic Soil Group—San Diego County Area, California



Map Scale: 1:7,990 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 13, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Oct 25, 2017

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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CaC	Calpine coarse sandy loam, 5 to 9 percent slopes	A	1.9	1.1%
LcE2	La Posta rocky loamy coarse sand, 5 to 30 percent slopes, eroded	A	140.3	83.2%
MvC	Mottsville loamy coarse sand, 2 to 9 percent slopes	A	26.4	15.6%
Totals for Area of Interest			**168.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

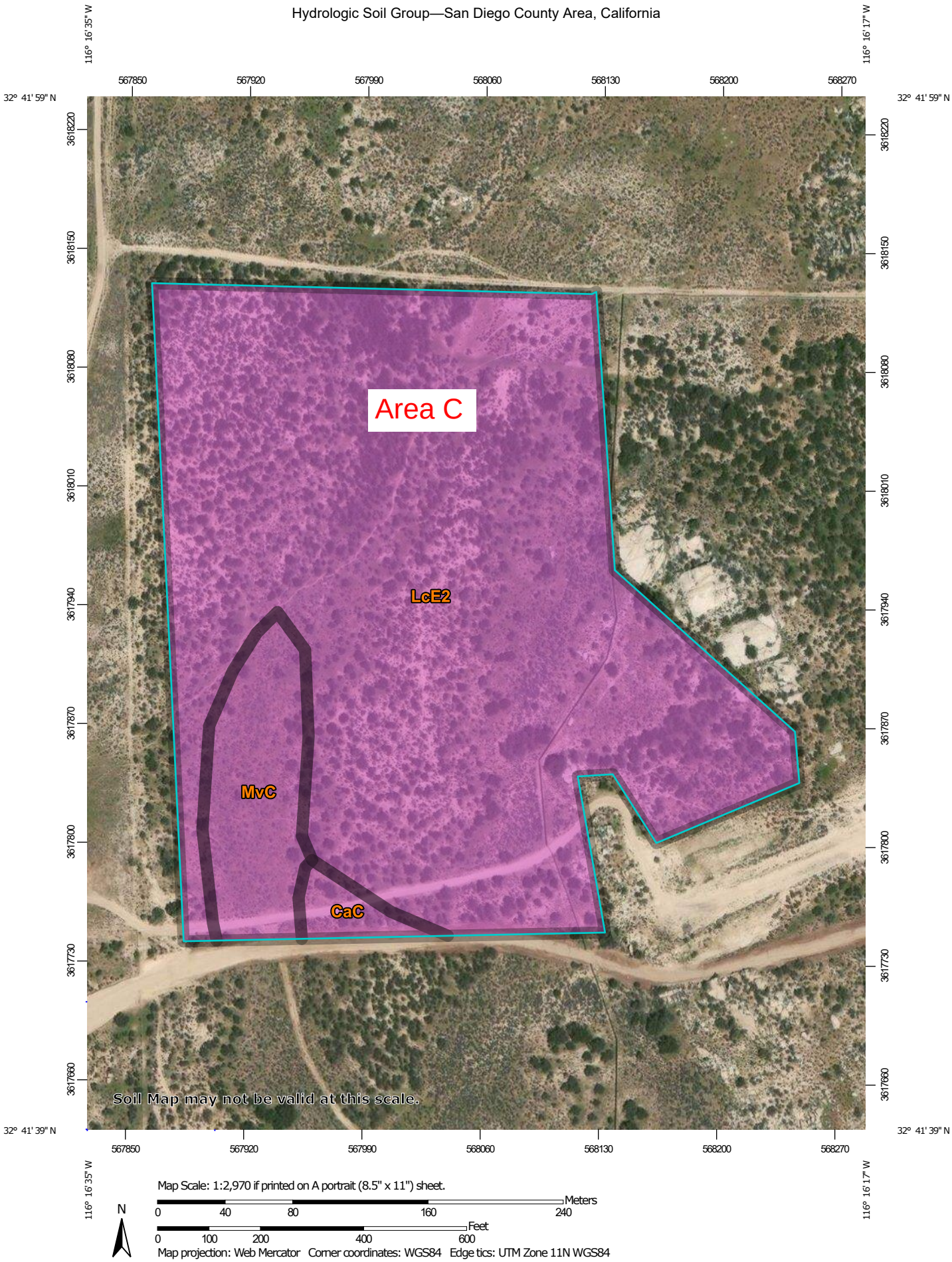
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher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116° 16' 17" W
32° 41' 59" N
32° 41' 39" N
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567920
567990
568060
568130
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568270
3618220
3618150
3618080
3618010
3617940
3617870
3617800
3617730
3617660
Area C
LcE2
MvC
CaC
Soil Map may not be valid at this scale.
Map Scale: 1:2,970 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 40 80 160 240
Feet
0 100 200 400 600
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Survey Area Data: Version 13, Sep 12, 2018

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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CaC	Calpine coarse sandy loam, 5 to 9 percent slopes	A	0.5	1.8%
LcE2	La Posta rocky loamy coarse sand, 5 to 30 percent slopes, eroded	A	24.2	89.2%
MvC	Mottsville loamy coarse sand, 2 to 9 percent slopes	A	2.4	9.0%
Totals for Area of Interest			**27.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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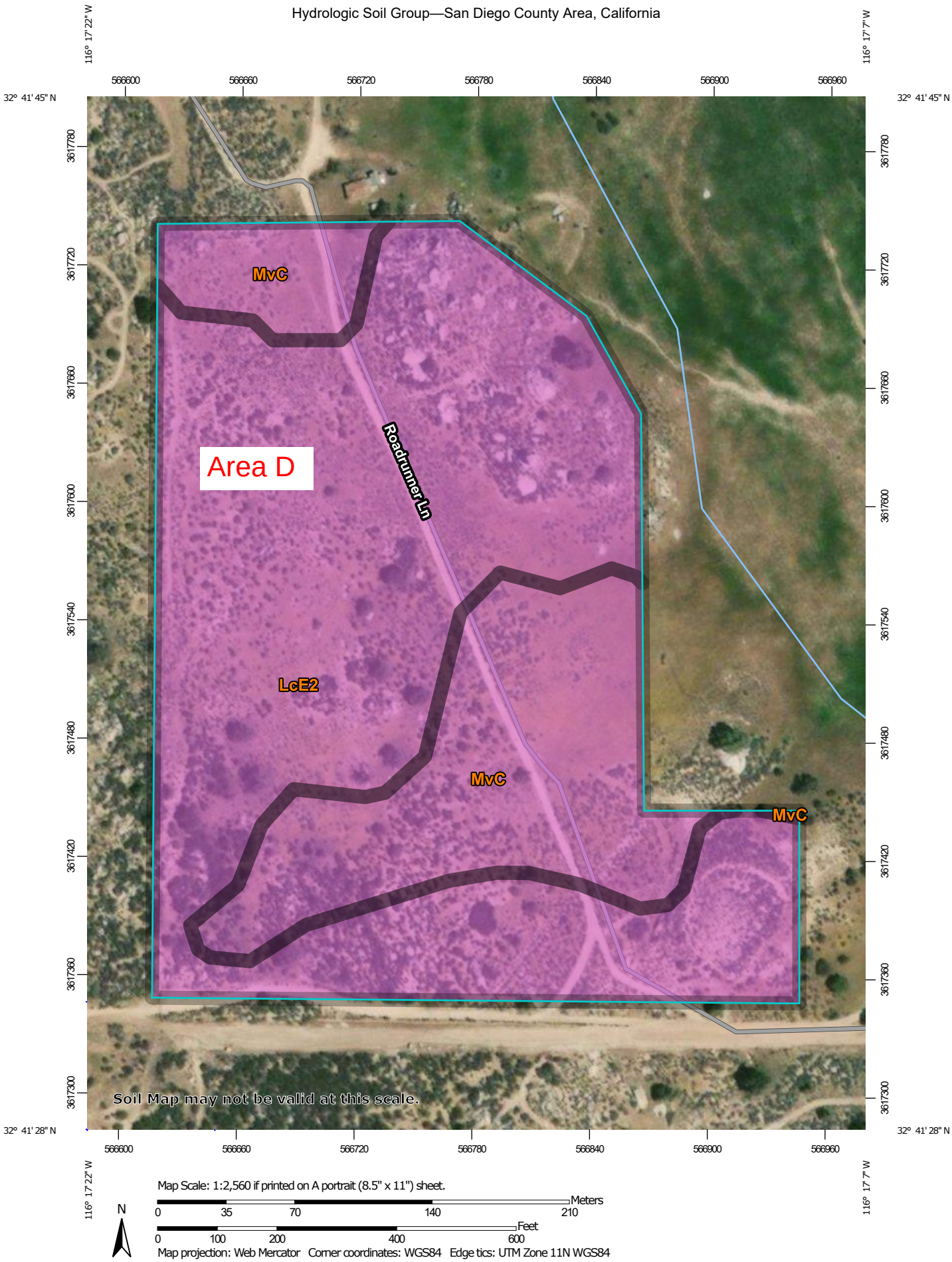
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Map Scale: 1:2,560 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
LcE2	La Posta rocky loamy coarse sand, 5 to 30 percent slopes, eroded	A	18.1	71.2%
MvC	Mottsville loamy coarse sand, 2 to 9 percent slopes	A	7.3	28.8%
Totals for Area of Interest			**25.3**	**100.0%**

Description

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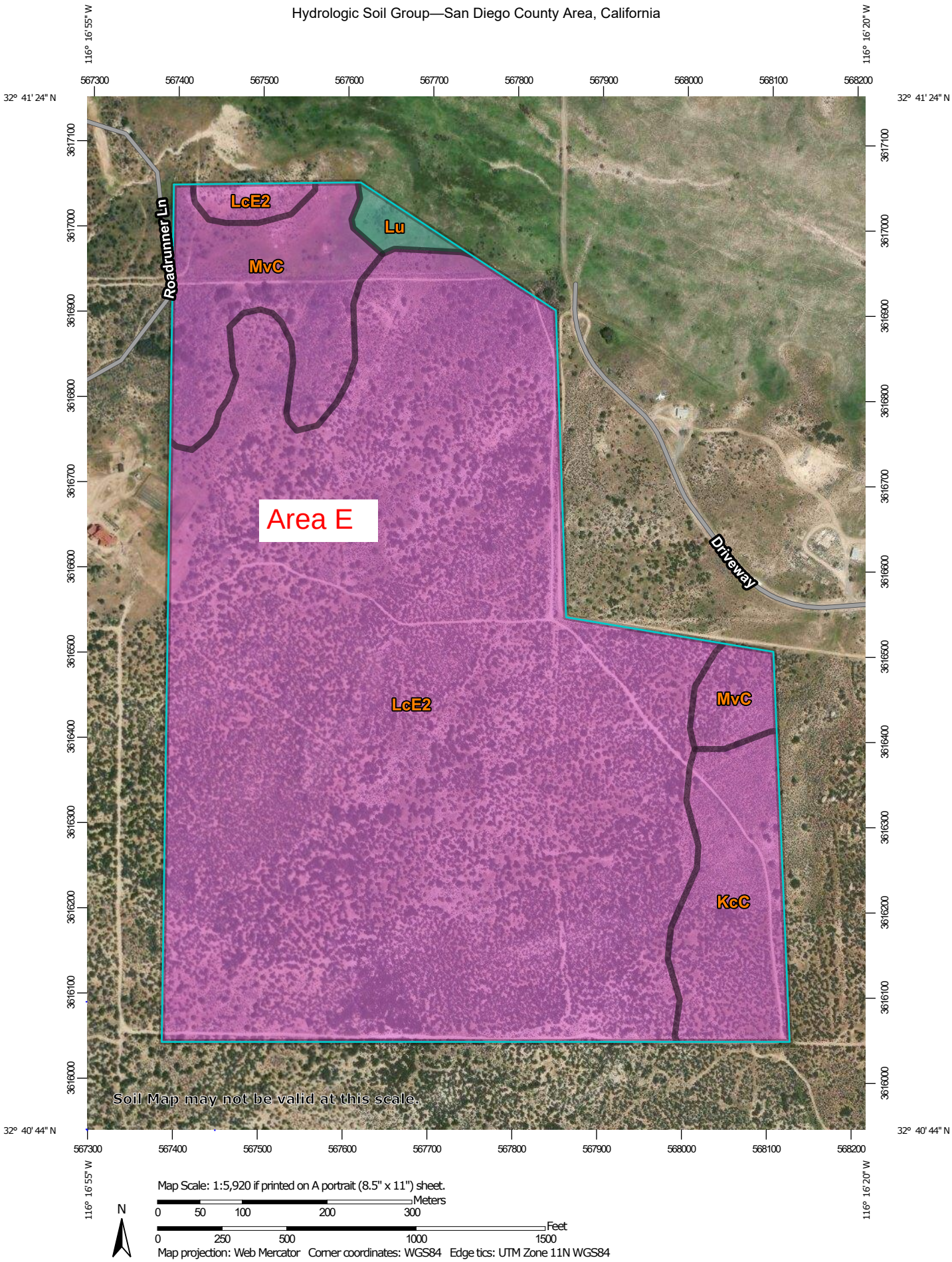
116° 16' 55" W
116° 16' 20" W
32° 41' 24" N
32° 40' 44" N
567300
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568000
568100
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3617000
3616900
3616800
3616700
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3616300
3616200
3616100
3616000
LcE2
Lu
MvC
Roadrunner Ln
Area E
Driveway
LcE2
MvC
KcC
Soil Map may not be valid at this scale.
Map Scale: 1:5,920 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 50 100 200 300
Feet
0 250 500 1000 1500
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
KcC	Kitchen Creek loamy coarse sand, 5 to 9 percent slopes	A	10.3	7.2%
LcE2	La Posta rocky loamy coarse sand, 5 to 30 percent slopes, eroded	A	116.3	81.8%
Lu	Loamy alluvial land	C	1.3	0.9%
MvC	Mottsville loamy coarse sand, 2 to 9 percent slopes	A	14.3	10.1%
Totals for Area of Interest			**142.2**	**100.0%**

Michael Baker
INTERNATIONAL

Appendix B – Existing Hydrology

Weighted Runoff Coefficients

On-Site Hydrologic Work Map
On-site AES Output

Off-Site Hydrologic Work Map
Off-site AES Output

Total Project Area = **398.70** **ac**
Total Project EX. Impervious = **0.00** **ac**
Total Project PR. Impervious = **0.96** **ac (0.25% of site)**

ON-SITE Runoff Coefficients

EXISTING Condition

Land Use	Area A	
	Area	C
Type A Natural	71.15	0.20
Type B Natural	0.00	0.25
Type C Natural	0.00	0.30
Type D Natural	0.00	0.35
Impervious	0.00	0.90
Total	**71.15**	

EX. Area A Weighted C = **0.20**

Land Use	Area B	
	Area	C
Type A Natural	140.61	0.20
Type B Natural	0.00	0.25
Type C Natural	0.00	0.30
Type D Natural	0.00	0.35
Impervious	0.00	0.90
Total	**140.61**	

EX. Area B Weighted C = **0.20**

Land Use	Area C	
	Area	C
Type A Natural	21.28	0.20
Type B Natural	0.00	0.25
Type C Natural	0.00	0.30
Type D Natural	0.00	0.35
Impervious	0.00	0.90
Total	**21.28**	

EX. Area C Weighted C = **0.20**

PROPOSED Condition

Land Use	Area A	
	Area	C
Type A Natural	70.99	0.20
Type B Natural	0.00	0.25
Type C Natural	0.00	0.30
Type D Natural	0.00	0.35
Impervious Solar Posts	0.02	0.90
Impervious Inverter Pad	0.13	0.90
Impervious Water Tanks	0.01	0.90
Impervious O&M Building	0.00	0.90
Impervious Sub-Station	0.00	0.90
Total	**71.15**	

PR. Area A Weighted C = **0.20**

Land Use	Area B	
	Area	C
Type A Natural	140.17	0.20
Type B Natural	0.00	0.25
Type C Natural	0.00	0.30
Type D Natural	0.00	0.35
Impervious Solar Posts	0.05	0.90
Impervious Inverter Pad	0.29	0.90
Impervious Water Tanks	0.01	0.90
Impervious O&M Building	0.02	0.90
Impervious Sub-Station	0.06	0.90
Total	**140.61**	

PR. Area B Weighted C = **0.20**

Land Use	Area C	
	Area	C
Type A Natural	21.14	0.20
Type B Natural	0.00	0.25
Type C Natural	0.00	0.30
Type D Natural	0.00	0.35
Impervious Solar Posts	0.01	0.90
Impervious Inverter Pad	0.04	0.90
Impervious Water Tanks	0.00	0.90
Impervious O&M Building	0.00	0.90
Impervious Sub-Station	0.00	0.90
Total	**21.18**	

PR. Area C Weighted C = **0.20**

Land Use	AREA D	
	Area	C
Type A Natural	25.73	0.20
Type B Natural	0.00	0.25
Type C Natural	0.00	0.30
Type D Natural	0.00	0.35
Impervious	0.00	0.90
Total	**25.73**	

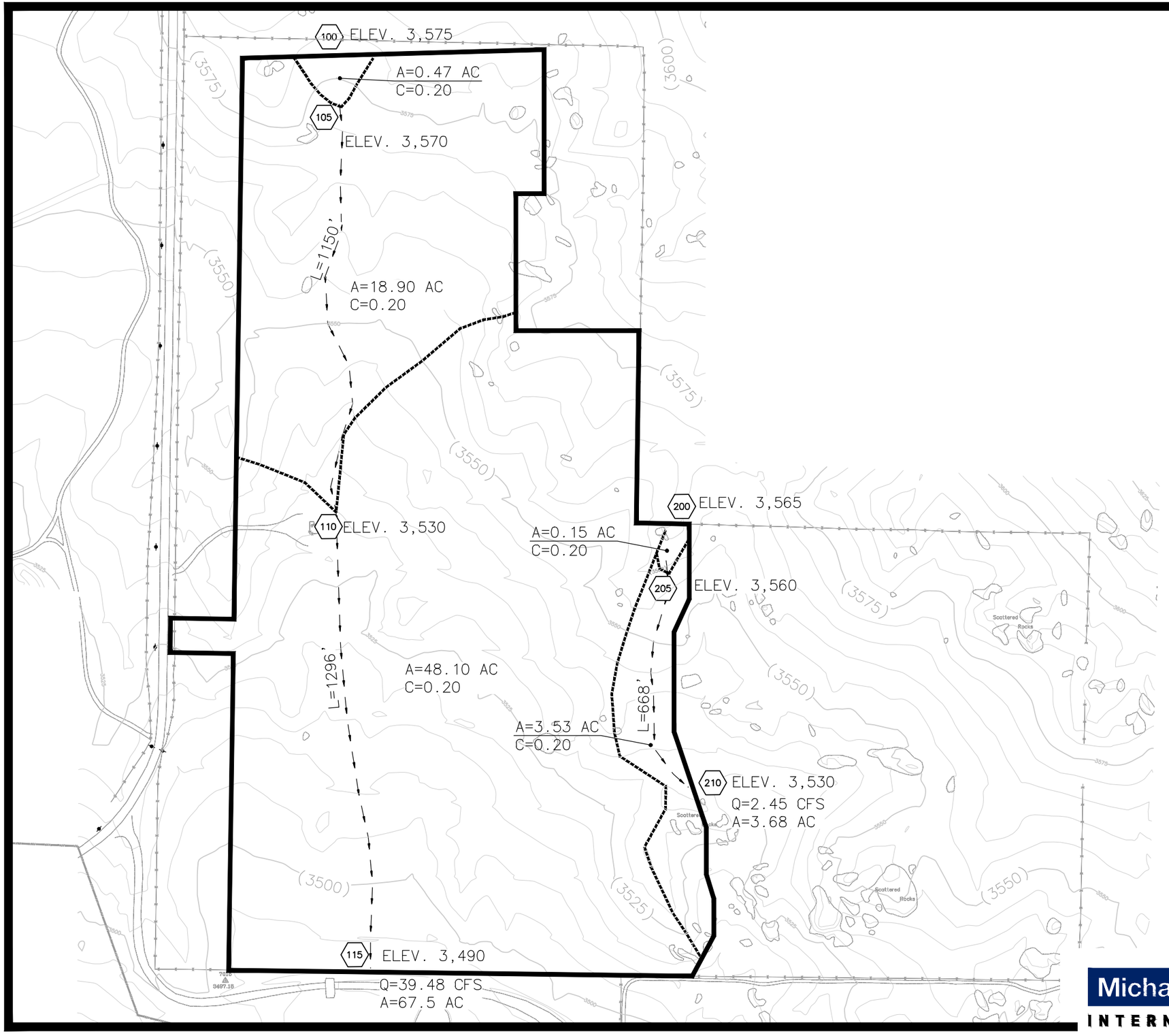
EX. Area D Weighted C = 0.20

Land Use	AREA D	
	Area	C
Type A Natural	25.68	0.20
Type B Natural	0.00	0.25
Type C Natural	0.00	0.30
Type D Natural	0.00	0.35
Impervious Solar Posts	0.01	0.90
Impervious Inverter Pad	0.04	0.90
Impervious Water Tank	0.00	0.90
Total	**25.73**	
PR. Area D Weighted C =		**0.20**

Land Use	AREA E	
	Area	C
Type A Natural	138.63	0.20
Type B Natural	0.00	0.25
Type C Natural	1.30	0.30
Type D Natural	0.00	0.35
Impervious	0.00	0.90
Total	**139.93**	

EX. Area E Weighted C = 0.20

Land Use	AREA E	
	Area	C
Type A Natural	138.35	0.20
Type B Natural	0.00	0.25
Type C Natural	1.30	0.30
Type D Natural	0.00	0.35
Impervious Solar Posts	0.05	0.90
Impervious Inverter Pad	0.22	0.90
Impervious Water Tank	0.01	0.90
Total	**139.93**	
PR. Area E Weighted C =		**0.20**



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

(100) HYDROLOGY NODE

442 NODE ELEVATION

SCALE 1"=300'

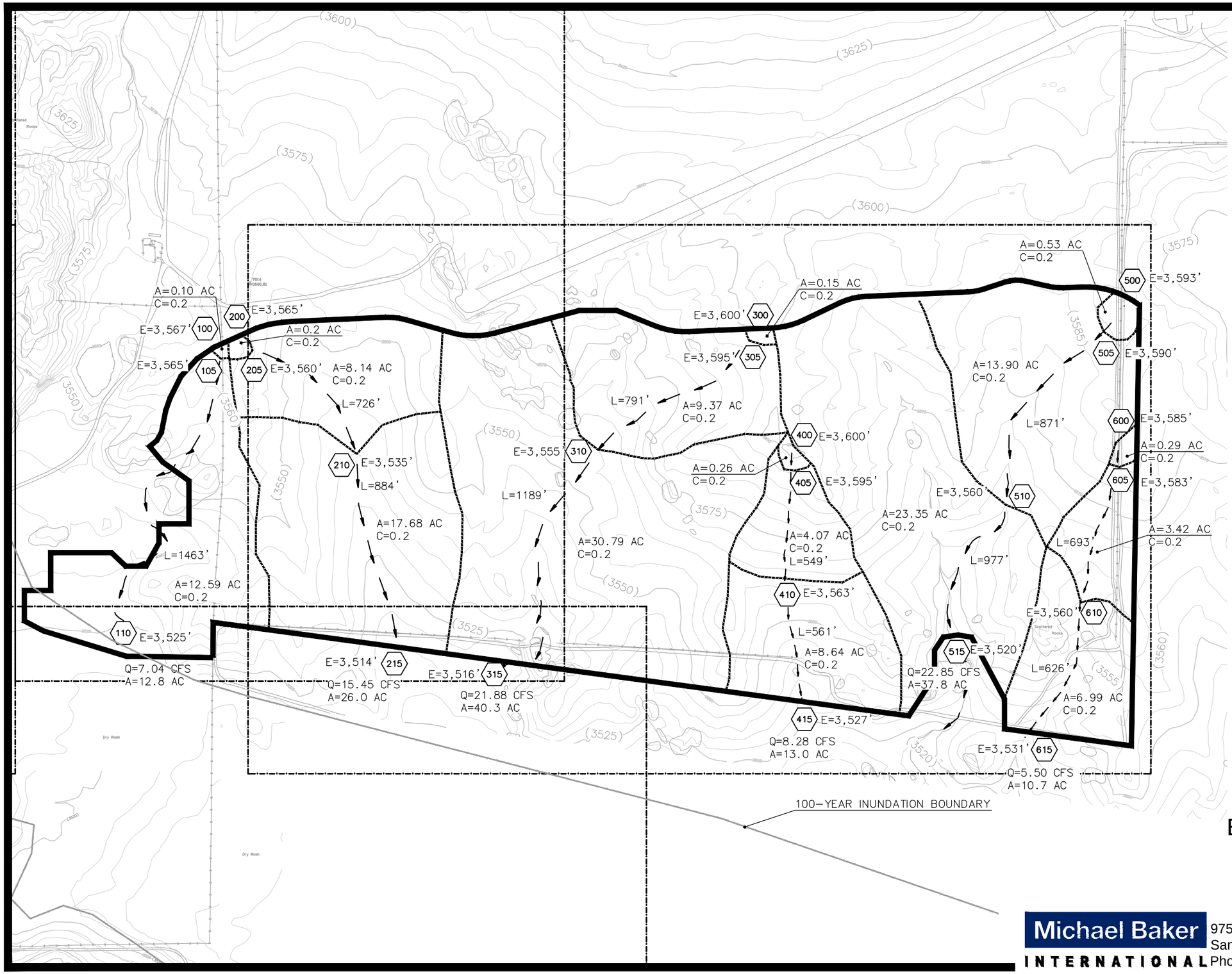
300 150 0 300

SCALE: 1"=300'

RUGGED SOLAR
EXISTING HYDROLOGIC
PROJECT SITE WORK MAP
AREA A

Michael Baker INTERNATIONAL
9755 Clairemont Mesa Blvd., Suite 100
San Diego, CA 92124
Phone: (858) 614-5000 · MBAKERINTL.COM

H:\PDATA\173007\CADD\Strmwater\Existing\173007 EX Hydro Work Map - Area A.dwg 09/23/19 - 10:11am chris.yamaguchi



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

SCALE 1"=400'

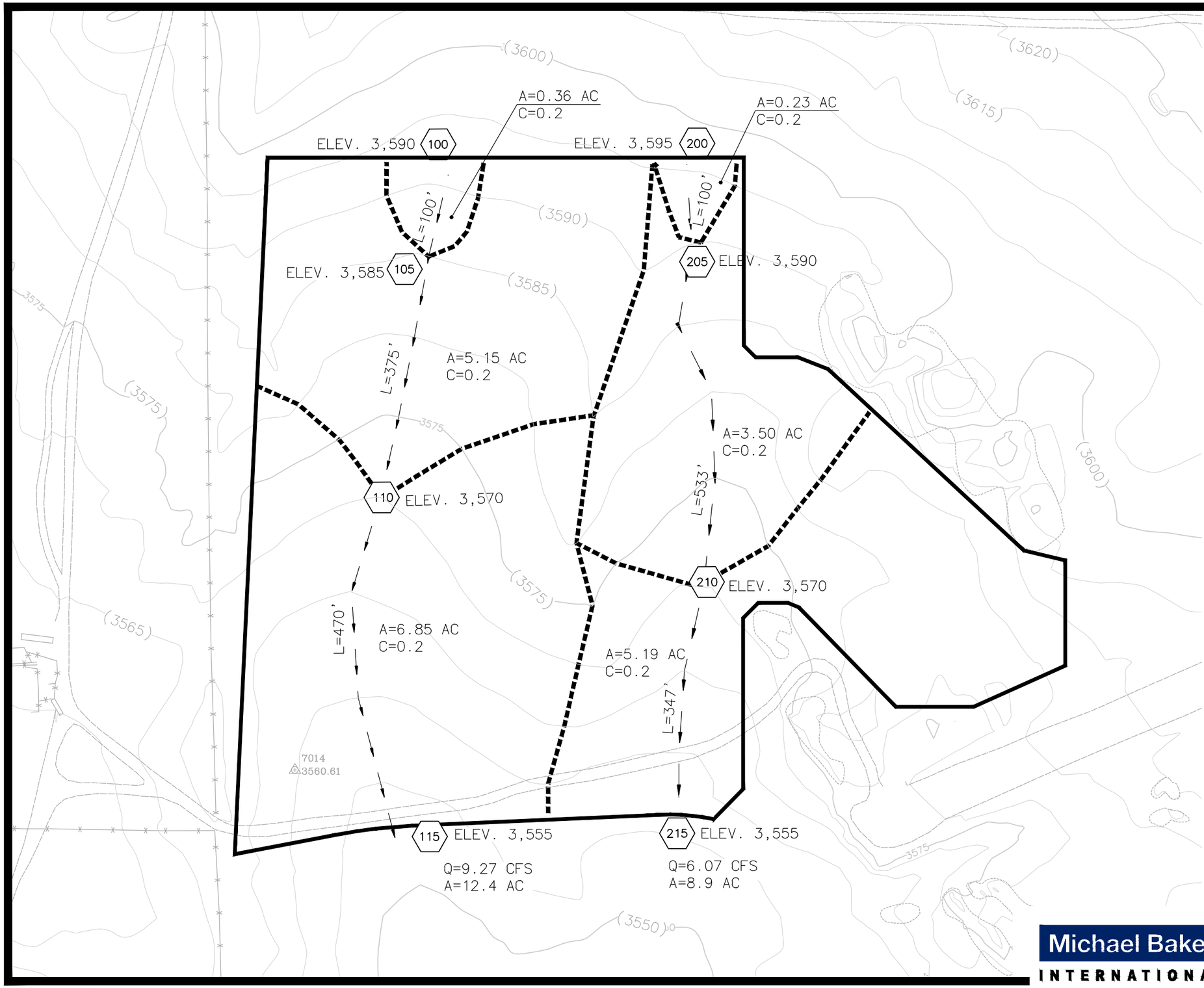
400 200 0 400

SCALE: 1"=400'

RUGGED SOLAR
EXISTING HYDROLOGIC PROJECT WORK MAP
AREA B

Michael Baker INTERNATIONAL
9755 Clairemont Mesa Blvd., Suite 100
San Diego, CA 92124
Phone: (858) 614-5000 · MBAKERINTL.COM

H:\PDATA\173007\CADD\Strmwater\Existing\173007 EX Hydro Work Map - Area B.dwg 09/23/19 - 10:12am chris.yamaguchi



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

150 75 0 150

SCALE: 1"=150'

SCALE 1"=150'

RUGGED SOLAR
EXISTING HYDROLOGIC
PROJECT SITE WORK MAP
AREA C

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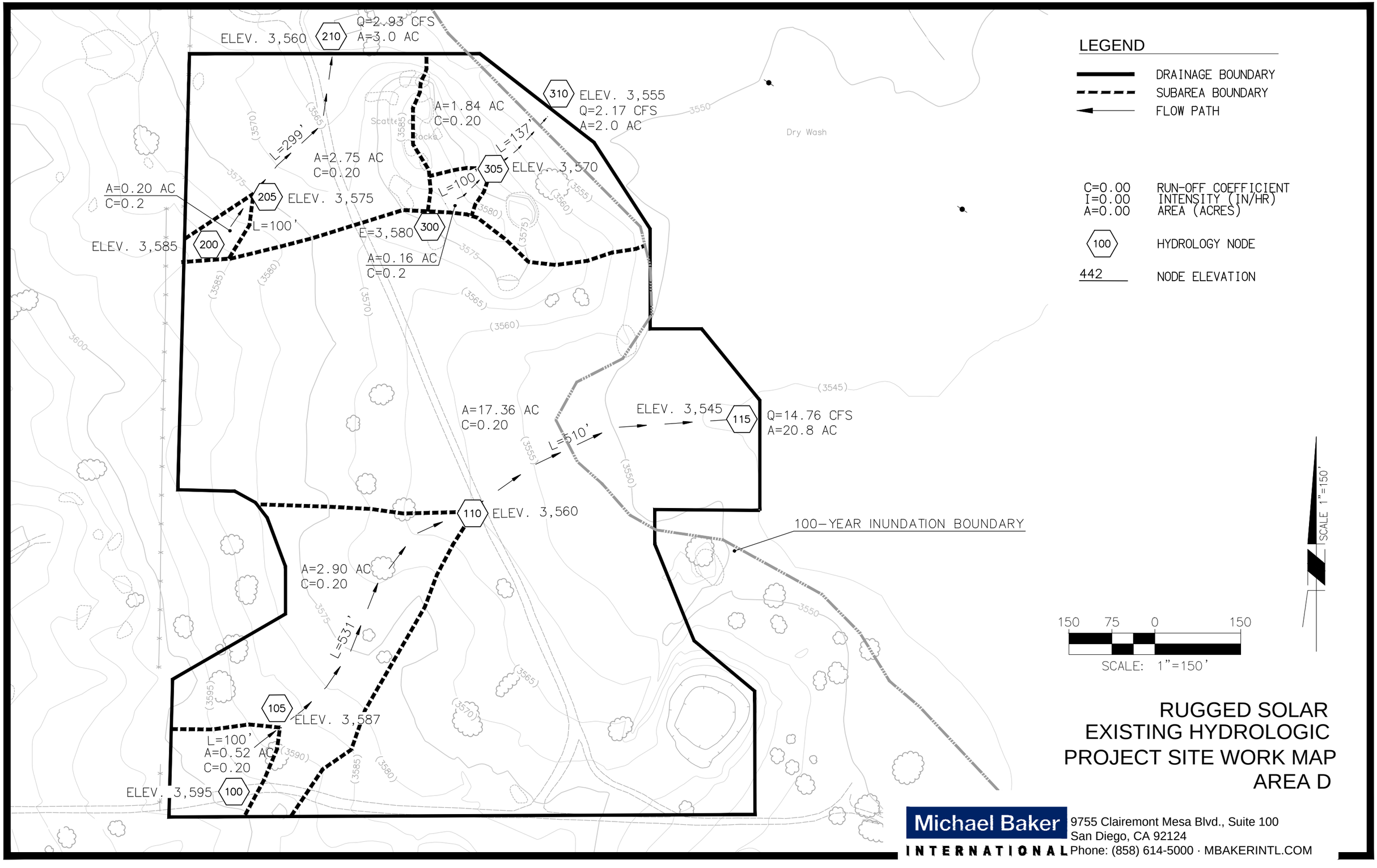
H:\PDATA\173007\CADD\Strmwater\Existing\173007 EX Hydro Work Map - Area C.dwg 09/23/19 - 10:12am chris.yamaguchi



RUGGED SOLAR
EXISTING HYDROLOGIC
PROJECT SITE WORK MAP
AREA D

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LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

100-YEAR INUNDATION BOUNDARY

Q=14.49 CFS
A=27.2 AC
415 ELEV. 3,519

315 ELEV. 3,514
Q=16.01 CFS
A=30.4 AC

A=20.80 AC
C=0.20
L=862'

A=14.77 AC
C=0.20
L=1009'

410 ELEV. 3,548

310 ELEV. 3,558

215 ELEV. 3,552
Q=12.62 CFS
A=21.4 AC

A=6.27 AC
C=0.20
L=1061'

A=14.58 AC
C=0.20
L=1504'

L=830'

405 ELEV. 3,618

ELEV. 3,628 400

A=0.13 AC
C=0.2

A=15.49 AC
C=0.20

210 ELEV. 3,588

Q=16.56 CFS
A=46.3 AC
115 ELEV. 3,522

A=35.42 AC
C=0.20

L=1141'

A=6.72 AC
C=0.20

305 ELEV. 3,650
L=100'

ELEV. 3,660 300

A=0.13 AC
C=0.2

110 ELEV. 3,598
L=1805'

L=1192'

A=10.59 AC
C=0.20

205 ELEV. 3,662

ELEV. 3,670 200

L=100'

A=0.07 AC
C=0.2

105 ELEV. 3,666

A=4.71 AC
C=0.20

505 ELEV. 3,652

L=979'

510 ELEV. 3,578

L=758'

A=9.63 AC
C=0.20

ELEV. 3,676 100

L=100'

A=0.29 AC
C=0.2

A=0.11 AC
C=0.2

500 L=100'
ELEV. 3,660

515 ELEV. 3,532
Q=8.17 CFS
A=14.6 AC

400 200 0 400
SCALE: 1"=400'

SCALE 1"=400'

RUGGED SOLAR
EXISTING HYDROLOGIC PROJECT SITE WORK MAP
AREA E

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA A                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-A.DAT
  TIME/DATE OF STUDY: 13:38 09/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3575.00
```

```
 DOWNSTREAM ELEVATION(FEET) =   3570.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
 SUBAREA RUNOFF(CFS) =      0.51
 TOTAL AREA(ACRES) =      0.47   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3570.00  DOWNSTREAM(FEET) =   3530.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1150.00   CHANNEL SLOPE =  0.0348
 CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.617
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.59
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.34
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   8.21
 Tc(MIN.) =   17.68
 SUBAREA AREA(ACRES) =    18.90       SUBAREA RUNOFF(CFS) =   13.67
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       19.4         PEAK FLOW RATE(CFS) =      14.01

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   2.91
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3530.00  DOWNSTREAM(FEET) =   3490.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1296.00   CHANNEL SLOPE =  0.0309
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.926
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.18
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.14
 AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   6.88
 Tc(MIN.) =   24.56
 SUBAREA AREA(ACRES) =    48.10       SUBAREA RUNOFF(CFS) =   28.15
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       67.5         PEAK FLOW RATE(CFS) =      39.48

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   3.54
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    2546.00 FEET.

+----------------------------------------------------------------------------+
```

```
| Begin Sub-Basin 200                                                    |
| Easterly Boundary                                                      |
|                                                                        |
+------------------------------------------------------------------------+

************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3565.00
  DOWNSTREAM ELEVATION(FEET) =   3560.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.16

************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3530.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   668.00   CHANNEL SLOPE =  0.0449
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.327
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.05
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  10.65
  Tc(MIN.) =   20.12
  SUBAREA AREA(ACRES) =     3.53       SUBAREA RUNOFF(CFS) =    2.35
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       2.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     768.00 FEET.
========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.7  TC(MIN.) =     20.12
  PEAK FLOW RATE(CFS)   =       2.45
========================================================================
========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA B                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-B.DAT
  TIME/DATE OF STUDY: 14:25 09/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3567.00
```

```
  DOWNSTREAM ELEVATION(FEET) =   3565.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.501
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.773
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3565.00  DOWNSTREAM(FEET) =   3525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1463.00   CHANNEL SLOPE =  0.0273
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.752
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.87
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.57
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =  15.51
  Tc(MIN.) =   27.01
  SUBAREA AREA(ACRES) =    12.59       SUBAREA RUNOFF(CFS) =    6.93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       12.8         PEAK FLOW RATE(CFS) =       7.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   1.93
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1563.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 200                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3565.00
  DOWNSTREAM ELEVATION(FEET) =   3560.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.22
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3535.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   726.00   CHANNEL SLOPE =  0.0344
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.652
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.52
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   7.94
  Tc(MIN.) =   17.42
  SUBAREA AREA(ACRES) =     8.14       SUBAREA RUNOFF(CFS) =    5.94
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        8.3         PEAK FLOW RATE(CFS) =       6.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     826.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3535.00  DOWNSTREAM(FEET) =   3514.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0238
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.970
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   6.58
  Tc(MIN.) =   24.00
  SUBAREA AREA(ACRES) =    17.68       SUBAREA RUNOFF(CFS) =   10.50
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       26.0         PEAK FLOW RATE(CFS) =      15.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   2.55
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =    1710.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 300                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3600.00
  DOWNSTREAM ELEVATION(FEET) =   3598.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.501
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.773
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3598.00  DOWNSTREAM(FEET) =   3555.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   791.00   CHANNEL SLOPE =  0.0544
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.479
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.81
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   7.28
  Tc(MIN.) =   18.78
  SUBAREA AREA(ACRES) =     9.37       SUBAREA RUNOFF(CFS) =    6.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        9.5         PEAK FLOW RATE(CFS) =       6.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.30
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =     891.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    315.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3555.00  DOWNSTREAM(FEET) =   3516.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1189.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.714
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.09
```

```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.25
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   8.82
 Tc(MIN.) =   27.60
 SUBAREA AREA(ACRES) =    30.79       SUBAREA RUNOFF(CFS) =   16.71
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       40.3         PEAK FLOW RATE(CFS) =      21.88

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.64
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =    2080.00 FEET.

+----------------------------------------------------------------------------+
| Begin Sub-Basin 400                                                        |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    400.00 TO NODE    405.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 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.) =    9.474
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    410.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3595.00  DOWNSTREAM(FEET) =   3563.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   549.00   CHANNEL SLOPE =  0.0583
 CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.975
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.58
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   5.80
 Tc(MIN.) =   15.27
 SUBAREA AREA(ACRES) =     4.07       SUBAREA RUNOFF(CFS) =    3.24
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        4.3         PEAK FLOW RATE(CFS) =       3.44

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.07
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    410.00 =     649.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    415.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3563.00  DOWNSTREAM(FEET) =   3527.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   561.00   CHANNEL SLOPE =  0.0642
  CHANNEL BASE(FEET) =  100.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.194
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.52
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   6.17
  Tc(MIN.) =   21.44
  SUBAREA AREA(ACRES) =     8.64       SUBAREA RUNOFF(CFS) =    5.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       13.0         PEAK FLOW RATE(CFS) =       8.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    415.00 =    1210.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 500                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    505.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3593.00
  DOWNSTREAM ELEVATION(FEET) =   3590.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.948
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    95.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.927
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.53   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    505.00 TO NODE    510.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3590.00  DOWNSTREAM(FEET) =   3560.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   871.00   CHANNEL SLOPE =  0.0344
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.644
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.22
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   6.53
  Tc(MIN.) =   17.48
  SUBAREA AREA(ACRES) =    13.90       SUBAREA RUNOFF(CFS) =   10.13
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       14.4         PEAK FLOW RATE(CFS) =      10.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.82
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    510.00 =     971.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    510.00 TO NODE    515.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3520.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   977.00   CHANNEL SLOPE =  0.0409
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.025
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.78
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.85
  Tc(MIN.) =   23.33
  SUBAREA AREA(ACRES) =    23.35       SUBAREA RUNOFF(CFS) =   14.13
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       37.8         PEAK FLOW RATE(CFS) =      22.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.13
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    515.00 =    1948.00 FEET.

+----------------------------------------------------------------------------+
| Begin Sub-Basin 6                                                          |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    605.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
  UPSTREAM ELEVATION(FEET) =   3585.00
  DOWNSTREAM ELEVATION(FEET) =   3583.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.501
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.773
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    610.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3583.00  DOWNSTREAM(FEET) =   3560.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   693.00   CHANNEL SLOPE =  0.0332
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.014
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.97
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  11.96
  Tc(MIN.) =   23.46
  SUBAREA AREA(ACRES) =     3.42       SUBAREA RUNOFF(CFS) =    2.06
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       2.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    610.00 =     793.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    610.00 TO NODE    615.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3531.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   626.00   CHANNEL SLOPE =  0.0463
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.569
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.58
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   6.59
  Tc(MIN.) =   30.04
  SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =    3.59
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       10.7         PEAK FLOW RATE(CFS) =       5.50
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    615.00 =    1419.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.7  TC(MIN.) =     30.04
  PEAK FLOW RATE(CFS)   =       5.50
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2013 Advanced Engineering Software (aes)
              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                              Analysis prepared by:
```

```
 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA C                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-C.DAT
  TIME/DATE OF STUDY: 15:04 09/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3590.00
```

```
 DOWNSTREAM ELEVATION(FEET) =   3585.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
 SUBAREA RUNOFF(CFS) =      0.39
 TOTAL AREA(ACRES) =      0.36   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3585.00  DOWNSTREAM(FEET) =   3570.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   375.00   CHANNEL SLOPE =  0.0400
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.422
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.69
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.80
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.47
 Tc(MIN.) =   12.95
 SUBAREA AREA(ACRES) =     5.15       SUBAREA RUNOFF(CFS) =    4.55
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =       4.87

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   2.16
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3570.00  DOWNSTREAM(FEET) =   3555.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   470.00   CHANNEL SLOPE =  0.0319
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.750
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.46
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.08
 AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   3.77
 Tc(MIN.) =   16.72
 SUBAREA AREA(ACRES) =     6.85       SUBAREA RUNOFF(CFS) =    5.14
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       12.4         PEAK FLOW RATE(CFS) =       9.27

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.28
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =     945.00 FEET.

+----------------------------------------------------------------------------+
```

```
| Begin Sub-Basin 200                                                    |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3595.00
  DOWNSTREAM ELEVATION(FEET) =   3590.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3590.00  DOWNSTREAM(FEET) =   3570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   533.00   CHANNEL SLOPE =  0.0375
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.887
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.40
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   6.34
  Tc(MIN.) =   15.81
  SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    2.72
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       2.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     633.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3570.00  DOWNSTREAM(FEET) =   3555.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   347.00   CHANNEL SLOPE =  0.0432
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.401
  *USER SPECIFIED(SUBAREA):
```

```
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.66
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.59
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   3.63
 Tc(MIN.) =   19.44
 SUBAREA AREA(ACRES) =     5.19       SUBAREA RUNOFF(CFS) =    3.53
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        8.9         PEAK FLOW RATE(CFS) =       6.07

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.68
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =     980.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        8.9  TC(MIN.) =     19.44
 PEAK FLOW RATE(CFS)   =       6.07
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA D                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-E.DAT
  TIME/DATE OF STUDY: 15:55 09/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3595.00
```

```
  DOWNSTREAM ELEVATION(FEET) =   3587.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.101
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.983
  SUBAREA RUNOFF(CFS) =      0.62
  TOTAL AREA(ACRES) =      0.52   TOTAL RUNOFF(CFS) =      0.62

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3587.00  DOWNSTREAM(FEET) =   3560.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   531.00   CHANNEL SLOPE =  0.0508
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.66
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   5.33
  Tc(MIN.) =   13.43
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    2.50
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       2.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.97
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     631.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3545.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0294
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.549
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.78
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   4.77
  Tc(MIN.) =   18.21
  SUBAREA AREA(ACRES) =    17.38       SUBAREA RUNOFF(CFS) =   12.34
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       20.8         PEAK FLOW RATE(CFS) =      14.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.20
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    1141.00 FEET.

+----------------------------------------------------------------------------+
```

```
| Begin Sub-Basin 200                                                    |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3585.00
  DOWNSTREAM ELEVATION(FEET) =   3575.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3575.00  DOWNSTREAM(FEET) =   3560.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   299.00   CHANNEL SLOPE =  0.0502
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.958
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.50
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   3.32
  Tc(MIN.) =   10.84
  SUBAREA AREA(ACRES) =     2.75       SUBAREA RUNOFF(CFS) =    2.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =       2.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     399.00 FEET.

+------------------------------------------------------------------------+
| Begin Sub-Basin 300                                                    |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   3580.00
 DOWNSTREAM ELEVATION(FEET) =   3570.00
 ELEVATION DIFFERENCE(FEET) =     10.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
 SUBAREA RUNOFF(CFS) =      0.20
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3570.00  DOWNSTREAM(FEET) =   3555.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   137.00   CHANNEL SLOPE =  0.1095
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.432
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.21
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.21
 AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =   1.89
 Tc(MIN.) =    9.41
 SUBAREA AREA(ACRES) =     1.84       SUBAREA RUNOFF(CFS) =    2.00
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       2.17

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   1.56
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =     237.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      9.41
 PEAK FLOW RATE(CFS)   =       2.17
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA E                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-F.DAT
  TIME/DATE OF STUDY: 13:43 09/10/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3676.00
```

```
  DOWNSTREAM ELEVATION(FEET) =   3666.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3666.00  DOWNSTREAM(FEET) =   3598.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1192.00   CHANNEL SLOPE =  0.0570
  CHANNEL BASE(FEET) =  250.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.74
  AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =  26.76
  Tc(MIN.) =   34.28
  SUBAREA AREA(ACRES) =    10.59       SUBAREA RUNOFF(CFS) =    5.00
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       10.9         PEAK FLOW RATE(CFS) =       5.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.02   FLOW VELOCITY(FEET/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1292.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3598.00  DOWNSTREAM(FEET) =   3522.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1805.00   CHANNEL SLOPE =  0.0421
  CHANNEL BASE(FEET) =  120.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.788
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =  18.41
  Tc(MIN.) =   52.69
  SUBAREA AREA(ACRES) =    35.42       SUBAREA RUNOFF(CFS) =   12.67
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       46.3         PEAK FLOW RATE(CFS) =      16.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.86
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    3097.00 FEET.
```

```
+-------------------------------------------------------------------------+
| Begin Sub-Basin 200                                                     |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3670.00
  DOWNSTREAM ELEVATION(FEET) =   3662.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.101
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.983
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3662.00  DOWNSTREAM(FEET) =   3588.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1141.00   CHANNEL SLOPE =  0.0649
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.596
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.95
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   9.74
  Tc(MIN.) =   17.84
  SUBAREA AREA(ACRES) =     6.69       SUBAREA RUNOFF(CFS) =    4.81
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =       4.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    1241.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3588.00  DOWNSTREAM(FEET) =   3552.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   830.00   CHANNEL SLOPE =  0.0434
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.953
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.17
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   6.37
  Tc(MIN.) =   24.21
  SUBAREA AREA(ACRES) =    14.58       SUBAREA RUNOFF(CFS) =    8.61
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       21.4         PEAK FLOW RATE(CFS) =      12.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =    2071.00 FEET.

+-------------------------------------------------------------------------+
| Begin Sub-basin 300                                                     |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3660.00
  DOWNSTREAM ELEVATION(FEET) =   3650.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3650.00  DOWNSTREAM(FEET) =   3558.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1504.00   CHANNEL SLOPE =  0.0612
  CHANNEL BASE(FEET) =   75.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.064
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =  15.34
  Tc(MIN.) =   22.86
  SUBAREA AREA(ACRES) =    15.49       SUBAREA RUNOFF(CFS) =    9.49
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       15.6         PEAK FLOW RATE(CFS) =       9.57
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.97
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =    1604.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    315.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3558.00  DOWNSTREAM(FEET) =   3514.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1009.00   CHANNEL SLOPE =  0.0436
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.635
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.79
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   6.03
  Tc(MIN.) =   28.89
  SUBAREA AREA(ACRES) =    14.77       SUBAREA RUNOFF(CFS) =    7.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       30.4         PEAK FLOW RATE(CFS) =      16.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.99
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =    2613.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 400                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    405.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3628.00
  DOWNSTREAM ELEVATION(FEET) =   3618.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3618.00  DOWNSTREAM(FEET) =   3548.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1061.00   CHANNEL SLOPE =  0.0660
  CHANNEL BASE(FEET) =   60.00   "Z" FACTOR =  17.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.073
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.16
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  15.24
  Tc(MIN.) =   22.76
  SUBAREA AREA(ACRES) =     6.27       SUBAREA RUNOFF(CFS) =    3.85
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        6.4         PEAK FLOW RATE(CFS) =       3.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.51
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    410.00 =    1161.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    415.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3548.00  DOWNSTREAM(FEET) =   3519.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   862.00   CHANNEL SLOPE =  0.0336
  CHANNEL BASE(FEET) =   22.00   "Z" FACTOR =  11.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.663
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.54
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.65
  Tc(MIN.) =   28.41
  SUBAREA AREA(ACRES) =    20.80       SUBAREA RUNOFF(CFS) =   11.08
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       27.2         PEAK FLOW RATE(CFS) =      14.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   2.94
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    415.00 =    2023.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 500                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    505.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3660.00
  DOWNSTREAM ELEVATION(FEET) =   3652.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.101
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.983
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.13

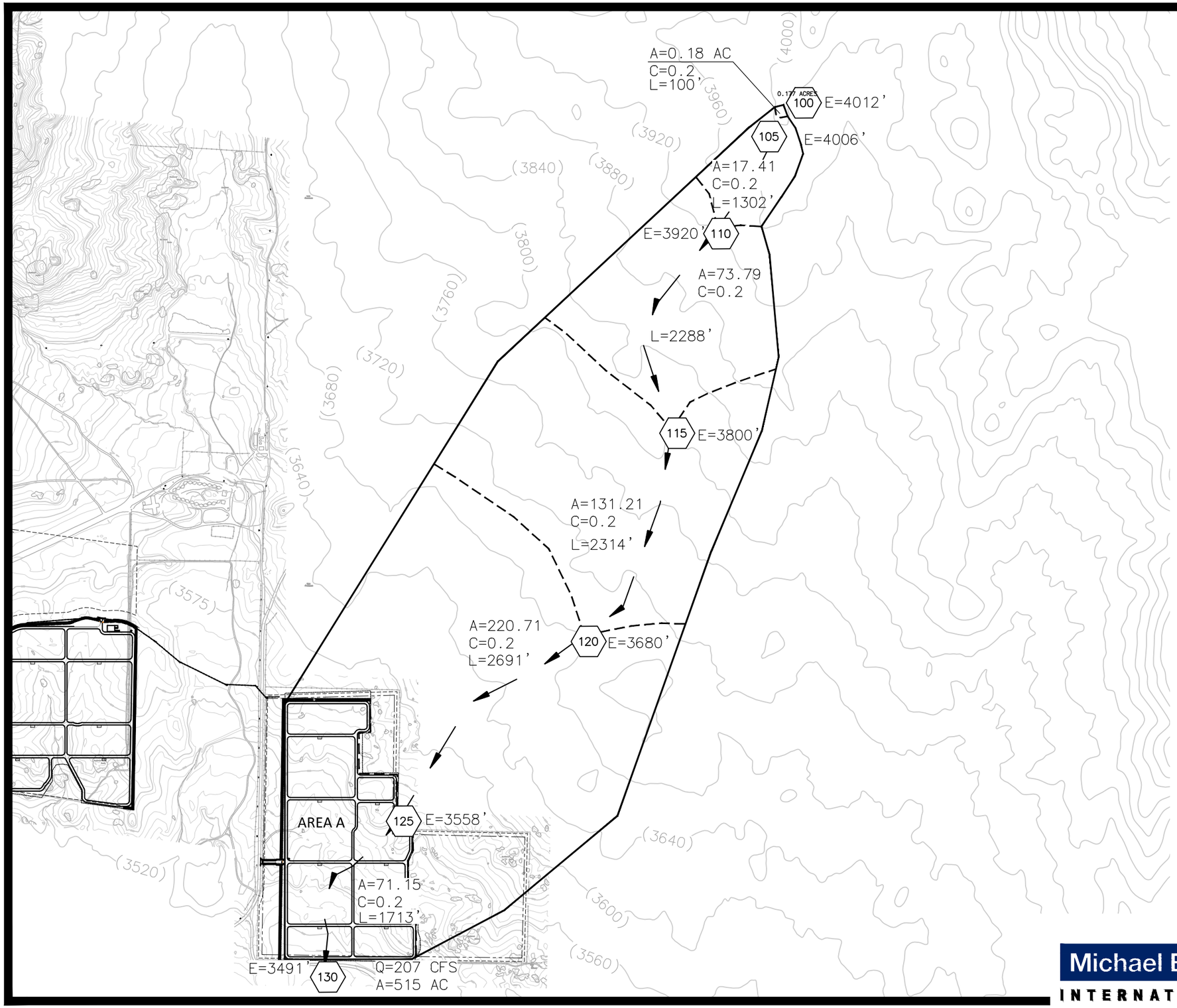
****************************************************************************
  FLOW PROCESS FROM NODE    505.00 TO NODE    510.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3652.00  DOWNSTREAM(FEET) =   3578.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   979.00   CHANNEL SLOPE =  0.0756
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.432
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.47
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =  11.08
  Tc(MIN.) =   19.18
  SUBAREA AREA(ACRES) =     4.71       SUBAREA RUNOFF(CFS) =    3.23
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        4.8         PEAK FLOW RATE(CFS) =       3.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.84
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    510.00 =    1079.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    510.00 TO NODE    515.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3578.00  DOWNSTREAM(FEET) =   3532.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   758.00   CHANNEL SLOPE =  0.0607
  CHANNEL BASE(FEET) =   60.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.799
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.77
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   7.12
  Tc(MIN.) =   26.30
  SUBAREA AREA(ACRES) =     9.78       SUBAREA RUNOFF(CFS) =    5.48
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =       8.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.04
```

```
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    515.00 =    1837.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =     26.30
 PEAK FLOW RATE(CFS)   =       8.17
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

SCALE 1"=1000'

1000 500 0 1000

SCALE: 1"=1000'

RUGGED SOLAR
HYDROLOGIC
OFF-SITE WORK MAP
AREA A

Michael Baker INTERNATIONAL
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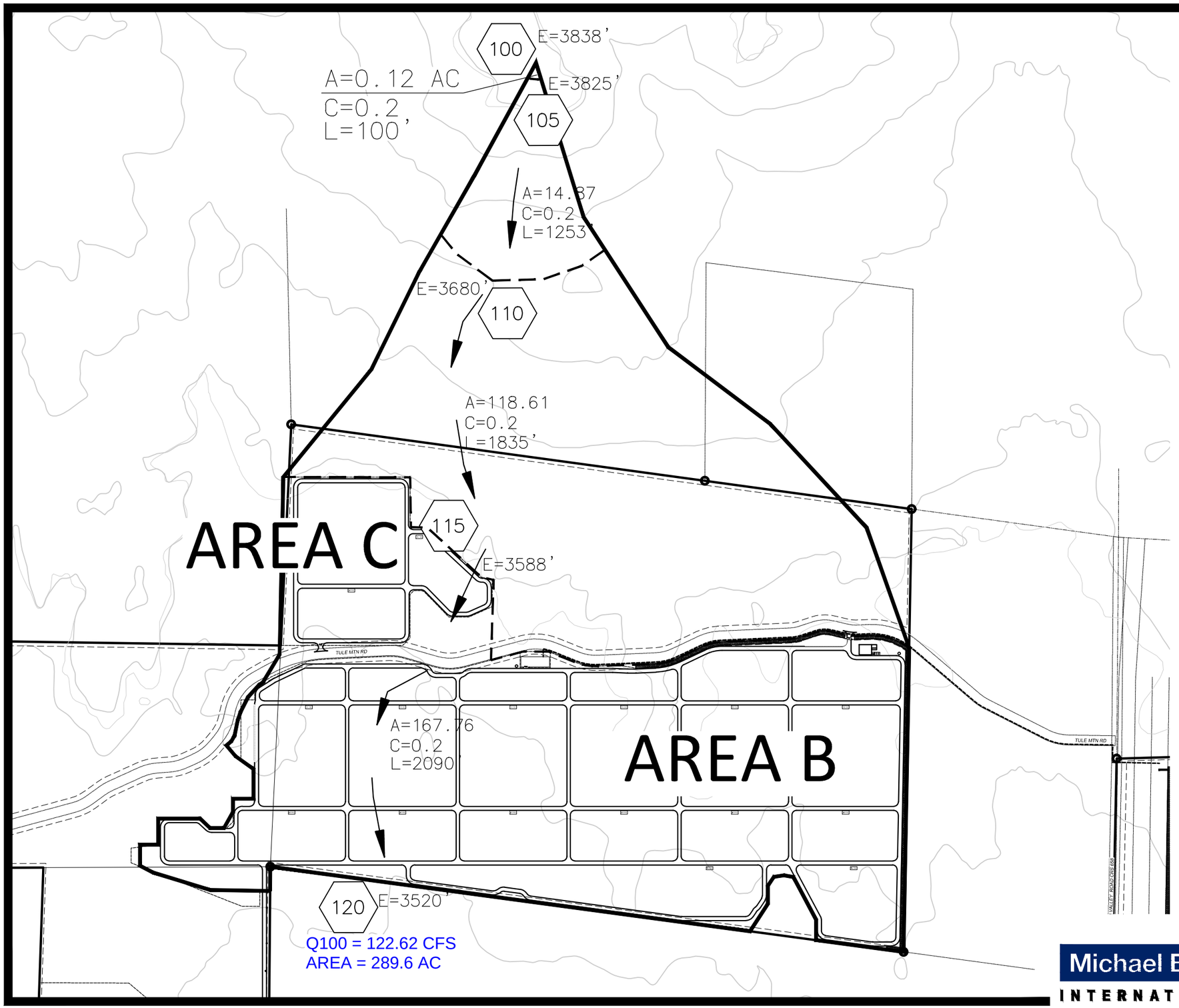
San Diego, CA 92124
Phone: (858) 614-5000 · MBAKERINTL.COM

H:\PDATA\173007\CADD\Strmwater\Off-Site\173007 PR Hydro Work Map - Area A Off-Site.dwg 09/23/19 - 10:35am chris.yamaguchi



LEGEND

- DRAINAGE BOUNDARY
- FLOW PATH
- 100 HYDROLOGY NODE

SCALE 1"=600'

600 300 0 600

SCALE: 1"=600'

RUGGED SOLAR
HYDROLOGIC
OFF-SITE WORK MAP
AREA B & C

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San Diego, CA 92124
Phone: (858) 614-5000 · MBAKERINTL.COM

LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

AREA D

Q=30 CFS
A=56 AC

E=3704'
A=.12
C=0.2
L=100'

105

100

E=3697'

A=8.27
C=0.2
L=881'

E=3640'

110

A=19.78
C=0.2
L=651'

115

E=3592'

A=27.57
C=0.2
L=1043'

E=3544'

120

(3680)

(3640)

(3600)

SCALE 1"=400'

400 200 0 400

SCALE: 1"=400'

RUGGED SOLAR
HYDROLOGIC
OFF-SITE WORK MAP
AREA D

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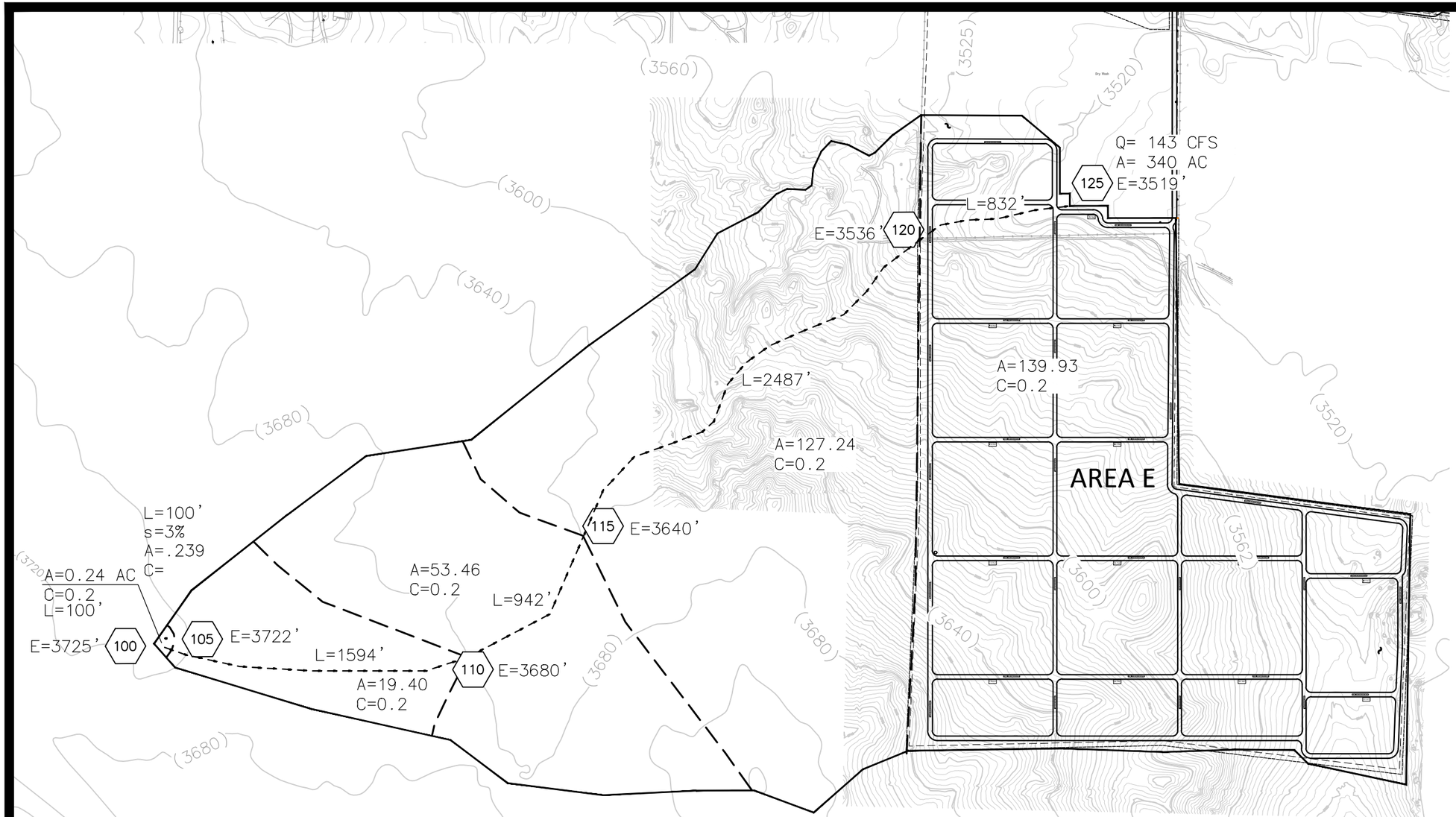

LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

SCALE 1"=600'

600 300 0 600

SCALE: 1"=600'

RUGGED SOLAR
HYDROLOGIC
OFF-SITE WORK MAP
AREA E

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H:\PDATA\173007\CADD\Strmwater\Off-Site\173007 PR Hydro Work Map - Area F Off-Site.dwg 09/23/19 - 10:39am chris.yamaguchi

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2013 Advanced Engineering Software (aes)
              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar    OFFSITE                                                  *
* AREA A                                                                   *
*                                                                          *
 **************************************************************************

  FILE NAME: C:\AES\MCSO\PR-AO.DAT
  TIME/DATE OF STUDY: 15:55 09/10/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   4012.00
```

```
 DOWNSTREAM ELEVATION(FEET) =   4006.00
 ELEVATION DIFFERENCE(FEET) =      6.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.916
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.624
 SUBAREA RUNOFF(CFS) =      0.20
 TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   4006.00  DOWNSTREAM(FEET) =   3920.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1302.00   CHANNEL SLOPE =  0.0661
 CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.704
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.95
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.67
 AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   8.12
 Tc(MIN.) =   17.04
 SUBAREA AREA(ACRES) =    17.41       SUBAREA RUNOFF(CFS) =   12.90
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =      13.03

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   3.42
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1402.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3920.00  DOWNSTREAM(FEET) =   3800.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2288.00   CHANNEL SLOPE =  0.0524
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.771
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.78
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.94
 AVERAGE FLOW DEPTH(FEET) =   0.21   TRAVEL TIME(MIN.) =   9.68
 Tc(MIN.) =   26.72
 SUBAREA AREA(ACRES) =    73.79       SUBAREA RUNOFF(CFS) =   40.90
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       91.4         PEAK FLOW RATE(CFS) =      50.65

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   4.64
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    3690.00 FEET.

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

```
 FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3800.00  DOWNSTREAM(FEET) =   3680.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2314.00   CHANNEL SLOPE =  0.0519
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.392
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      82.16
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.63
 AVERAGE FLOW DEPTH(FEET) =   0.36   TRAVEL TIME(MIN.) =   6.85
 Tc(MIN.) =   33.56
 SUBAREA AREA(ACRES) =   131.21       SUBAREA RUNOFF(CFS) =   62.77
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =      222.6         PEAK FLOW RATE(CFS) =     106.48

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   6.24
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    6004.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3680.00  DOWNSTREAM(FEET) =   3558.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2691.00   CHANNEL SLOPE =  0.0453
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.135
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     153.66
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.93
 AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   6.47
 Tc(MIN.) =   40.03
 SUBAREA AREA(ACRES) =   220.71       SUBAREA RUNOFF(CFS) =   94.24
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =      443.3         PEAK FLOW RATE(CFS) =     189.28

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   7.51
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    125.00 =    8695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    130.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3558.00  DOWNSTREAM(FEET) =   3491.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1713.00   CHANNEL SLOPE =  0.0391
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   1.000
```

```
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.012
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     203.60
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.40
 AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   3.86
 Tc(MIN.) =   43.89
 SUBAREA AREA(ACRES) =    71.15       SUBAREA RUNOFF(CFS) =   28.63
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =      514.5         PEAK FLOW RATE(CFS) =     207.01

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   7.44
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =   10408.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      514.5  TC(MIN.) =     43.89
 PEAK FLOW RATE(CFS)   =     207.01
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

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              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                              Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* Rugged Solar - Offsite                                                 *
* AREA BC                                                                *
*                                                                        *
 ************************************************************************

  FILE NAME: EX-D.DAT
  TIME/DATE OF STUDY: 16:42 09/16/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    100.00 TO NODE    105.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3838.00
  DOWNSTREAM ELEVATION(FEET) =   3825.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
```

```
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
 SUBAREA RUNOFF(CFS) =      0.15
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3825.00  DOWNSTREAM(FEET) =   3680.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1253.00   CHANNEL SLOPE =  0.1157
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.963
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.14
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.26
 AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =  16.57
 Tc(MIN.) =   24.09
 SUBAREA AREA(ACRES) =     3.10       SUBAREA RUNOFF(CFS) =    1.84
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =       1.91

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   1.48
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1353.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3680.00  DOWNSTREAM(FEET) =   3588.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1835.00   CHANNEL SLOPE =  0.0501
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.416
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.98
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.41
 AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   8.96
 Tc(MIN.) =   33.05
 SUBAREA AREA(ACRES) =   118.61       SUBAREA RUNOFF(CFS) =   57.31
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =      121.8         PEAK FLOW RATE(CFS) =      58.87

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   4.47
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    3188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

O-EX-BC

```
 ELEVATION DATA: UPSTREAM(FEET) =   3588.00  DOWNSTREAM(FEET) =   3520.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2090.00   CHANNEL SLOPE =  0.0325
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.117
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      94.49
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.64
 AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   7.51
 Tc(MIN.) =   40.56
 SUBAREA AREA(ACRES) =   167.76       SUBAREA RUNOFF(CFS) =   71.03
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =      289.6          PEAK FLOW RATE(CFS) =     122.62

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   5.16
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    5278.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      289.6  TC(MIN.) =     40.56
 PEAK FLOW RATE(CFS)   =     122.62
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar - Off-Site                                                 *
* AREA D                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCSO\O-EX-E.DAT
  TIME/DATE OF STUDY: 16:42 10/15/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3704.00
```

```
 DOWNSTREAM ELEVATION(FEET) =   3697.00
 ELEVATION DIFFERENCE(FEET) =      7.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.469
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.814
 SUBAREA RUNOFF(CFS) =      0.14
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3697.00  DOWNSTREAM(FEET) =   3640.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   881.00   CHANNEL SLOPE =  0.0647
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.539
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.22
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.50
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   9.82
 Tc(MIN.) =   18.29
 SUBAREA AREA(ACRES) =     8.27       SUBAREA RUNOFF(CFS) =    5.85
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        8.4         PEAK FLOW RATE(CFS) =       5.94

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.03
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     981.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3640.00  DOWNSTREAM(FEET) =   3592.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   651.00   CHANNEL SLOPE =  0.0737
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.114
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.10
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.70
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   4.01
 Tc(MIN.) =   22.30
 SUBAREA AREA(ACRES) =    19.78       SUBAREA RUNOFF(CFS) =   12.32
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       28.2         PEAK FLOW RATE(CFS) =      17.54

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   3.11
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    1632.00 FEET.

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

```
 FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3592.00  DOWNSTREAM(FEET) =   3544.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1043.00   CHANNEL SLOPE =  0.0460
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.697
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.99
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.13
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.56
 Tc(MIN.) =   27.86
 SUBAREA AREA(ACRES) =    27.57       SUBAREA RUNOFF(CFS) =   14.87
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       55.7         PEAK FLOW RATE(CFS) =      30.07

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.31
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    2675.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       55.7  TC(MIN.) =     27.86
 PEAK FLOW RATE(CFS)   =      30.07
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

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              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA E  OFFSITE                                                         *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCSO\PR-FO.DAT
  TIME/DATE OF STUDY: 07:58 09/11/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3725.00
```

```
 DOWNSTREAM ELEVATION(FEET) =   3722.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.233
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.846
 SUBAREA RUNOFF(CFS) =      0.23
 TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3722.00  DOWNSTREAM(FEET) =   3680.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1594.00   CHANNEL SLOPE =  0.0263
 CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.893
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.18
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.93
 AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =  13.76
 Tc(MIN.) =   24.99
 SUBAREA AREA(ACRES) =    19.40       SUBAREA RUNOFF(CFS) =   11.22
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       19.6         PEAK FLOW RATE(CFS) =      11.36

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.46
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1694.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3680.00  DOWNSTREAM(FEET) =   3640.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   942.00   CHANNEL SLOPE =  0.0425
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.584
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.22
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.28
 AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   4.79
 Tc(MIN.) =   29.78
 SUBAREA AREA(ACRES) =    53.46       SUBAREA RUNOFF(CFS) =   27.62
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       73.1         PEAK FLOW RATE(CFS) =      37.77

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   3.83
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    2636.00 FEET.

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

```
 FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3640.00  DOWNSTREAM(FEET) =   3536.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2487.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.193
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      65.79
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.82
 AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   8.60
 Tc(MIN.) =   38.39
 SUBAREA AREA(ACRES) =   127.24       SUBAREA RUNOFF(CFS) =   55.82
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =      200.3         PEAK FLOW RATE(CFS) =      87.89

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   5.44
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    5123.00 FEET.

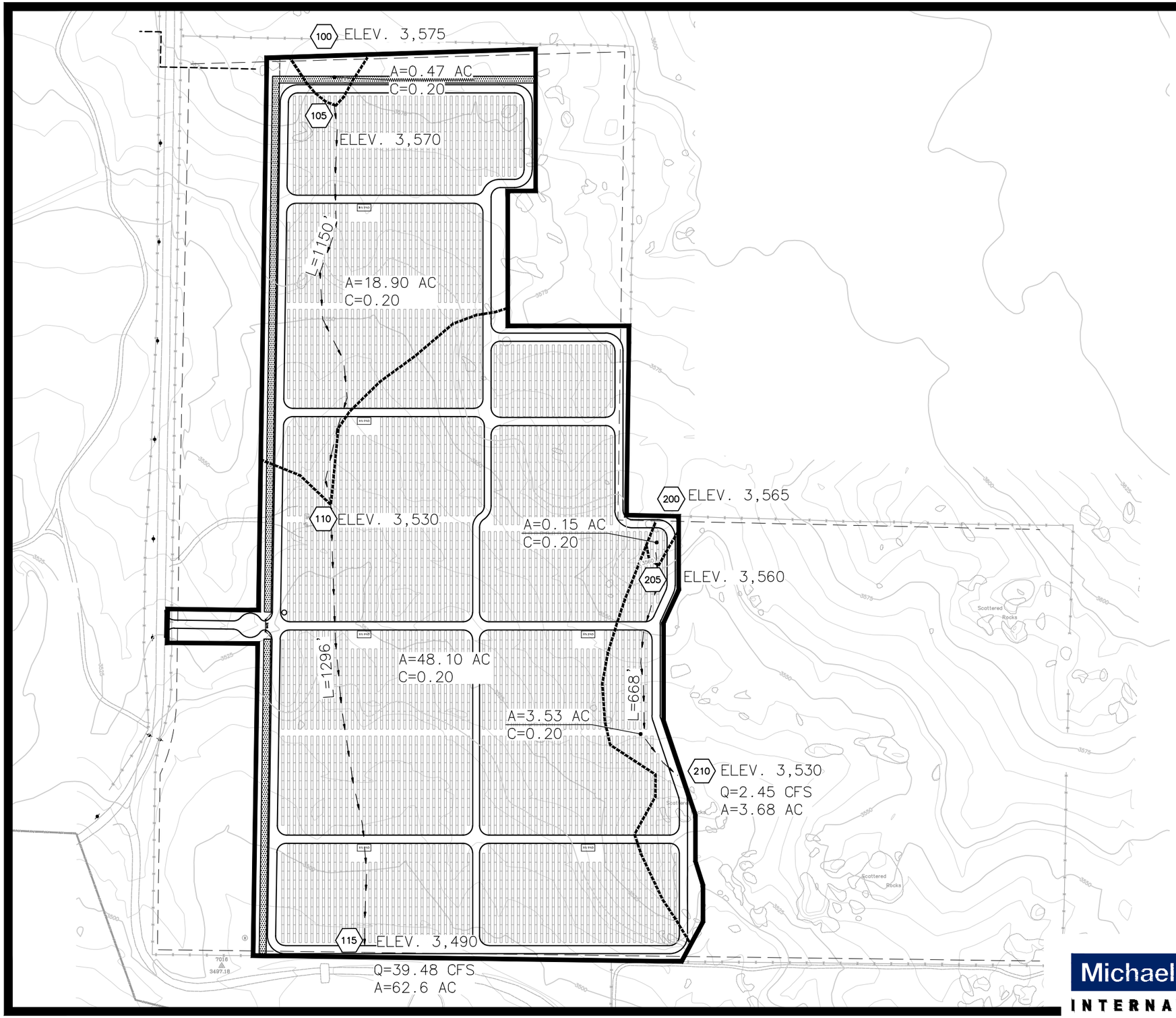
****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3536.00  DOWNSTREAM(FEET) =   3519.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   832.00   CHANNEL SLOPE =  0.0204
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.095
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     117.21
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.89
 AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   2.83
 Tc(MIN.) =   41.22
 SUBAREA AREA(ACRES) =   139.93       SUBAREA RUNOFF(CFS) =   58.63
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =      340.3         PEAK FLOW RATE(CFS) =     142.57

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   5.31
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    125.00 =    5955.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      340.3  TC(MIN.) =     41.22
 PEAK FLOW RATE(CFS)   =     142.57
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Michael Baker
INTERNATIONAL

Appendix C – Proposed Hydrology

On-Site Hydrologic Work Map
On-Site AES Output



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

SCALE 1"=300'

300 150 0 300

SCALE: 1"=300'

RUGGED SOLAR
PROPOSED HYDROLOGIC
PROJECT SITE WORK MAP
AREA A

Michael Baker INTERNATIONAL
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San Diego, CA 92124
Phone: (858) 614-5000 · MBAKERINTL.COM

H:\PDATA\173007\CADD\Strmwater\Proposed\173007 PR Hydro Work Map - Area A Proposed.dwg 10/09/19 - 2:02pm kian.murray

H:\PDATA\173007\CADD\Strmwater\Proposed\173007 PR Hydro Work Map - Area B Proposed.dwg 10/09/19 - 2:06pm kian.murray

LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

A=0.10 AC
C=0.2
E=3,565'
200
E=3,567'
100
A=0.2 AC
C=0.2
E=3,565'
105
205
E=3,560'
A=8.14 AC
C=0.2
L=726'
210
E=3,535'
L=884'
A=17.68 AC
C=0.2
L=1463'
A=12.59 AC
C=0.2
110
E=3,525'
Q=7.04 CFS
A=13.2 AC
E=3,600'
300
A=0.15 AC
C=0.2
E=3,595'
305
L=791'
A=9.37 AC
C=0.2
E=3,555'
310
L=1189'
A=30.79 AC
C=0.2
E=3,514'
215
Q=15.45 CFS
A=26.0 AC
E=3,516'
315
Q=21.88 CFS
A=40.3 AC
400
E=3,600'
A=0.26 AC
C=0.2
405
E=3,595'
A=4.07 AC
C=0.2
L=549'
410
E=3,563'
L=561'
A=8.64 AC
C=0.2
415
E=3,527'
Q=8.28 CFS
A=13.0 AC
A=0.53 AC
C=0.2
500
E=3,593'
505
E=3,590'
A=13.90 AC
C=0.2
L=871'
E=3,560'
510
A=23.35 AC
C=0.2
L=977'
515
E=3,520'
Q=22.85 CFS
A=37.8 AC
600
E=3,585'
A=0.29 AC
C=0.2
605
E=3,583'
A=3.42 AC
C=0.2
L=693'
E=3,560'
610
L=626'
A=6.99 AC
C=0.2
E=3,531'
615
Q=5.50 CFS
A=10.7 AC

100-YEAR INUNDATION BOUNDARY

SCALE 1"=400'

400 200 0 400
SCALE: 1"=400'

RUGGED SOLAR
EXISTING HYDROLOGIC PROJECT WORK MAP AREA B

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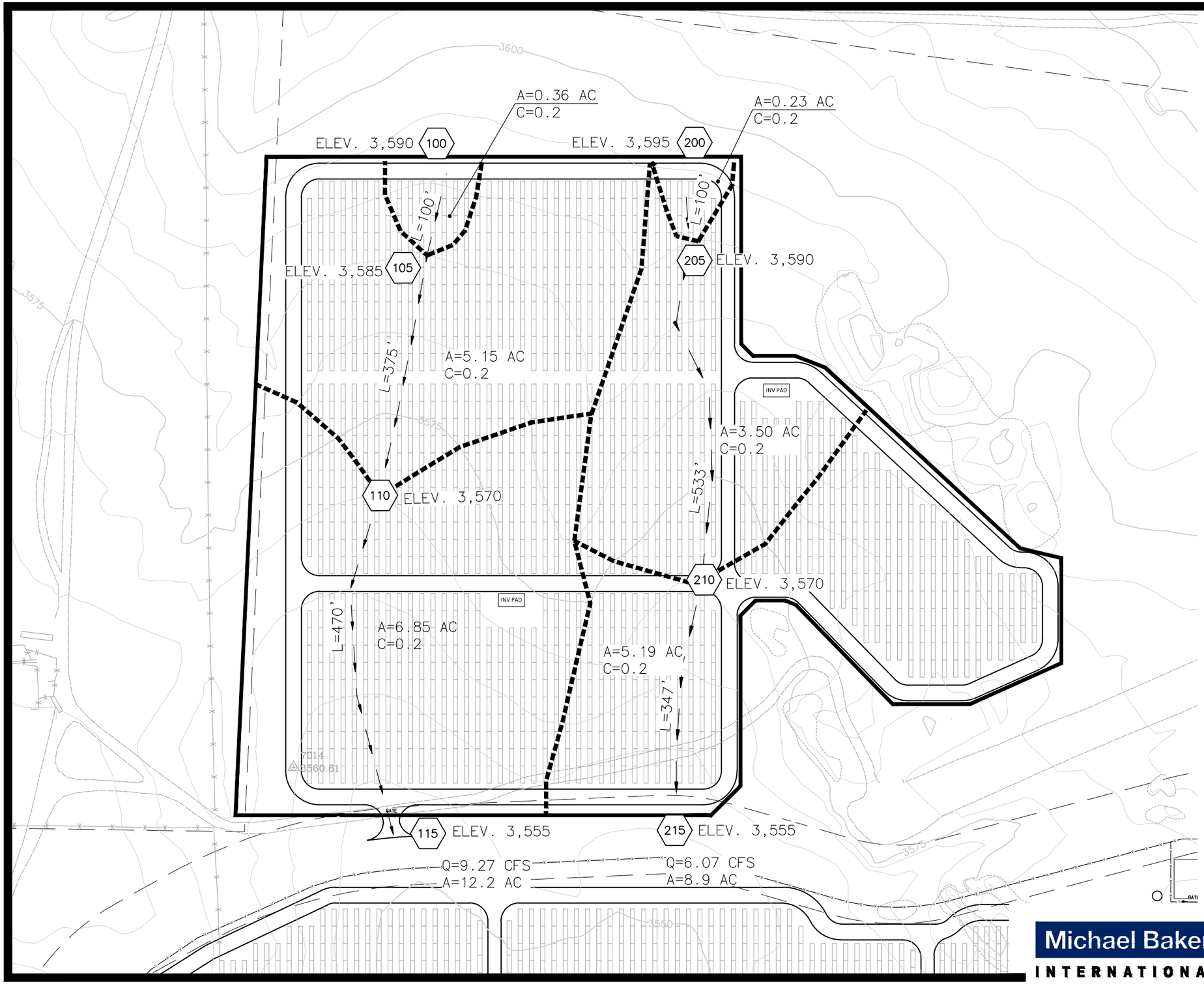

LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH

C=0.00 RUN-OFF COEFFICIENT
I=0.00 INTENSITY (IN/HR)
A=0.00 AREA (ACRES)

100 HYDROLOGY NODE

442 NODE ELEVATION

SCALE 1"=150'

150 75 0 150

SCALE: 1"=150'

RUGGED SOLAR
PROPOSED HYDROLOGIC PROJECT SITE WORK MAP
AREA C

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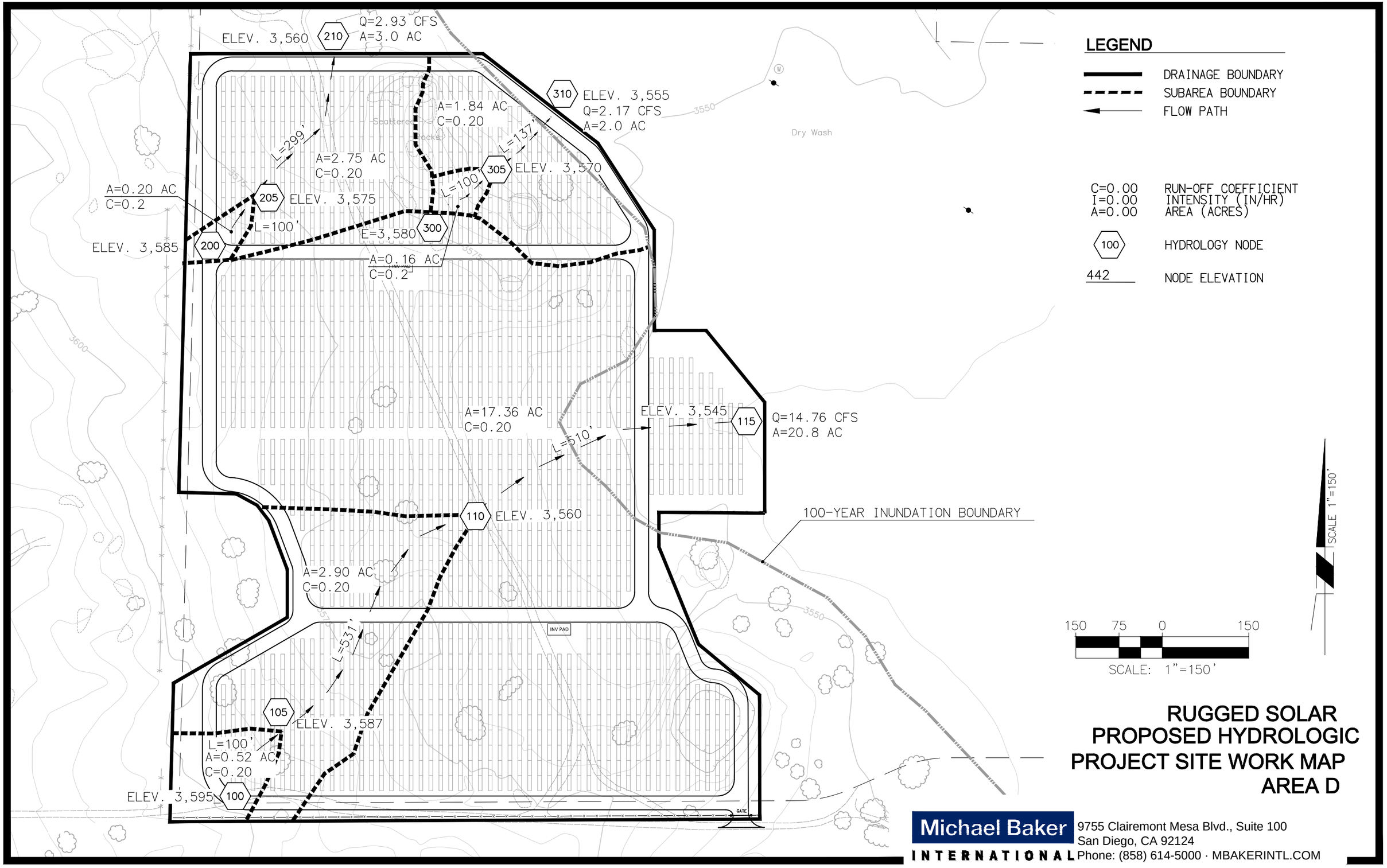
H:\PDATA\173007\CADD\Strmwater\Proposed\173007 PR Hydro Work Map - Area C Proposed.dwg 10/09/19 - 2:13pm kian.murray



RUGGED SOLAR
PROPOSED HYDROLOGIC
PROJECT SITE WORK MAP
AREA D

Michael Baker INTERNATIONAL
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San Diego, CA 92124
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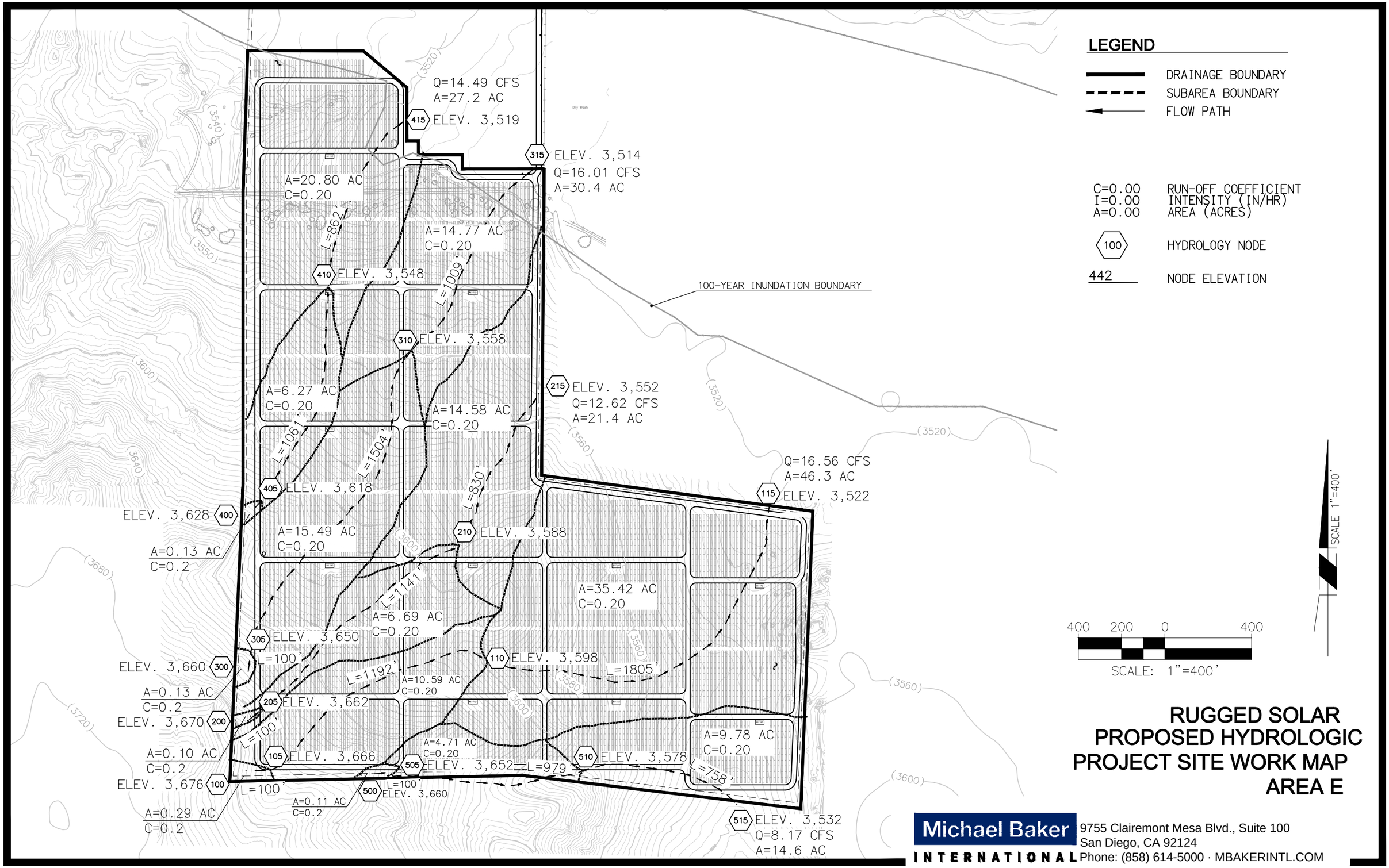
H:\PDATA\173007\CADD\Strmwater\Proposed\173007 PR Hydro Work Map - Area D Proposed.dwg 10/09/19 - 2:17pm kian.murray



RUGGED SOLAR
PROPOSED HYDROLOGIC PROJECT SITE WORK MAP AREA E

Michael Baker INTERNATIONAL
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San Diego, CA 92124
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```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2013 Advanced Engineering Software (aes)
              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                              Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA A                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-A.DAT
  TIME/DATE OF STUDY: 13:38 09/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3575.00
```

```
 DOWNSTREAM ELEVATION(FEET) =   3570.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
 SUBAREA RUNOFF(CFS) =      0.51
 TOTAL AREA(ACRES) =      0.47   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3570.00  DOWNSTREAM(FEET) =   3530.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1150.00   CHANNEL SLOPE =  0.0348
 CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.617
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.59
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.34
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   8.21
 Tc(MIN.) =   17.68
 SUBAREA AREA(ACRES) =    18.90       SUBAREA RUNOFF(CFS) =   13.67
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       19.4         PEAK FLOW RATE(CFS) =      14.01

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   2.91
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3530.00  DOWNSTREAM(FEET) =   3490.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1296.00   CHANNEL SLOPE =  0.0309
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.926
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.18
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.14
 AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   6.88
 Tc(MIN.) =   24.56
 SUBAREA AREA(ACRES) =    48.10       SUBAREA RUNOFF(CFS) =   28.15
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       67.5         PEAK FLOW RATE(CFS) =      39.48

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   3.54
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    2546.00 FEET.

+----------------------------------------------------------------------------+
```

```
| Begin Sub-Basin 200                                                    |
| Easterly Boundary                                                      |
|                                                                        |
+------------------------------------------------------------------------+

************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3565.00
  DOWNSTREAM ELEVATION(FEET) =   3560.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.16

************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3530.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   668.00   CHANNEL SLOPE =  0.0449
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.327
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.05
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  10.65
  Tc(MIN.) =   20.12
  SUBAREA AREA(ACRES) =     3.53       SUBAREA RUNOFF(CFS) =    2.35
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       2.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     768.00 FEET.
========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.7  TC(MIN.) =     20.12
  PEAK FLOW RATE(CFS)   =       2.45
========================================================================
========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2013 Advanced Engineering Software (aes)
              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:
```

```
 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA B                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-B.DAT
  TIME/DATE OF STUDY: 14:25 09/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3567.00
```

```
  DOWNSTREAM ELEVATION(FEET) =   3565.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.501
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.773
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3565.00  DOWNSTREAM(FEET) =   3525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1463.00   CHANNEL SLOPE =  0.0273
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.752
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.87
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.57
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =  15.51
  Tc(MIN.) =   27.01
  SUBAREA AREA(ACRES) =    12.59       SUBAREA RUNOFF(CFS) =    6.93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       12.8         PEAK FLOW RATE(CFS) =       7.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   1.93
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1563.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 200                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3565.00
  DOWNSTREAM ELEVATION(FEET) =   3560.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.22
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3535.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   726.00   CHANNEL SLOPE =  0.0344
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.652
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.52
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   7.94
  Tc(MIN.) =   17.42
  SUBAREA AREA(ACRES) =     8.14       SUBAREA RUNOFF(CFS) =    5.94
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        8.3         PEAK FLOW RATE(CFS) =       6.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     826.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3535.00  DOWNSTREAM(FEET) =   3514.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0238
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.970
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   6.58
  Tc(MIN.) =   24.00
  SUBAREA AREA(ACRES) =    17.68       SUBAREA RUNOFF(CFS) =   10.50
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       26.0         PEAK FLOW RATE(CFS) =      15.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   2.55
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =    1710.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 300                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3600.00
  DOWNSTREAM ELEVATION(FEET) =   3598.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.501
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.773
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3598.00  DOWNSTREAM(FEET) =   3555.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   791.00   CHANNEL SLOPE =  0.0544
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.479
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.81
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   7.28
  Tc(MIN.) =   18.78
  SUBAREA AREA(ACRES) =     9.37       SUBAREA RUNOFF(CFS) =    6.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        9.5         PEAK FLOW RATE(CFS) =       6.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.30
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =     891.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    315.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3555.00  DOWNSTREAM(FEET) =   3516.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1189.00   CHANNEL SLOPE =  0.0328
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.714
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.09
```

```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.25
 AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   8.82
 Tc(MIN.) =   27.60
 SUBAREA AREA(ACRES) =    30.79       SUBAREA RUNOFF(CFS) =   16.71
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       40.3         PEAK FLOW RATE(CFS) =      21.88

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.64
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =    2080.00 FEET.

+----------------------------------------------------------------------------+
| Begin Sub-Basin 400                                                        |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    400.00 TO NODE    405.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 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.) =    9.474
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    410.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3595.00  DOWNSTREAM(FEET) =   3563.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   549.00   CHANNEL SLOPE =  0.0583
 CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.975
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.58
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   5.80
 Tc(MIN.) =   15.27
 SUBAREA AREA(ACRES) =     4.07       SUBAREA RUNOFF(CFS) =    3.24
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        4.3         PEAK FLOW RATE(CFS) =       3.44

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.07
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    410.00 =     649.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    415.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3563.00  DOWNSTREAM(FEET) =   3527.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   561.00   CHANNEL SLOPE =  0.0642
  CHANNEL BASE(FEET) =  100.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.194
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.52
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   6.17
  Tc(MIN.) =   21.44
  SUBAREA AREA(ACRES) =     8.64       SUBAREA RUNOFF(CFS) =    5.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       13.0         PEAK FLOW RATE(CFS) =       8.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    415.00 =    1210.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 500                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    505.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3593.00
  DOWNSTREAM ELEVATION(FEET) =   3590.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.948
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    95.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.927
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.53   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    505.00 TO NODE    510.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3590.00  DOWNSTREAM(FEET) =   3560.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   871.00   CHANNEL SLOPE =  0.0344
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.644
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.22
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   6.53
  Tc(MIN.) =   17.48
  SUBAREA AREA(ACRES) =    13.90       SUBAREA RUNOFF(CFS) =   10.13
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       14.4         PEAK FLOW RATE(CFS) =      10.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.82
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    510.00 =     971.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    510.00 TO NODE    515.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3520.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   977.00   CHANNEL SLOPE =  0.0409
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.025
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.78
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.85
  Tc(MIN.) =   23.33
  SUBAREA AREA(ACRES) =    23.35       SUBAREA RUNOFF(CFS) =   14.13
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       37.8         PEAK FLOW RATE(CFS) =      22.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   3.13
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    515.00 =    1948.00 FEET.

+----------------------------------------------------------------------------+
| Begin Sub-Basin 6                                                          |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    605.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
```

```
  UPSTREAM ELEVATION(FEET) =   3585.00
  DOWNSTREAM ELEVATION(FEET) =   3583.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.501
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.773
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    610.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3583.00  DOWNSTREAM(FEET) =   3560.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   693.00   CHANNEL SLOPE =  0.0332
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.014
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.97
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  11.96
  Tc(MIN.) =   23.46
  SUBAREA AREA(ACRES) =     3.42       SUBAREA RUNOFF(CFS) =    2.06
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       2.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    610.00 =     793.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    610.00 TO NODE    615.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3531.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   626.00   CHANNEL SLOPE =  0.0463
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.569
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.58
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   6.59
  Tc(MIN.) =   30.04
  SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =    3.59
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       10.7         PEAK FLOW RATE(CFS) =       5.50
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    615.00 =    1419.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.7  TC(MIN.) =     30.04
  PEAK FLOW RATE(CFS)   =       5.50
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2013 Advanced Engineering Software (aes)
              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA C                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-C.DAT
  TIME/DATE OF STUDY: 15:04 09/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3590.00
```

```
 DOWNSTREAM ELEVATION(FEET) =   3585.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
 SUBAREA RUNOFF(CFS) =      0.39
 TOTAL AREA(ACRES) =      0.36   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3585.00  DOWNSTREAM(FEET) =   3570.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   375.00   CHANNEL SLOPE =  0.0400
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.422
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.69
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.80
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.47
 Tc(MIN.) =   12.95
 SUBAREA AREA(ACRES) =     5.15       SUBAREA RUNOFF(CFS) =    4.55
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =       4.87

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   2.16
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3570.00  DOWNSTREAM(FEET) =   3555.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   470.00   CHANNEL SLOPE =  0.0319
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.750
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.46
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.08
 AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   3.77
 Tc(MIN.) =   16.72
 SUBAREA AREA(ACRES) =     6.85       SUBAREA RUNOFF(CFS) =    5.14
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =       12.4         PEAK FLOW RATE(CFS) =       9.27

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.28
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =     945.00 FEET.

+----------------------------------------------------------------------------+
```

```
| Begin Sub-Basin 200                                                    |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3595.00
  DOWNSTREAM ELEVATION(FEET) =   3590.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.474
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.408
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3590.00  DOWNSTREAM(FEET) =   3570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   533.00   CHANNEL SLOPE =  0.0375
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.887
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.40
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   6.34
  Tc(MIN.) =   15.81
  SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    2.72
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       2.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     633.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3570.00  DOWNSTREAM(FEET) =   3555.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   347.00   CHANNEL SLOPE =  0.0432
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.401
  *USER SPECIFIED(SUBAREA):
```

```
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.66
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.59
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   3.63
 Tc(MIN.) =   19.44
 SUBAREA AREA(ACRES) =     5.19       SUBAREA RUNOFF(CFS) =    3.53
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        8.9         PEAK FLOW RATE(CFS) =       6.07

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.68
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =     980.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        8.9  TC(MIN.) =     19.44
 PEAK FLOW RATE(CFS)   =       6.07
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2013 Advanced Engineering Software (aes)
              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA D                                                                  *
*                                                                         *
 **************************************************************************

  FILE NAME: C:\AES\MCS\PR-E.DAT
  TIME/DATE OF STUDY: 15:55 09/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3595.00
```

```
  DOWNSTREAM ELEVATION(FEET) =   3587.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.101
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.983
  SUBAREA RUNOFF(CFS) =      0.62
  TOTAL AREA(ACRES) =      0.52   TOTAL RUNOFF(CFS) =      0.62

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3587.00  DOWNSTREAM(FEET) =   3560.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   531.00   CHANNEL SLOPE =  0.0508
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.318
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.66
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   5.33
  Tc(MIN.) =   13.43
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    2.50
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       2.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.97
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     631.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3560.00  DOWNSTREAM(FEET) =   3545.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0294
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.549
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.78
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   4.77
  Tc(MIN.) =   18.21
  SUBAREA AREA(ACRES) =    17.38       SUBAREA RUNOFF(CFS) =   12.34
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       20.8         PEAK FLOW RATE(CFS) =      14.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.20
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    1141.00 FEET.

+----------------------------------------------------------------------------+
```

```
| Begin Sub-Basin 200                                                    |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3585.00
  DOWNSTREAM ELEVATION(FEET) =   3575.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3575.00  DOWNSTREAM(FEET) =   3560.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   299.00   CHANNEL SLOPE =  0.0502
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.958
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.50
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   3.32
  Tc(MIN.) =   10.84
  SUBAREA AREA(ACRES) =     2.75       SUBAREA RUNOFF(CFS) =    2.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =       2.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     399.00 FEET.

+------------------------------------------------------------------------+
| Begin Sub-Basin 300                                                    |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   3580.00
 DOWNSTREAM ELEVATION(FEET) =   3570.00
 ELEVATION DIFFERENCE(FEET) =     10.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
 SUBAREA RUNOFF(CFS) =      0.20
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   3570.00  DOWNSTREAM(FEET) =   3555.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   137.00   CHANNEL SLOPE =  0.1095
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.432
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .2000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.21
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.21
 AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =   1.89
 Tc(MIN.) =    9.41
 SUBAREA AREA(ACRES) =     1.84       SUBAREA RUNOFF(CFS) =    2.00
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
 TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       2.17

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.03   FLOW VELOCITY(FEET/SEC.) =   1.56
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =     237.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      9.41
 PEAK FLOW RATE(CFS)   =       2.17
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2013 Advanced Engineering Software (aes)
              Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                            Analysis prepared by:
```

```
 ************************** DESCRIPTION OF STUDY **************************
* Rugged Solar                                                            *
* AREA E                                                                  *
*                                                                         *
 *************************************************************************

  FILE NAME: C:\AES\MCS\PR-F.DAT
  TIME/DATE OF STUDY: 13:43 09/10/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    100.00 TO NODE    105.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3676.00
```

```
  DOWNSTREAM ELEVATION(FEET) =   3666.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3666.00  DOWNSTREAM(FEET) =   3598.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1192.00   CHANNEL SLOPE =  0.0570
  CHANNEL BASE(FEET) =  250.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.74
  AVERAGE FLOW DEPTH(FEET) =   0.02   TRAVEL TIME(MIN.) =  26.76
  Tc(MIN.) =   34.28
  SUBAREA AREA(ACRES) =    10.59       SUBAREA RUNOFF(CFS) =    5.00
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       10.9         PEAK FLOW RATE(CFS) =       5.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.02   FLOW VELOCITY(FEET/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1292.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3598.00  DOWNSTREAM(FEET) =   3522.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1805.00   CHANNEL SLOPE =  0.0421
  CHANNEL BASE(FEET) =  120.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.788
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =  18.41
  Tc(MIN.) =   52.69
  SUBAREA AREA(ACRES) =    35.42       SUBAREA RUNOFF(CFS) =   12.67
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       46.3         PEAK FLOW RATE(CFS) =      16.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.86
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    3097.00 FEET.
```

```
+-------------------------------------------------------------------------+
| Begin Sub-Basin 200                                                     |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3670.00
  DOWNSTREAM ELEVATION(FEET) =   3662.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.101
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.983
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3662.00  DOWNSTREAM(FEET) =   3588.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1141.00   CHANNEL SLOPE =  0.0649
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.596
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.95
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   9.74
  Tc(MIN.) =   17.84
  SUBAREA AREA(ACRES) =     6.69       SUBAREA RUNOFF(CFS) =    4.81
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =       4.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    1241.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3588.00  DOWNSTREAM(FEET) =   3552.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   830.00   CHANNEL SLOPE =  0.0434
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.953
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.17
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   6.37
  Tc(MIN.) =   24.21
  SUBAREA AREA(ACRES) =    14.58       SUBAREA RUNOFF(CFS) =    8.61
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       21.4         PEAK FLOW RATE(CFS) =      12.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =    2071.00 FEET.

+-------------------------------------------------------------------------+
| Begin Sub-basin 300                                                     |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3660.00
  DOWNSTREAM ELEVATION(FEET) =   3650.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3650.00  DOWNSTREAM(FEET) =   3558.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1504.00   CHANNEL SLOPE =  0.0612
  CHANNEL BASE(FEET) =   75.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.064
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =  15.34
  Tc(MIN.) =   22.86
  SUBAREA AREA(ACRES) =    15.49       SUBAREA RUNOFF(CFS) =    9.49
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       15.6         PEAK FLOW RATE(CFS) =       9.57
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.97
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    310.00 =    1604.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    315.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3558.00  DOWNSTREAM(FEET) =   3514.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1009.00   CHANNEL SLOPE =  0.0436
  CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.635
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.79
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   6.03
  Tc(MIN.) =   28.89
  SUBAREA AREA(ACRES) =    14.77       SUBAREA RUNOFF(CFS) =    7.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       30.4         PEAK FLOW RATE(CFS) =      16.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.99
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    315.00 =    2613.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 400                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    405.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3628.00
  DOWNSTREAM ELEVATION(FEET) =   3618.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.520
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    410.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3618.00  DOWNSTREAM(FEET) =   3548.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1061.00   CHANNEL SLOPE =  0.0660
  CHANNEL BASE(FEET) =   60.00   "Z" FACTOR =  17.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.073
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.16
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =  15.24
  Tc(MIN.) =   22.76
  SUBAREA AREA(ACRES) =     6.27       SUBAREA RUNOFF(CFS) =    3.85
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        6.4         PEAK FLOW RATE(CFS) =       3.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.51
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    410.00 =    1161.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    415.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3548.00  DOWNSTREAM(FEET) =   3519.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   862.00   CHANNEL SLOPE =  0.0336
  CHANNEL BASE(FEET) =   22.00   "Z" FACTOR =  11.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.663
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.54
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.65
  Tc(MIN.) =   28.41
  SUBAREA AREA(ACRES) =    20.80       SUBAREA RUNOFF(CFS) =   11.08
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       27.2         PEAK FLOW RATE(CFS) =      14.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   2.94
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    415.00 =    2023.00 FEET.

+--------------------------------------------------------------------------+
| Begin Sub-Basin 500                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    505.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   3660.00
  DOWNSTREAM ELEVATION(FEET) =   3652.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.101
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.983
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    505.00 TO NODE    510.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3652.00  DOWNSTREAM(FEET) =   3578.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   979.00   CHANNEL SLOPE =  0.0756
  CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.432
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.47
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =  11.08
  Tc(MIN.) =   19.18
  SUBAREA AREA(ACRES) =     4.71       SUBAREA RUNOFF(CFS) =    3.23
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =        4.8         PEAK FLOW RATE(CFS) =       3.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.84
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    510.00 =    1079.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    510.00 TO NODE    515.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   3578.00  DOWNSTREAM(FEET) =   3532.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   758.00   CHANNEL SLOPE =  0.0607
  CHANNEL BASE(FEET) =   60.00   "Z" FACTOR =  15.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.799
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.77
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   7.12
  Tc(MIN.) =   26.30
  SUBAREA AREA(ACRES) =     9.78       SUBAREA RUNOFF(CFS) =    5.48
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
  TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =       8.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.04
```

```
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    515.00 =    1837.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =     26.30
 PEAK FLOW RATE(CFS)   =       8.17
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Michael Baker
INTERNATIONAL

Appendix D – 100-Year Limits of Inundation

Flow Master Cross Sections
100-year Limits of Inundation Exhibit

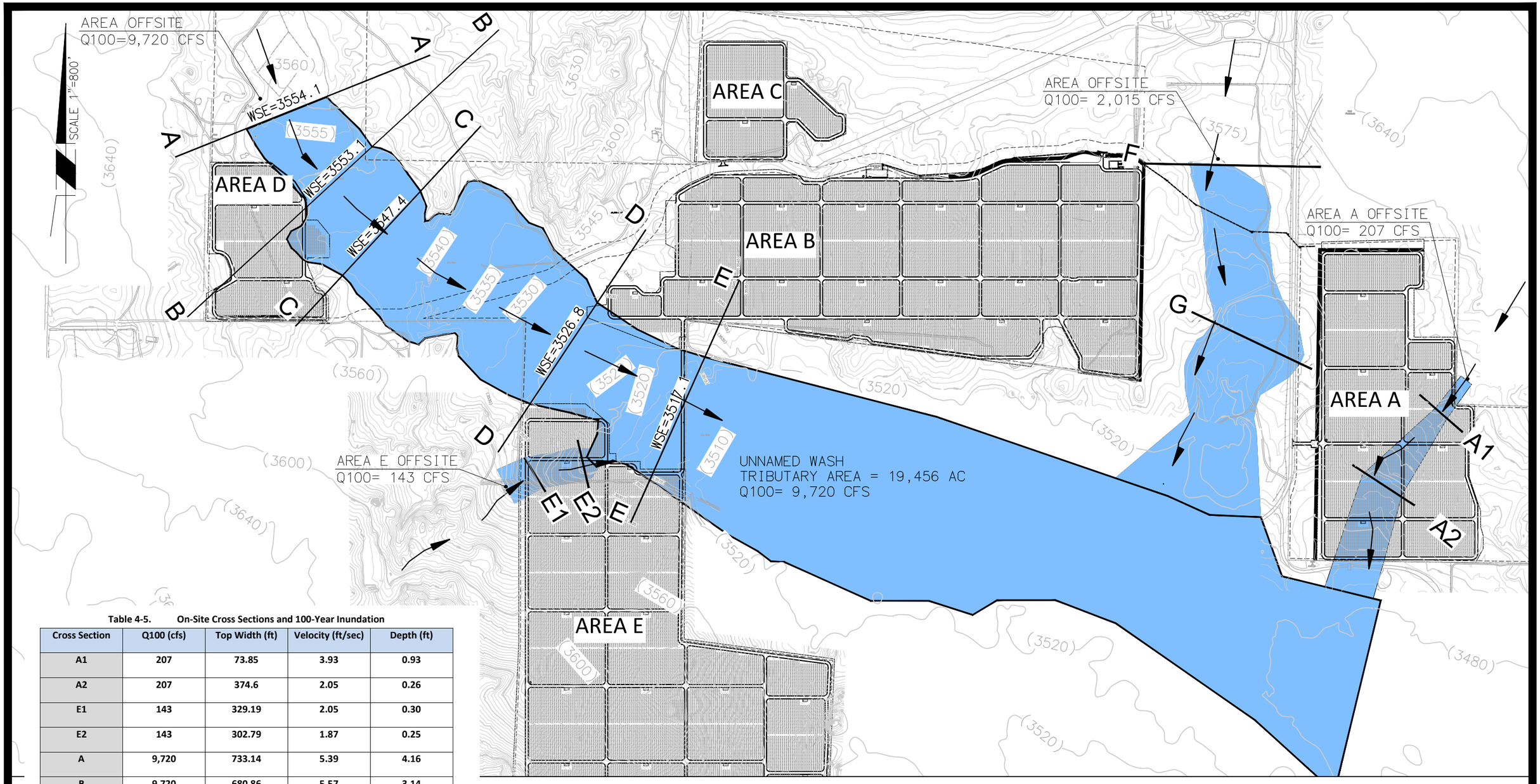

Table 4-5. On-Site Cross Sections and 100-Year Inundation

Cross Section	Q100 (cfs)	Top Width (ft)	Velocity (ft/sec)	Depth (ft)
A1	207	73.85	3.93	0.93
A2	207	374.6	2.05	0.26
E1	143	329.19	2.05	0.30
E2	143	302.79	1.87	0.25
A	9,720	733.14	5.39	4.16
B	9,720	680.86	5.57	3.14
C	9,720	912.41	4.67	2.43
D	9,720	904.93	5.61	1.82
E	9,720	1087.17	4.46	2.11
F	2,015	413.98	4.09	1.45
G	2,015	533.03	3.69	1.06

RUGGED SOLAR
CROSS SECTIONS

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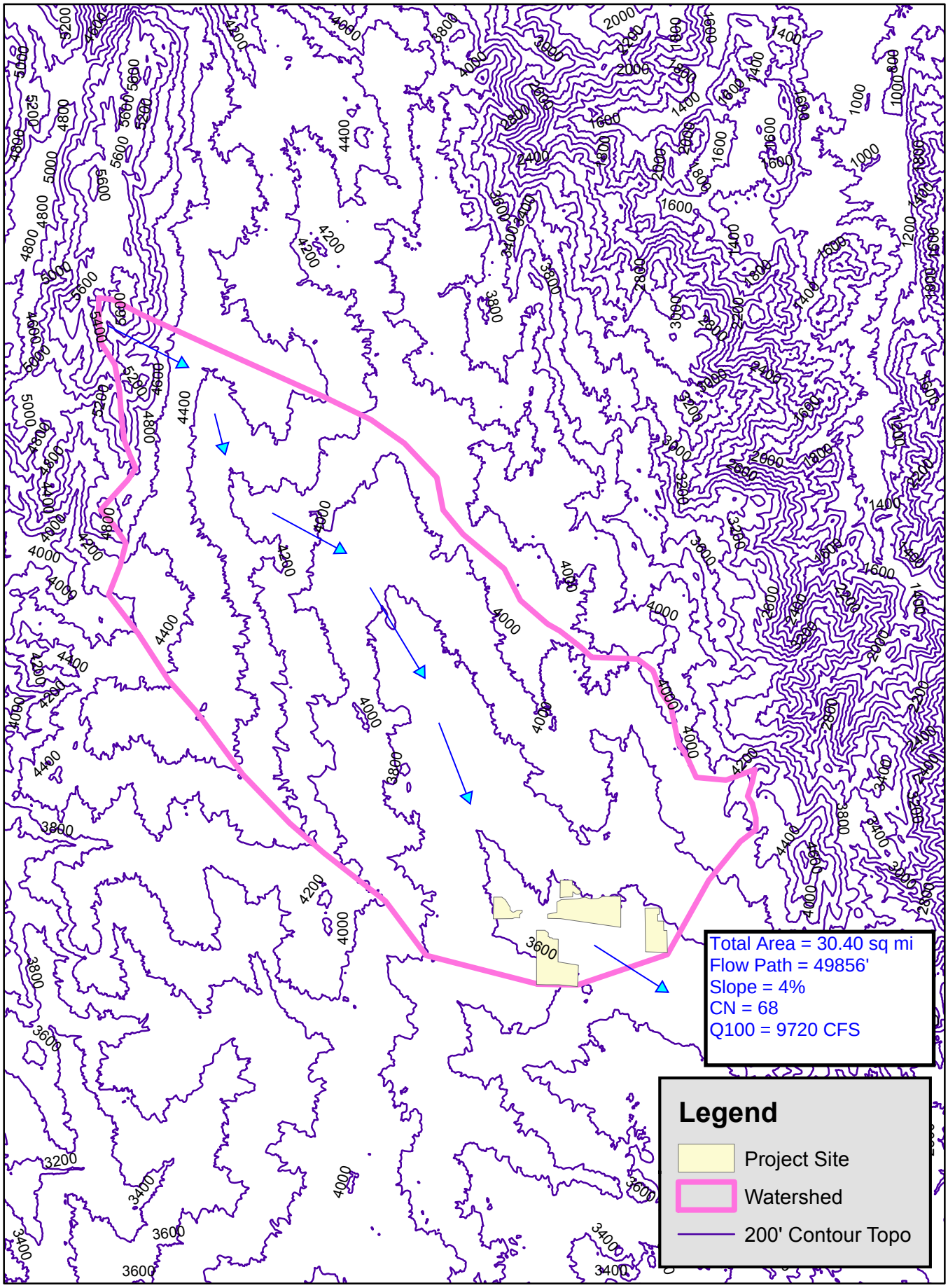
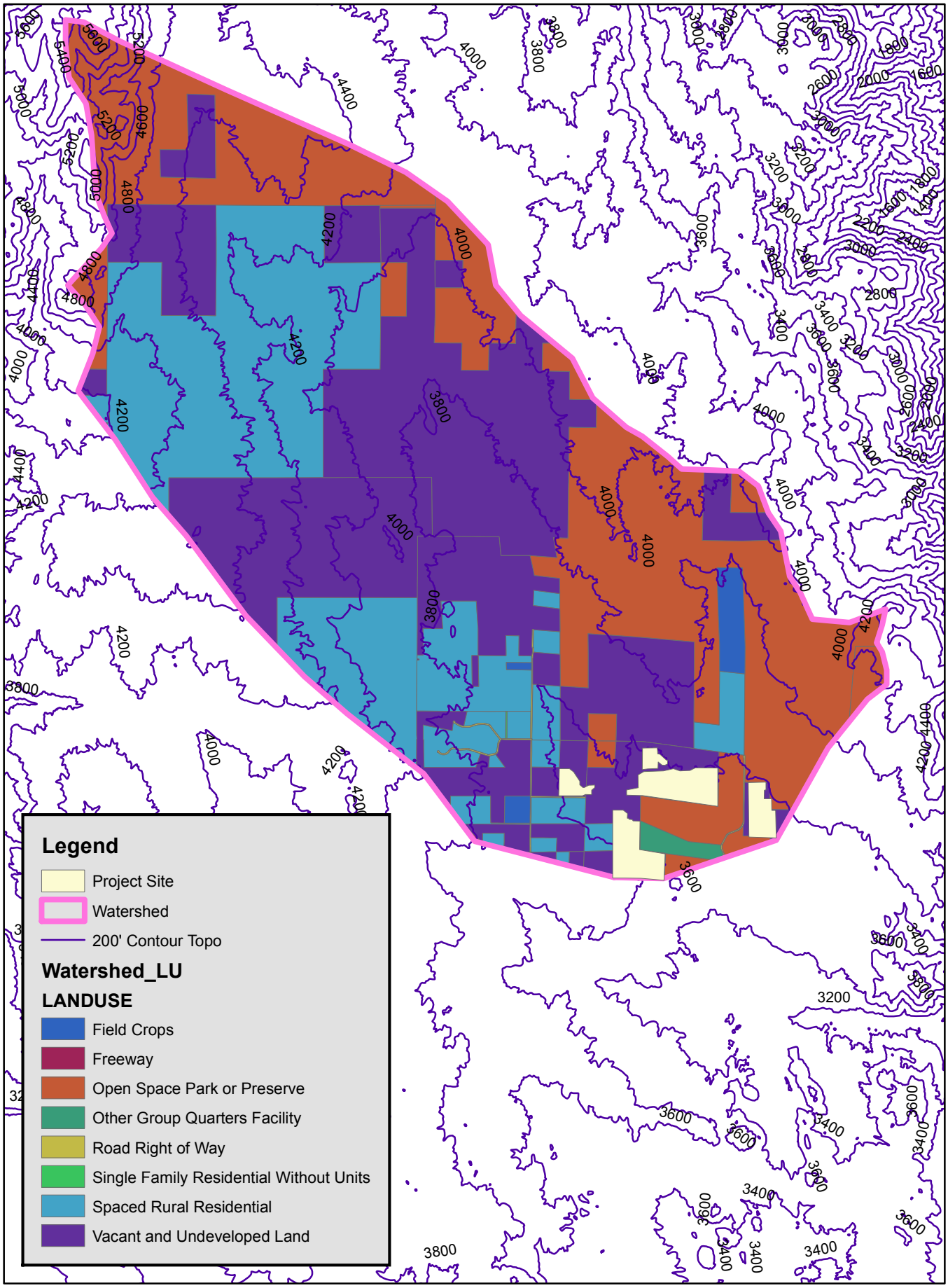
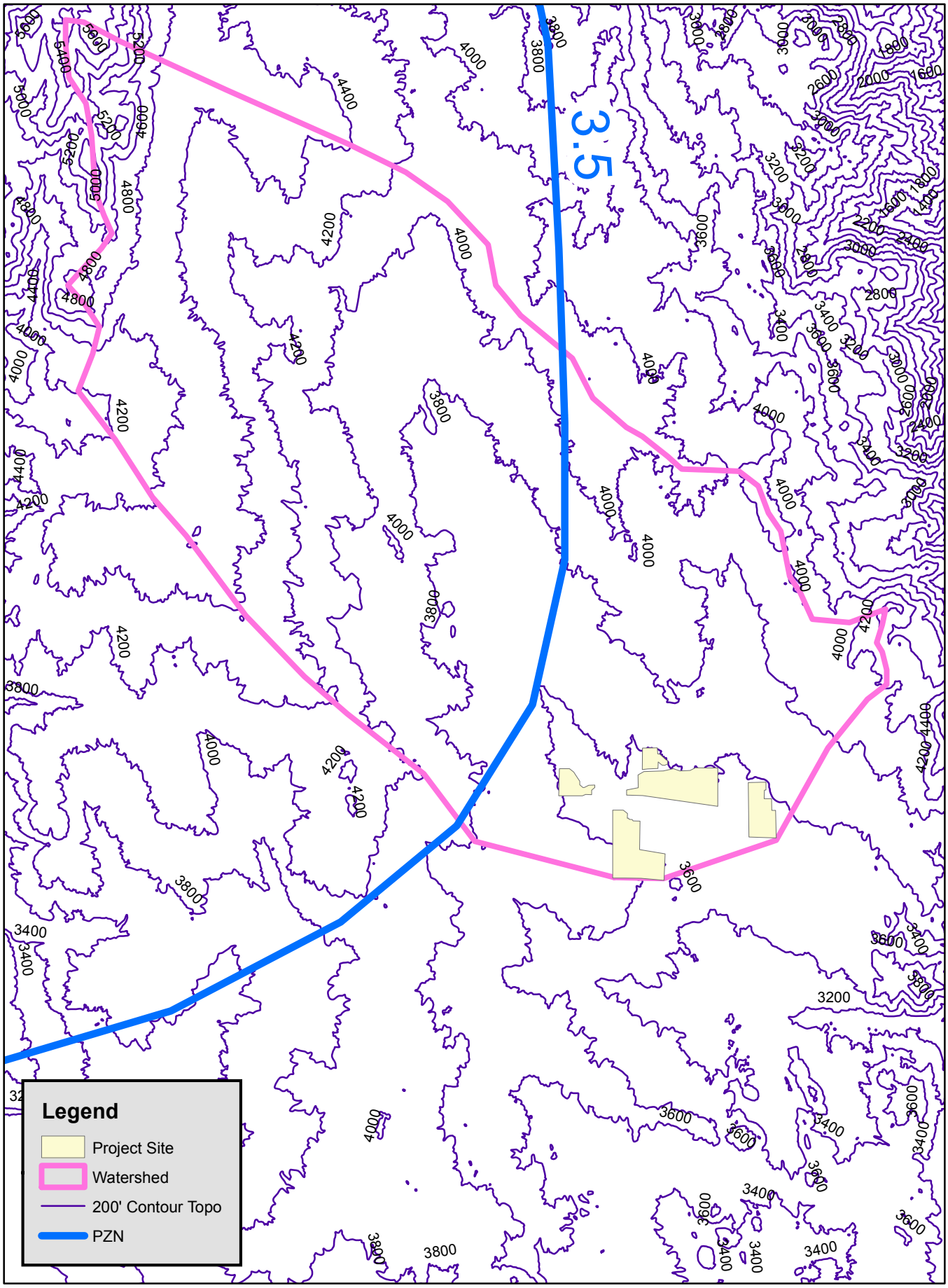
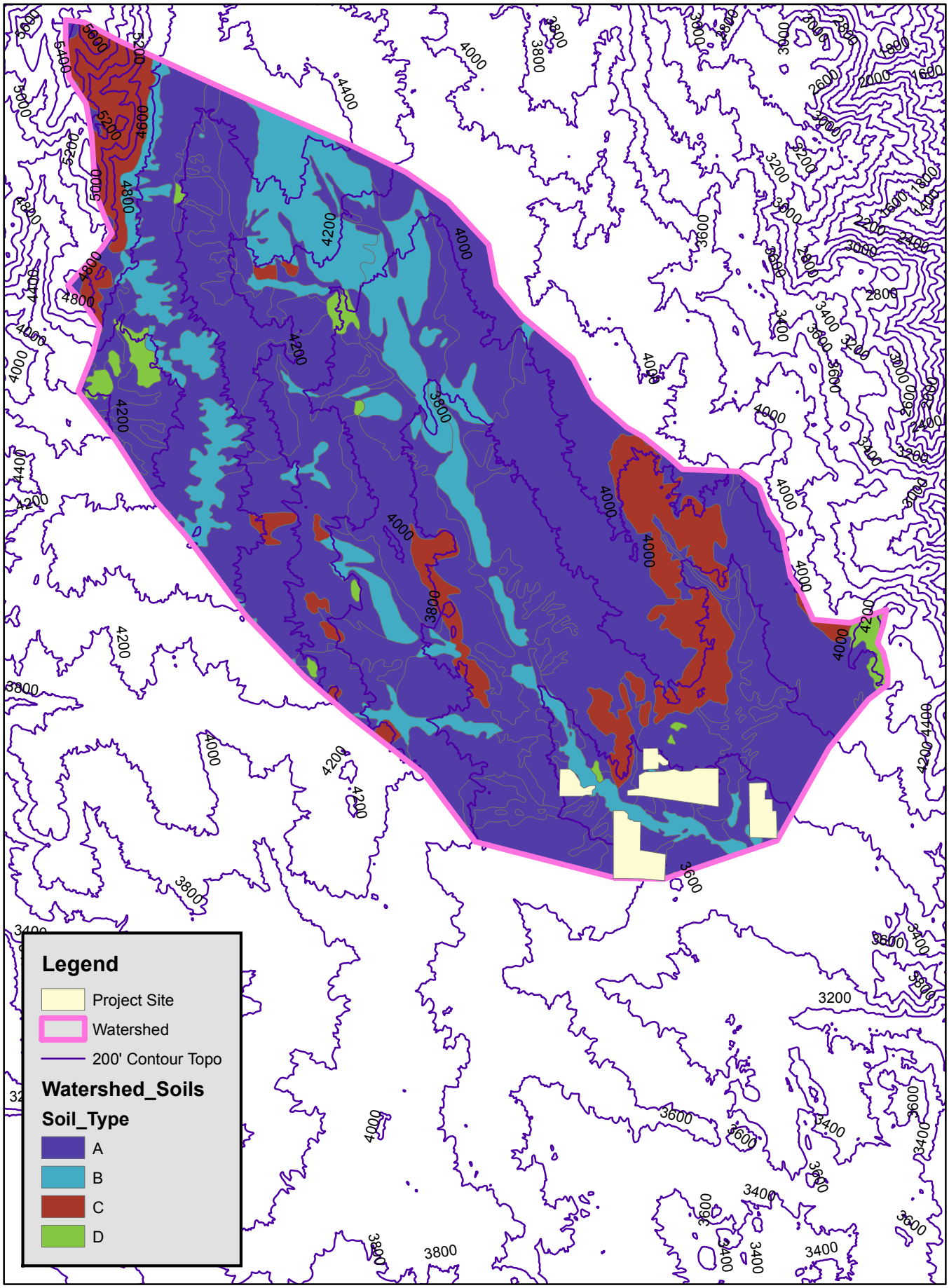

Total Area = 30.40 sq mi
Flow Path = 49856'
Slope = 4%
CN = 68
Q100 = 9720 CFS
Legend
Project Site
Watershed
200' Contour Topo


Legend
Project Site
Watershed
200' Contour Topo
Watershed_LU
LANDUSE
Field Crops
Freeway
Open Space Park or Preserve
Other Group Quarters Facility
Road Right of Way
Single Family Residential Without Units
Spaced Rural Residential
Vacant and Undeveloped Land


3.5
Legend
Project Site
Watershed
200' Contour Topo
PZN


Legend
Project Site
Watershed
200' Contour Topo
Watershed_Soils
Soil_Type
A
B
C
D

Rugged Solar - Adjusted Curve Number					
Land Use	**Cover Description**	**Soil Type**	**CN (Table 4-2 SDCHM)**	**Area (acres)**	**CN*Area**
SANDAG	**Table 4-2 SDCHM**	**Soil Survey**	**PZN = 2.0**		
Residential (2 acres)	Spaced Rural Residential	A	46	21.920307	1008.33
Row Crops, Contoured, Poor	Field Crops	A	70	12.195905	853.71
Row Crops, Contoured, Poor	Field Crops	A	70	68.570935	4799.97
Row Crops, Contoured, Poor	Field Crops	A	70	21.168382	1481.79
Row Crops, Contoured, Poor	Field Crops	A	70	0.039438	2.76
Row Crops, Contoured, Poor	Field Crops	A	70	4.454336	311.80
Row Crops, Contoured, Poor	Field Crops	A	70	1.936986	135.59
Row Crops, Contoured, Poor	Field Crops	A	70	0.341293	23.89
Row Crops, Contoured, Poor	Field Crops	A	70	3.411256	238.79
Row Crops, Contoured, Poor	Field Crops	A	70	27.210548	1904.74
Row Crops, Contoured, Poor	Field Crops	A	70	5.153017	360.71
Row Crops, Contoured, Poor	Field Crops	B	79	5.472659	432.34
Row Crops, Contoured, Poor	Field Crops	C	84	12.990921	1091.24
Row Crops, Contoured, Poor	Field Crops	C	84	31.013370	2605.12
Streets and Roads	Freeway	A	98	4.301869	421.58
Open Brush, Fair	Open Space Park or Preserve	A	46	202.992736	9337.67
Open Brush, Fair	Open Space Park or Preserve	A	46	12.249353	563.47
Open Brush, Fair	Open Space Park or Preserve	A	46	56.033243	2577.53
Open Brush, Fair	Open Space Park or Preserve	A	46	10.682035	491.37
Open Brush, Fair	Open Space Park or Preserve	A	46	1.566528	72.06
Open Brush, Fair	Open Space Park or Preserve	A	46	227.349608	10458.08
Open Brush, Fair	Open Space Park or Preserve	A	46	25.190076	1158.74
Open Brush, Fair	Open Space Park or Preserve	A	46	124.471313	5725.68
Open Brush, Fair	Open Space Park or Preserve	A	46	24.123135	1109.66
Open Brush, Fair	Open Space Park or Preserve	A	46	20.848539	959.03
Open Brush, Fair	Open Space Park or Preserve	A	46	20.837891	958.54
Open Brush, Fair	Open Space Park or Preserve	A	46	11.769445	541.39
Open Brush, Fair	Open Space Park or Preserve	A	46	0.791027	36.39
Open Brush, Fair	Open Space Park or Preserve	A	46	1.292750	59.47
Open Brush, Fair	Open Space Park or Preserve	A	46	405.768048	18665.33
Open Brush, Fair	Open Space Park or Preserve	A	46	35.700188	1642.21
Open Brush, Fair	Open Space Park or Preserve	A	46	6.072814	279.35
Open Brush, Fair	Open Space Park or Preserve	A	46	6.693116	307.88
Open Brush, Fair	Open Space Park or Preserve	A	46	6.449707	296.69
Open Brush, Fair	Open Space Park or Preserve	A	46	6.495982	298.82
Open Brush, Fair	Open Space Park or Preserve	A	46	12.577203	578.55
Open Brush, Fair	Open Space Park or Preserve	A	46	7.614106	350.25
Open Brush, Fair	Open Space Park or Preserve	A	46	2.450986	112.75
Open Brush, Fair	Open Space Park or Preserve	A	46	18.005888	828.27
Open Brush, Fair	Open Space Park or Preserve	A	46	0.092355	4.25
Open Brush, Fair	Open Space Park or Preserve	A	46	0.161882	7.45
Open Brush, Fair	Open Space Park or Preserve	A	46	2,231.276004	102638.70
Open Brush, Fair	Open Space Park or Preserve	A	46	0.671526	30.89
Open Brush, Fair	Open Space Park or Preserve	A	46	135.419153	6229.28
Open Brush, Fair	Open Space Park or Preserve	A	46	10.642475	489.55
Open Brush, Fair	Open Space Park or Preserve	A	46	14.919985	686.32
Open Brush, Fair	Open Space Park or Preserve	A	46	3.079627	141.66
Open Brush, Fair	Open Space Park or Preserve	A	46	28.482284	1310.19
Open Brush, Fair	Open Space Park or Preserve	A	46	1.063984	48.94
Open Brush, Fair	Open Space Park or Preserve	A	46	0.145055	6.67
Open Brush, Fair	Open Space Park or Preserve	A	46	147.041712	6763.92
Open Brush, Fair	Open Space Park or Preserve	A	46	30.899459	1421.38
Open Brush, Fair	Open Space Park or Preserve	A	46	44.241728	2035.12
Open Brush, Fair	Open Space Park or Preserve	A	46	55.366973	2546.88
Open Brush, Fair	Open Space Park or Preserve	A	46	5.846330	268.93
Open Brush, Fair	Open Space Park or Preserve	A	46	0.000031	0.00
Open Brush, Fair	Open Space Park or Preserve	B	66	127.521927	8416.45
Open Brush, Fair	Open Space Park or Preserve	B	66	436.861115	28832.83
Open Brush, Fair	Open Space Park or Preserve	B	66	8.730881	576.24
Open Brush, Fair	Open Space Park or Preserve	B	66	2.221922	146.65
Open Brush, Fair	Open Space Park or Preserve	B	66	1.241257	81.92
Open Brush, Fair	Open Space Park or Preserve	B	66	2.553244	168.51
Open Brush, Fair	Open Space Park or Preserve	B	66	66.166249	4366.97
Open Brush, Fair	Open Space Park or Preserve	B	66	13.706384	904.62
Open Brush, Fair	Open Space Park or Preserve	B	66	5.224329	344.81
Open Brush, Fair	Open Space Park or Preserve	B	66	0.147816	9.76
Open Brush, Fair	Open Space Park or Preserve	B	66	0.295469	19.50
Open Brush, Fair	Open Space Park or Preserve	B	66	73.080128	4823.29
Open Brush, Fair	Open Space Park or Preserve	C	77	1.340921	103.25
Open Brush, Fair	Open Space Park or Preserve	C	77	516.545981	39774.04

Open Brush, Fair	Open Space Park or Preserve	C	77	65.388906	5034.95
Open Brush, Fair	Open Space Park or Preserve	C	77	40.328743	3105.31
Open Brush, Fair	Open Space Park or Preserve	C	77	446.012132	34342.93
Open Brush, Fair	Open Space Park or Preserve	C	77	226.529258	17442.75
Open Brush, Fair	Open Space Park or Preserve	C	77	24.235222	1866.11
Open Brush, Fair	Open Space Park or Preserve	C	77	7.031089	541.39
Open Brush, Fair	Open Space Park or Preserve	C	77	0.000031	0.00
Open Brush, Fair	Open Space Park or Preserve	D	83	9.006544	747.54
Open Brush, Fair	Open Space Park or Preserve	D	83	0.015315	1.27
Open Brush, Fair	Open Space Park or Preserve	D	83	49.558999	4113.40
Open Brush, Fair	Open Space Park or Preserve	D	83	2.074415	172.18
Open Brush, Fair	Open Space Park or Preserve	D	83	1.048709	87.04
Open Brush, Fair	Open Space Park or Preserve	D	83	34.160998	2835.36
Residential (1 acre)	Other Group Quarters Facility	A	51	6.528265	332.94
Residential (1 acre)	Other Group Quarters Facility	A	51	73.227646	3734.61
Residential (1 acre)	Other Group Quarters Facility	B	68	7.724351	525.26
Streets and Roads	Road Right of Way	A	98	1.214611	119.03
Streets and Roads	Road Right of Way	A	98	1.284002	125.83
Streets and Roads	Road Right of Way	A	98	3.346590	327.97
Streets and Roads	Road Right of Way	A	98	0.132981	13.03
Streets and Roads	Road Right of Way	A	98	4.187893	410.41
Streets and Roads	Road Right of Way	A	98	1.539194	150.84
Streets and Roads	Road Right of Way	A	98	10.922947	1070.45
Streets and Roads	Road Right of Way	A	98	1.347190	132.02
Streets and Roads	Road Right of Way	A	98	0.455670	44.66
Streets and Roads	Road Right of Way	A	98	0.433318	42.47
Streets and Roads	Road Right of Way	A	98	4.809599	471.34
Streets and Roads	Road Right of Way	A	98	1.022537	100.21
Streets and Roads	Road Right of Way	A	98	0.666659	65.33
Streets and Roads	Road Right of Way	A	98	0.227079	22.25
Streets and Roads	Road Right of Way	B	98	1.495884	146.60
Streets and Roads	Road Right of Way	B	98	3.309375	324.32
Streets and Roads	Road Right of Way	B	98	0.559650	54.85
Open Brush, Fair	Single Family Residential Without Units	A	46	0.568644	26.16
Open Brush, Fair	Single Family Residential Without Units	A	46	0.968112	44.53
Open Brush, Fair	Single Family Residential Without Units	A	46	0.364218	16.75
Residential (2 acres)	Spaced Rural Residential	A	46	2.850439	131.12
Residential (2 acres)	Spaced Rural Residential	A	46	74.387723	3421.84
Residential (2 acres)	Spaced Rural Residential	A	46	2.462123	113.26
Residential (2 acres)	Spaced Rural Residential	A	46	3.071655	141.30
Residential (2 acres)	Spaced Rural Residential	A	46	9.681749	445.36
Residential (2 acres)	Spaced Rural Residential	A	46	42.755013	1966.73
Residential (2 acres)	Spaced Rural Residential	A	46	23.318728	1072.66
Residential (2 acres)	Spaced Rural Residential	A	46	25.923722	1192.49
Residential (2 acres)	Spaced Rural Residential	A	46	35.072606	1613.34
Residential (2 acres)	Spaced Rural Residential	A	46	25.784919	1186.11
Residential (2 acres)	Spaced Rural Residential	A	46	14.409885	662.85
Residential (2 acres)	Spaced Rural Residential	A	46	4.932640	226.90
Residential (2 acres)	Spaced Rural Residential	A	46	12.225183	562.36
Residential (2 acres)	Spaced Rural Residential	A	46	41.660533	1916.38
Residential (2 acres)	Spaced Rural Residential	A	46	42.947893	1975.60
Residential (2 acres)	Spaced Rural Residential	A	46	988.866824	45487.87
Residential (2 acres)	Spaced Rural Residential	A	46	78.210086	3597.66
Residential (2 acres)	Spaced Rural Residential	A	46	11.118307	511.44
Residential (2 acres)	Spaced Rural Residential	A	46	428.494354	19710.74
Residential (2 acres)	Spaced Rural Residential	A	46	63.176967	2906.14
Residential (2 acres)	Spaced Rural Residential	A	46	364.914188	16786.05
Residential (2 acres)	Spaced Rural Residential	A	46	58.708146	2700.57
Residential (2 acres)	Spaced Rural Residential	A	46	17.223340	792.27
Residential (2 acres)	Spaced Rural Residential	A	46	173.865876	7997.83
Residential (2 acres)	Spaced Rural Residential	A	46	222.383235	10229.63
Residential (2 acres)	Spaced Rural Residential	A	46	16.584060	762.87
Residential (2 acres)	Spaced Rural Residential	A	46	6.711516	308.73
Residential (2 acres)	Spaced Rural Residential	A	46	1.227980	56.49
Residential (2 acres)	Spaced Rural Residential	A	46	1.654724	76.12
Residential (2 acres)	Spaced Rural Residential	A	46	1.401936	64.49
Residential (2 acres)	Spaced Rural Residential	A	46	42.868416	1971.95
Residential (2 acres)	Spaced Rural Residential	A	46	81.204179	3735.39
Residential (2 acres)	Spaced Rural Residential	A	46	0.030612	1.41
Residential (2 acres)	Spaced Rural Residential	A	46	1.602647	73.72
Residential (2 acres)	Spaced Rural Residential	A	46	3.518886	161.87
Residential (2 acres)	Spaced Rural Residential	A	46	18.621824	856.60
Residential (2 acres)	Spaced Rural Residential	A	46	0.146445	6.74
Residential (2 acres)	Spaced Rural Residential	A	46	7.457425	343.04

Residential (2 acres)	Spaced Rural Residential	A	46	2.503127	115.14
Residential (2 acres)	Spaced Rural Residential	A	46	0.043059	1.98
Residential (2 acres)	Spaced Rural Residential	A	46	18.203319	837.35
Residential (2 acres)	Spaced Rural Residential	A	46	15.124165	695.71
Residential (2 acres)	Spaced Rural Residential	A	46	3.246024	149.32
Residential (2 acres)	Spaced Rural Residential	A	46	44.548175	2049.22
Residential (2 acres)	Spaced Rural Residential	A	46	270.960649	12464.19
Residential (2 acres)	Spaced Rural Residential	A	46	44.548216	2049.22
Residential (2 acres)	Spaced Rural Residential	A	46	9.822473	451.83
Residential (2 acres)	Spaced Rural Residential	A	46	45.376843	2087.33
Residential (2 acres)	Spaced Rural Residential	A	46	1.015812	46.73
Residential (2 acres)	Spaced Rural Residential	A	46	53.244859	2449.26
Residential (2 acres)	Spaced Rural Residential	A	46	2.574017	118.40
Residential (2 acres)	Spaced Rural Residential	A	46	1.281896	58.97
Residential (2 acres)	Spaced Rural Residential	A	46	26.657876	1226.26
Residential (2 acres)	Spaced Rural Residential	A	46	37.797741	1738.70
Residential (2 acres)	Spaced Rural Residential	A	46	216.379898	9953.48
Residential (2 acres)	Spaced Rural Residential	A	46	43.114597	1983.27
Residential (2 acres)	Spaced Rural Residential	A	46	28.445927	1308.51
Residential (2 acres)	Spaced Rural Residential	A	46	21.997279	1011.87
Residential (2 acres)	Spaced Rural Residential	A	46	6.579473	302.66
Residential (2 acres)	Spaced Rural Residential	A	46	11.454104	526.89
Residential (2 acres)	Spaced Rural Residential	A	46	43.126731	1983.83
Residential (2 acres)	Spaced Rural Residential	A	46	0.185577	8.54
Residential (2 acres)	Spaced Rural Residential	A	46	10.062161	462.86
Residential (2 acres)	Spaced Rural Residential	A	46	0.000027	0.00
Residential (2 acres)	Spaced Rural Residential	B	65	41.965733	2727.77
Residential (2 acres)	Spaced Rural Residential	B	65	37.215961	2419.04
Residential (2 acres)	Spaced Rural Residential	B	65	80.681485	5244.30
Residential (2 acres)	Spaced Rural Residential	B	65	13.960778	907.45
Residential (2 acres)	Spaced Rural Residential	B	65	26.617897	1730.16
Residential (2 acres)	Spaced Rural Residential	B	65	0.171382	11.14
Residential (2 acres)	Spaced Rural Residential	B	65	2.010076	130.65
Residential (2 acres)	Spaced Rural Residential	B	65	267.116734	17362.59
Residential (2 acres)	Spaced Rural Residential	B	65	58.235109	3785.28
Residential (2 acres)	Spaced Rural Residential	B	65	88.224309	5734.58
Residential (2 acres)	Spaced Rural Residential	B	65	127.084588	8260.50
Residential (2 acres)	Spaced Rural Residential	B	65	60.246317	3916.01
Residential (2 acres)	Spaced Rural Residential	B	65	55.183373	3586.92
Residential (2 acres)	Spaced Rural Residential	B	65	3.917098	254.61
Residential (2 acres)	Spaced Rural Residential	B	65	27.335316	1776.80
Residential (2 acres)	Spaced Rural Residential	B	65	38.608546	2509.56
Residential (2 acres)	Spaced Rural Residential	B	65	0.347416	22.58
Residential (2 acres)	Spaced Rural Residential	B	65	29.869407	1941.51
Residential (2 acres)	Spaced Rural Residential	B	65	0.088433	5.75
Residential (2 acres)	Spaced Rural Residential	C	77	9.093206	700.18
Residential (2 acres)	Spaced Rural Residential	C	77	16.812677	1294.58
Residential (2 acres)	Spaced Rural Residential	C	77	15.724078	1210.75
Residential (2 acres)	Spaced Rural Residential	C	77	15.809863	1217.36
Residential (2 acres)	Spaced Rural Residential	C	77	9.514974	732.65
Residential (2 acres)	Spaced Rural Residential	C	77	22.736685	1750.72
Residential (2 acres)	Spaced Rural Residential	C	77	3.890075	299.54
Residential (2 acres)	Spaced Rural Residential	C	77	14.162852	1090.54
Residential (2 acres)	Spaced Rural Residential	C	77	83.612903	6438.19
Residential (2 acres)	Spaced Rural Residential	D	82	51.254464	4202.87
Residential (2 acres)	Spaced Rural Residential	D	82	73.504418	6027.36
Residential (2 acres)	Spaced Rural Residential	D	82	12.470883	1022.61
Residential (2 acres)	Spaced Rural Residential	D	82	5.851974	479.86
Residential (2 acres)	Spaced Rural Residential	D	82	1.022296	83.83
Residential (2 acres)	Spaced Rural Residential	D	82	8.180676	670.82
Residential (2 acres)	Spaced Rural Residential	D	82	2.831343	232.17
Residential (2 acres)	Spaced Rural Residential	D	82	0.000027	0.00
Western Desert, Natural	Vacant and Undeveloped Land	A	63	8.969054	565.05
Western Desert, Natural	Vacant and Undeveloped Land	A	63	1.113824	70.17
Western Desert, Natural	Vacant and Undeveloped Land	A	63	1.460695	92.02
Western Desert, Natural	Vacant and Undeveloped Land	A	63	2.958709	186.40
Western Desert, Natural	Vacant and Undeveloped Land	A	63	12.826259	808.05
Western Desert, Natural	Vacant and Undeveloped Land	A	63	4.212614	265.39
Western Desert, Natural	Vacant and Undeveloped Land	A	63	1.873667	118.04
Western Desert, Natural	Vacant and Undeveloped Land	A	63	3.133002	197.38
Western Desert, Natural	Vacant and Undeveloped Land	A	63	3.089696	194.65
Western Desert, Natural	Vacant and Undeveloped Land	A	63	60.980554	3841.77
Western Desert, Natural	Vacant and Undeveloped Land	A	63	77.069417	4855.37
Western Desert, Natural	Vacant and Undeveloped Land	A	63	28.633819	1803.93

Western Desert, Natural	Vacant and Undeveloped Land	A	63	13.208268	832.12
Western Desert, Natural	Vacant and Undeveloped Land	A	63	14.177846	893.20
Western Desert, Natural	Vacant and Undeveloped Land	A	63	7.283873	458.88
Western Desert, Natural	Vacant and Undeveloped Land	A	63	8.069949	508.41
Western Desert, Natural	Vacant and Undeveloped Land	A	63	2.106136	132.69
Western Desert, Natural	Vacant and Undeveloped Land	A	63	8.182222	515.48
Western Desert, Natural	Vacant and Undeveloped Land	A	63	397.359451	25033.65
Western Desert, Natural	Vacant and Undeveloped Land	A	63	0.489148	30.82
Western Desert, Natural	Vacant and Undeveloped Land	A	63	26.551804	1672.76
Western Desert, Natural	Vacant and Undeveloped Land	A	63	4.542289	286.16
Western Desert, Natural	Vacant and Undeveloped Land	A	63	33.274728	2096.31
Western Desert, Natural	Vacant and Undeveloped Land	A	63	13.145827	828.19
Western Desert, Natural	Vacant and Undeveloped Land	A	63	835.884862	52660.75
Western Desert, Natural	Vacant and Undeveloped Land	A	63	362.336060	22827.17
Western Desert, Natural	Vacant and Undeveloped Land	A	63	0.148349	9.35
Western Desert, Natural	Vacant and Undeveloped Land	A	63	59.840649	3769.96
Western Desert, Natural	Vacant and Undeveloped Land	A	63	45.824948	2886.97
Western Desert, Natural	Vacant and Undeveloped Land	A	63	33.144306	2088.09
Western Desert, Natural	Vacant and Undeveloped Land	A	63	18.156653	1143.87
Western Desert, Natural	Vacant and Undeveloped Land	A	63	1.481616	93.34
Western Desert, Natural	Vacant and Undeveloped Land	A	63	172.686269	10879.23
Western Desert, Natural	Vacant and Undeveloped Land	A	63	18.173518	1144.93
Western Desert, Natural	Vacant and Undeveloped Land	A	63	862.777112	54354.96
Western Desert, Natural	Vacant and Undeveloped Land	A	63	193.876443	12214.22
Western Desert, Natural	Vacant and Undeveloped Land	A	63	33.021206	2080.34
Western Desert, Natural	Vacant and Undeveloped Land	A	63	95.093883	5990.91
Western Desert, Natural	Vacant and Undeveloped Land	A	63	175.284180	11042.90
Western Desert, Natural	Vacant and Undeveloped Land	A	63	200.343517	12621.64
Western Desert, Natural	Vacant and Undeveloped Land	A	63	22.957438	1446.32
Western Desert, Natural	Vacant and Undeveloped Land	A	63	2.781153	175.21
Western Desert, Natural	Vacant and Undeveloped Land	A	63	7.557240	476.11
Western Desert, Natural	Vacant and Undeveloped Land	A	63	3.771300	237.59
Western Desert, Natural	Vacant and Undeveloped Land	A	63	0.440251	27.74
Western Desert, Natural	Vacant and Undeveloped Land	A	63	547.826621	34513.08
Western Desert, Natural	Vacant and Undeveloped Land	A	63	27.954431	1761.13
Western Desert, Natural	Vacant and Undeveloped Land	A	63	4.393009	276.76
Western Desert, Natural	Vacant and Undeveloped Land	A	63	2.525874	159.13
Western Desert, Natural	Vacant and Undeveloped Land	A	63	3.702552	233.26
Western Desert, Natural	Vacant and Undeveloped Land	A	63	0.370743	23.36
Western Desert, Natural	Vacant and Undeveloped Land	A	63	9.885094	622.76
Western Desert, Natural	Vacant and Undeveloped Land	A	63	9.511758	599.24
Western Desert, Natural	Vacant and Undeveloped Land	A	63	1.798252	113.29
Western Desert, Natural	Vacant and Undeveloped Land	A	63	116.516184	7340.52
Western Desert, Natural	Vacant and Undeveloped Land	A	63	195.789905	12334.76
Western Desert, Natural	Vacant and Undeveloped Land	A	63	150.837436	9502.76
Western Desert, Natural	Vacant and Undeveloped Land	A	63	10.171080	640.78
Western Desert, Natural	Vacant and Undeveloped Land	A	63	3.522902	221.94
Western Desert, Natural	Vacant and Undeveloped Land	A	63	64.899854	4088.69
Western Desert, Natural	Vacant and Undeveloped Land	A	63	6.039543	380.49
Western Desert, Natural	Vacant and Undeveloped Land	A	63	4.955696	312.21
Western Desert, Natural	Vacant and Undeveloped Land	A	63	7.778847	490.07
Western Desert, Natural	Vacant and Undeveloped Land	A	63	2.293875	144.51
Western Desert, Natural	Vacant and Undeveloped Land	A	63	3.817612	240.51
Western Desert, Natural	Vacant and Undeveloped Land	A	63	5.923828	373.20
Western Desert, Natural	Vacant and Undeveloped Land	A	63	15.064953	949.09
Western Desert, Natural	Vacant and Undeveloped Land	A	63	2.387698	150.43
Western Desert, Natural	Vacant and Undeveloped Land	A	63	279.201958	17589.72
Western Desert, Natural	Vacant and Undeveloped Land	A	63	34.224175	2156.12
Western Desert, Natural	Vacant and Undeveloped Land	A	63	53.356432	3361.46
Western Desert, Natural	Vacant and Undeveloped Land	A	63	17.740780	1117.67
Western Desert, Natural	Vacant and Undeveloped Land	A	63	4.745290	298.95
Western Desert, Natural	Vacant and Undeveloped Land	A	63	0.006510	0.41
Western Desert, Natural	Vacant and Undeveloped Land	A	63	10.834105	682.55
Western Desert, Natural	Vacant and Undeveloped Land	A	63	3.085402	194.38
Western Desert, Natural	Vacant and Undeveloped Land	A	63	0.157952	9.95
Western Desert, Natural	Vacant and Undeveloped Land	A	63	0.737764	46.48
Western Desert, Natural	Vacant and Undeveloped Land	A	63	5.608728	353.35
Western Desert, Natural	Vacant and Undeveloped Land	A	63	318.782350	20083.29
Western Desert, Natural	Vacant and Undeveloped Land	A	63	1.204489	75.88

Western Desert, Natural	Vacant and Undeveloped Land	A	63	26.903109	1694.90
Western Desert, Natural	Vacant and Undeveloped Land	A	63	38.787767	2443.63
Western Desert, Natural	Vacant and Undeveloped Land	A	63	8.025251	505.59
Western Desert, Natural	Vacant and Undeveloped Land	A	63	77.047693	4854.00
Western Desert, Natural	Vacant and Undeveloped Land	A	63	1.772950	111.70
Western Desert, Natural	Vacant and Undeveloped Land	A	63	20.998103	1322.88
Western Desert, Natural	Vacant and Undeveloped Land	A	63	0.000003	0.00
Western Desert, Natural	Vacant and Undeveloped Land	B	77	1.108614	85.36
Western Desert, Natural	Vacant and Undeveloped Land	B	77	8.990190	692.24
Western Desert, Natural	Vacant and Undeveloped Land	B	77	7.371990	567.64
Western Desert, Natural	Vacant and Undeveloped Land	B	77	35.771448	2754.40
Western Desert, Natural	Vacant and Undeveloped Land	B	77	108.900286	8385.32
Western Desert, Natural	Vacant and Undeveloped Land	B	77	11.879055	914.69
Western Desert, Natural	Vacant and Undeveloped Land	B	77	22.022237	1695.71
Western Desert, Natural	Vacant and Undeveloped Land	B	77	94.328484	7263.29
Western Desert, Natural	Vacant and Undeveloped Land	B	77	80.856565	6225.96
Western Desert, Natural	Vacant and Undeveloped Land	B	77	10.494960	808.11
Western Desert, Natural	Vacant and Undeveloped Land	B	77	13.568752	1044.79
Western Desert, Natural	Vacant and Undeveloped Land	B	77	1.048730	80.75
Western Desert, Natural	Vacant and Undeveloped Land	B	77	9.627324	741.30
Western Desert, Natural	Vacant and Undeveloped Land	B	77	44.990590	3464.28
Western Desert, Natural	Vacant and Undeveloped Land	B	77	10.965652	844.36
Western Desert, Natural	Vacant and Undeveloped Land	B	77	2.678968	206.28
Western Desert, Natural	Vacant and Undeveloped Land	B	77	340.688898	26233.05
Western Desert, Natural	Vacant and Undeveloped Land	B	77	79.236849	6101.24
Western Desert, Natural	Vacant and Undeveloped Land	B	77	141.661326	10907.92
Western Desert, Natural	Vacant and Undeveloped Land	B	77	12.364823	952.09
Western Desert, Natural	Vacant and Undeveloped Land	B	77	46.873173	3609.23
Western Desert, Natural	Vacant and Undeveloped Land	B	77	2.384297	183.59
Western Desert, Natural	Vacant and Undeveloped Land	B	77	24.734873	1904.59
Western Desert, Natural	Vacant and Undeveloped Land	B	77	0.123473	9.51
Western Desert, Natural	Vacant and Undeveloped Land	B	77	1.820712	140.19
Western Desert, Natural	Vacant and Undeveloped Land	B	77	35.939946	2767.38
Western Desert, Natural	Vacant and Undeveloped Land	B	77	23.647357	1820.85
Western Desert, Natural	Vacant and Undeveloped Land	B	77	2.678245	206.22
Western Desert, Natural	Vacant and Undeveloped Land	B	77	9.960007	766.92
Western Desert, Natural	Vacant and Undeveloped Land	B	77	2.173552	167.36
Western Desert, Natural	Vacant and Undeveloped Land	B	77	13.335969	1026.87
Western Desert, Natural	Vacant and Undeveloped Land	B	77	59.847524	4608.26
Western Desert, Natural	Vacant and Undeveloped Land	B	77	0.000003	0.00
Western Desert, Natural	Vacant and Undeveloped Land	C	85	46.923199	3988.47
Western Desert, Natural	Vacant and Undeveloped Land	C	85	13.504982	1147.92
Western Desert, Natural	Vacant and Undeveloped Land	C	85	3.077603	261.60
Western Desert, Natural	Vacant and Undeveloped Land	C	85	38.971367	3312.57
Western Desert, Natural	Vacant and Undeveloped Land	C	85	12.998674	1104.89
Western Desert, Natural	Vacant and Undeveloped Land	C	85	5.394772	458.56
Western Desert, Natural	Vacant and Undeveloped Land	C	85	18.831352	1600.66
Western Desert, Natural	Vacant and Undeveloped Land	C	85	12.576823	1069.03
Western Desert, Natural	Vacant and Undeveloped Land	C	85	36.741342	3123.01
Western Desert, Natural	Vacant and Undeveloped Land	C	85	82.902664	7046.73
Western Desert, Natural	Vacant and Undeveloped Land	C	85	59.688060	5073.49
Western Desert, Natural	Vacant and Undeveloped Land	C	85	107.820685	9164.76
Western Desert, Natural	Vacant and Undeveloped Land	C	85	40.409872	3434.84
Western Desert, Natural	Vacant and Undeveloped Land	D	88	24.506570	2156.58
Western Desert, Natural	Vacant and Undeveloped Land	D	88	8.625433	759.04
Western Desert, Natural	Vacant and Undeveloped Land	D	88	6.647990	585.02
Western Desert, Natural	Vacant and Undeveloped Land	D	88	5.133793	451.77
Western Desert, Natural	Vacant and Undeveloped Land	D	88	2.770225	243.78
Western Desert, Natural	Vacant and Undeveloped Land	D	88	5.546367	488.08

Sum	**19,456.7**	**1,153,987.3**
Average CN for PZN = 2.0		**59**
Project Watershed PZN		**3.5**
Per Table 4-6, "Greater than or equal to a 35-year return period": Adjusted PZN		**2.5**
Per Table 4-10: Adjusted CN		**68.2**

PZN	CN	
2	59	Calculated above
2.5	?	*
3	77	Table 4-10 (County Hydrology Manual)
2.5 =	68.15530461	*

Rugged Solar
MBI JN: 173007
September 2019

WATERSHED LAG: REFERENCES

T_c = Concentration Time (Hours)

From San Diego County Hydrology Manual, Figure 3-4 (page 3-16)

$$T_c = (\frac{11.9*L^3}{\Delta E})^{0.385}$$

Where:

L = Watercourse distance (miles)

ΔE = Change in elevation along effective slope line (feet)

Tl = Corps Lag for San Diego Unit Hydrology Program

$$\text{Corps } T_l = 0.8\ T_c$$

Watershed Lag: T_p = Time to Peak (Minutes)

From San Diego County Hydrology Manual, Eq. 4-22 (page 4-36)

$$T_p = 0.67 * T_c$$

Rugged Solar
MBI JN: 173007
September 2019

WATERSHED: Unamed tributary to Salton Sea

T_c = Concentration Time (Hours)

L =	49,856	feet
	9.44	miles
ΔE =	2,000	feet
T_c =	1.86	hours
	111.57	minutes

Tl = Corps Lag for San Diego Unit Hydrology Program

T_c =	1.86	hours
Tl =	1.49	hours

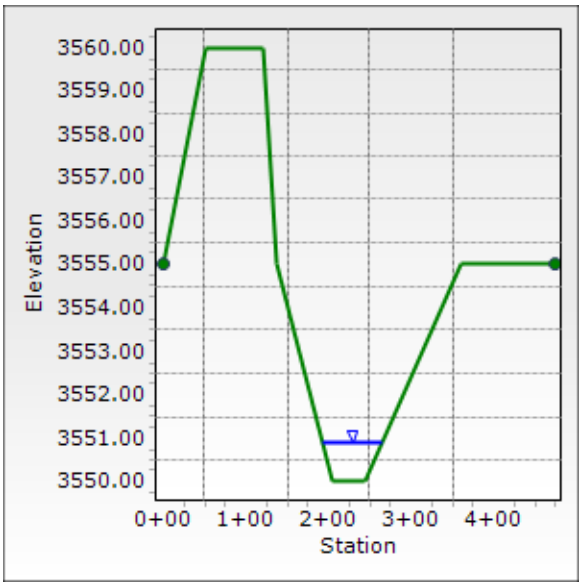
```
*************************************************************************
* The San Diego Unit Hydrograph (SDUH) Peak Discharge Program uses the  *
* procedures described in Section 4 of the San Diego County Hydrology   *
* Manual for NRCS Hydrologic Method calculations.  The SDUH Peak Discharge *
* Program may be used only for determination of peak flow rate, and may not *
* be used for detention basin design or other routing purposes for which a *
* hydrograph is required.  To generate a hydrograph, the calculation method *
* described in Section 4 of the San Diego County Hydrology Manual may be *
* used, or a computer program that includes good documentation of the    *
* calculations (see Section 1.7 of the San Diego County Hydrology manual). *
* Note: the RATHYDRO computer program is not based on the calculation method *
* described in Section 4 of the San Diego County Hydrology Manual and may *
* not be used to generate a hydrograph based on the SDUH Peak Discharge *
* Program output.                                                       *
*************************************************************************

 Project Identification: Rugged Solar
 Storm Frequency (years) =  100
 Drainage Area (square miles) =   30.400
 6-Hour Rainfall (inches) =     3.10
 6-Hour Depth-Area Factor =    0.950
 24-Hour Rainfall (inches) =     5.20
 24-Hour Depth-Area Factor =    0.964
 Adjusted Curve Number = 68
 Unit Interval (minutes) = 30
 Watershed Lag Time (hours) =    1.488
 Peak Flow Rate (cfs) =     9720.2
```

Cross Section for X SEC-A1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010 ft/ft
Normal Depth	11.1 in
Discharge	207.00 cfs



Worksheet for X SEC-A1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.010	ft/ft
Discharge	207.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,555.00
0+52	3,560.00
1+20	3,560.00
1+37	3,555.00
2+05	3,550.00
2+45	3,550.00
3+60	3,555.00
4+75	3,555.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,555.00)	(4+75, 3,555.00)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	11.1	in
Elevation Range	3,550.0 to 3,560.0	ft
Flow Area	52.6	ft²
Wetted Perimeter	73.9	ft
Hydraulic Radius	8.5	in
Top Width	73.85	ft
Normal Depth	11.1	in
Critical Depth	9.9	in
Critical Slope	0.015	ft/ft
Velocity	3.93	ft/s
Velocity Head	0.24	ft
Specific Energy	1.17	ft
Froude Number	0.821	

Worksheet for X SEC-A1

Results	
Flow Type	Subcritical

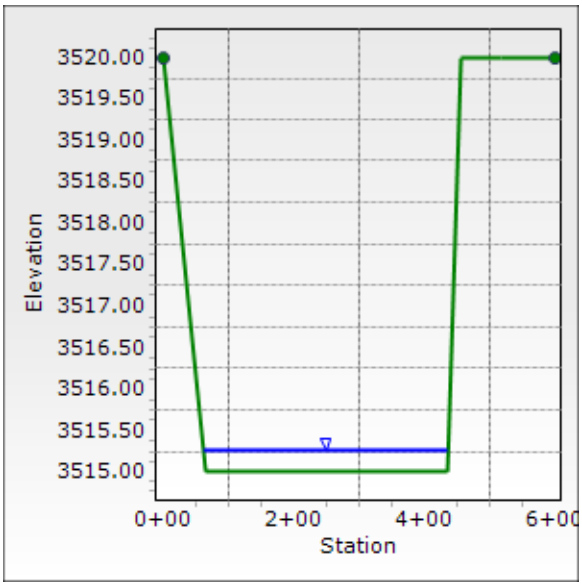
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.1 in
Critical Depth	9.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.015 ft/ft

Cross Section for X SEC-A2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010 ft/ft
Normal Depth	3.2 in
Discharge	207.00 cfs



Worksheet for X SEC-A2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.010	ft/ft
Discharge	207.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,520.00
0+65	3,515.00
4+35	3,515.00
4+55	3,520.00
5+17	3,520.00
5+99	3,520.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,520.00)	(5+99, 3,520.00)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	3.2	in
Elevation Range	3,515.0 to 3,520.0	ft
Flow Area	100.8	ft²
Wetted Perimeter	374.6	ft
Hydraulic Radius	3.2	in
Top Width	374.60	ft
Normal Depth	3.2	in
Critical Depth	2.6	in
Critical Slope	0.022	ft/ft
Velocity	2.05	ft/s
Velocity Head	0.07	ft
Specific Energy	0.34	ft
Froude Number	0.698	
Flow Type	Subcritical	

Worksheet for X SEC-A2

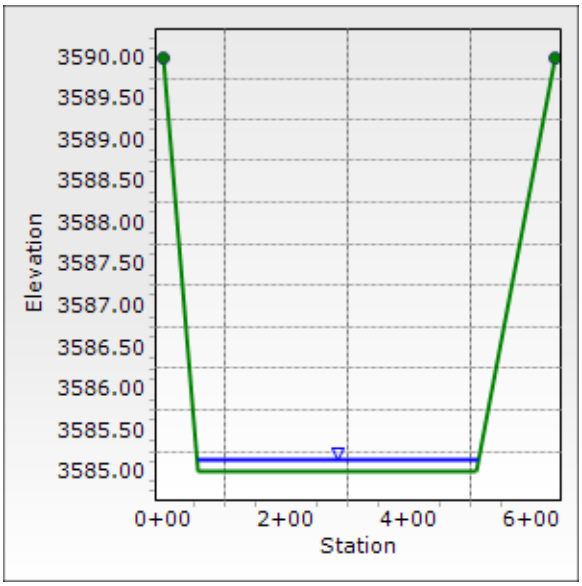
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.2 in
Critical Depth	2.6 in
Channel Slope	0.010 ft/ft
Critical Slope	0.022 ft/ft

Cross Section for X-SEC-E1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 ft/ft
Normal Depth	1.7 in
Discharge	102.00 cfs



X-SEC-E1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 ft/ft
Discharge	102.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,590.00
0+57	3,585.00
5+11	3,585.00
6+38	3,590.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,590.00)	(6+38, 3,590.00)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	1.7 in
Elevation Range	3,585.0 to 3,590.0 ft
Flow Area	63.1 ft²
Wetted Perimeter	459.1 ft
Hydraulic Radius	1.6 in
Top Width	459.09 ft
Normal Depth	1.7 in
Critical Depth	1.4 in
Critical Slope	0.027 ft/ft
Velocity	1.62 ft/s
Velocity Head	0.04 ft
Specific Energy	0.18 ft
Froude Number	0.768
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in

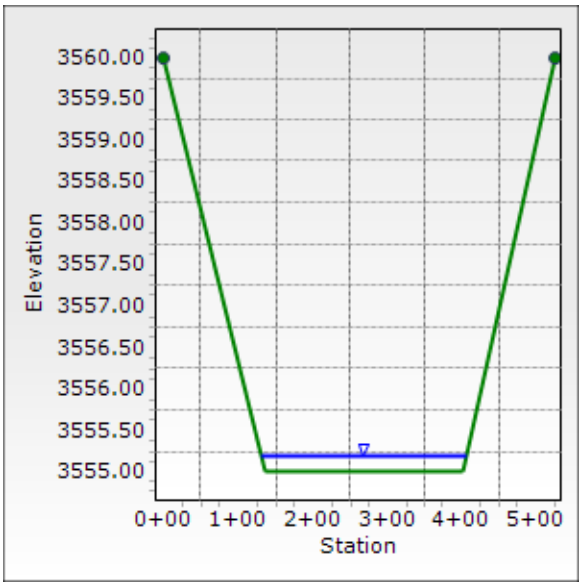
GVF Input Data	
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.7 in
Critical Depth	1.4 in
Channel Slope	0.015 ft/ft
Critical Slope	0.027 ft/ft

Cross Section for X-SEC-E2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 ft/ft
Normal Depth	2.3 in
Discharge	102.00 cfs



X-SEC-E2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 ft/ft
Discharge	102.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,560.00
1+37	3,555.00
4+01	3,555.00
5+25	3,560.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,560.00)	(5+25, 3,560.00)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	2.3 in
Elevation Range	3,555.0 to 3,560.0 ft
Flow Area	51.4 ft²
Wetted Perimeter	274.0 ft
Hydraulic Radius	2.2 in
Top Width	273.97 ft
Normal Depth	2.3 in
Critical Depth	2.0 in
Critical Slope	0.024 ft/ft
Velocity	1.99 ft/s
Velocity Head	0.06 ft
Specific Energy	0.25 ft
Froude Number	0.809
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in

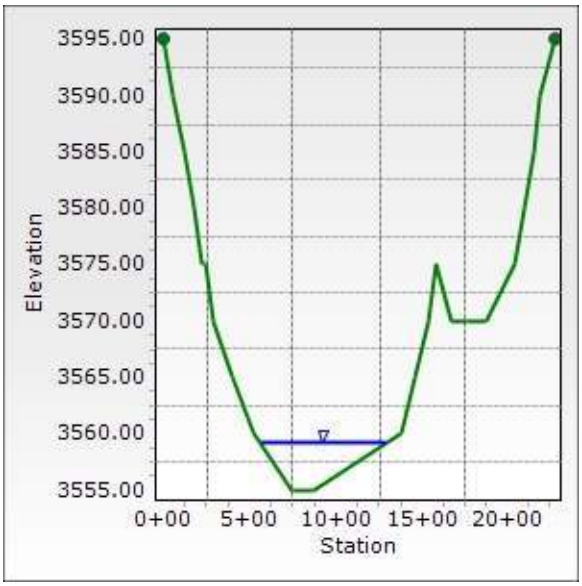
GVF Input Data	
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.3 in
Critical Depth	2.0 in
Channel Slope	0.015 ft/ft
Critical Slope	0.024 ft/ft

Cross Section X SEC-A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010 ft/ft
Normal Depth	50.0 in
Discharge	9,720.20 cfs



X SEC-A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010 ft/ft
Discharge	9,720.20 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,595.00
0+57	3,590.00
1+19	3,585.00
1+81	3,580.00
2+25	3,575.00
2+38	3,575.00
2+42	3,575.00
2+91	3,570.00
3+96	3,565.00
5+28	3,560.00
7+42	3,555.00
7+63	3,555.00
8+65	3,555.00
8+74	3,555.00
13+81	3,560.00
14+65	3,565.00
15+37	3,570.00
15+83	3,575.00
16+70	3,570.00
17+77	3,570.00
18+74	3,570.00
20+39	3,575.00
20+97	3,580.00
21+50	3,585.00
21+82	3,590.00
22+74	3,595.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,595.00)	(22+74, 3,595.00)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

X SEC-A

Options	
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	50.0 in
Elevation Range	3555.00 to 3595.00 ft
Flow Area	1,803.3 ft²
Wetted Perimeter	733.2 ft
Hydraulic Radius	29.5 in
Top Width	733.14 ft
Normal Depth	50.0 in
Critical Depth	39.4 in
Critical Slope	0.029 ft/ft
Velocity	5.39 ft/s
Velocity Head	0.45 ft
Specific Energy	4.62 ft
Froude Number	0.606
Flow Type	Subcritical

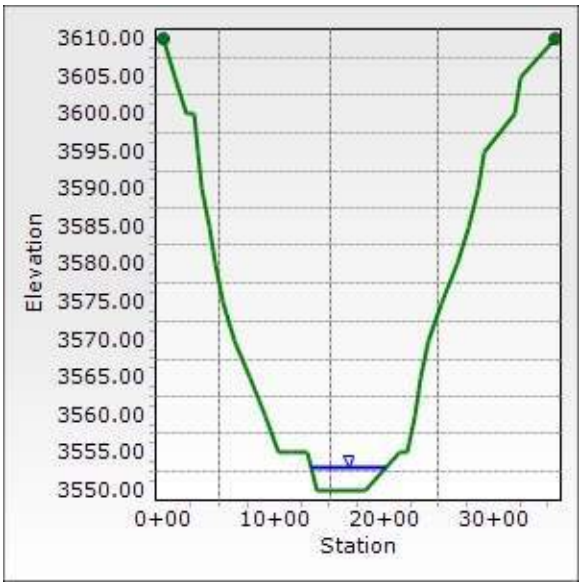
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	50.0 in
Critical Depth	39.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.029 ft/ft

Cross Section X-SEC-B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010 ft/ft
Normal Depth	37.7 in
Discharge	9,720.20 cfs



X-SEC-B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.010 ft/ft
Discharge	9,720.20 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,610.00
0+97	3,605.00
2+10	3,600.00
2+30	3,600.00
2+71	3,600.00
3+05	3,595.00
3+52	3,590.00
4+11	3,585.00
4+69	3,580.00
5+37	3,575.00
6+46	3,570.00
7+81	3,565.00
9+15	3,560.00
10+46	3,555.00
11+60	3,555.00
13+09	3,555.00
13+98	3,550.00
18+28	3,550.00
21+38	3,555.00
22+13	3,555.00
22+83	3,560.00
23+39	3,565.00
23+98	3,570.00
25+17	3,575.00
26+54	3,580.00
27+74	3,585.00
28+44	3,590.00
29+09	3,595.00
31+78	3,600.00
32+37	3,605.00
35+48	3,610.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,610.00)	(35+48, 3,610.00)	0.050

X-SEC-B

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	37.7 in
Elevation Range	3550.00 to 3610.00 ft
Flow Area	1,746.1 ft²
Wetted Perimeter	681.0 ft
Hydraulic Radius	30.8 in
Top Width	680.86 ft
Normal Depth	37.7 in
Critical Depth	28.0 in
Critical Slope	0.029 ft/ft
Velocity	5.57 ft/s
Velocity Head	0.48 ft
Specific Energy	3.63 ft
Froude Number	0.613
Flow Type	Subcritical

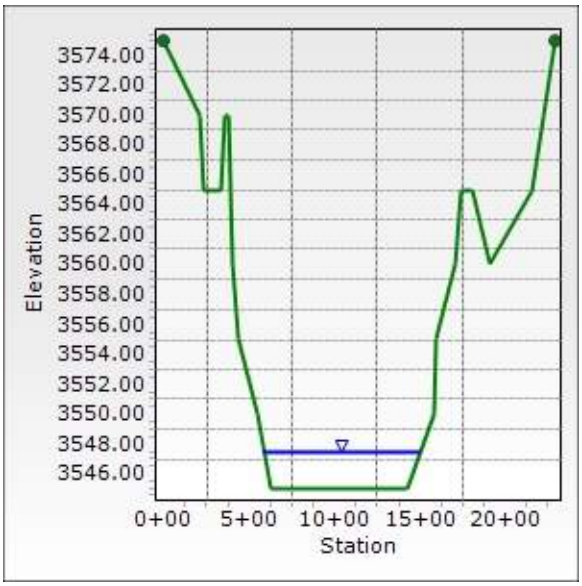
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	37.7 in
Critical Depth	28.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.029 ft/ft

Cross Section X-SEC-C

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.008 ft/ft
Normal Depth	29.2 in
Discharge	9,720.20 cfs



X-SEC-C

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.008 ft/ft
Discharge	9,720.20 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,575.00
2+11	3,570.00
2+37	3,565.00
3+39	3,565.00
3+60	3,570.00
3+78	3,570.00
3+92	3,565.00
4+05	3,560.00
4+36	3,555.00
5+46	3,550.00
6+24	3,545.00
14+24	3,545.00
15+77	3,550.00
15+97	3,555.00
17+02	3,560.00
17+37	3,565.00
18+10	3,565.00
19+03	3,560.00
21+50	3,565.00
22+18	3,570.00
22+87	3,575.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,575.00)	(22+87, 3,575.00)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	29.2 in

X-SEC-C

Results	
Elevation Range	3545.00 to 3575.00 ft
Flow Area	2,083.3 ft²
Wetted Perimeter	912.5 ft
Hydraulic Radius	27.4 in
Top Width	912.41 ft
Normal Depth	29.2 in
Critical Depth	19.6 in
Critical Slope	0.031 ft/ft
Velocity	4.67 ft/s
Velocity Head	0.34 ft
Specific Energy	2.77 ft
Froude Number	0.544
Flow Type	Subcritical

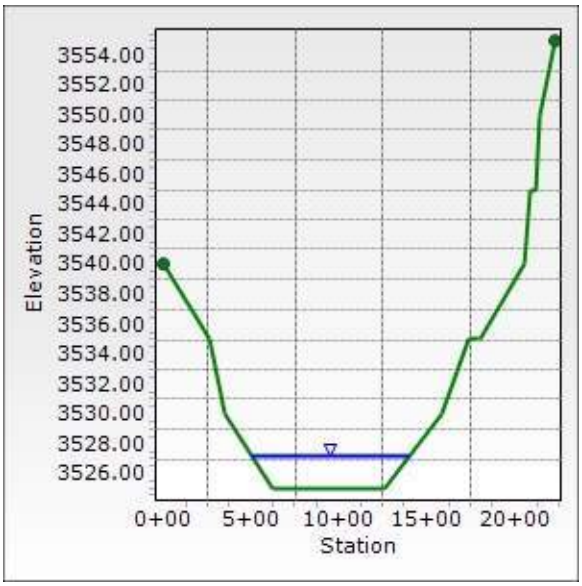
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	29.2 in
Critical Depth	19.6 in
Channel Slope	0.008 ft/ft
Critical Slope	0.031 ft/ft

Cross Section X-SEC-D

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 ft/ft
Normal Depth	26.9 in
Discharge	9,720.20 cfs



X-SEC-D

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 ft/ft
Discharge	9,720.20 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,540.00
2+67	3,535.00
3+52	3,530.00
6+20	3,525.00
12+62	3,525.00
15+81	3,530.00
17+38	3,535.00
17+92	3,535.00
18+10	3,535.00
20+51	3,540.00
20+91	3,545.00
21+21	3,545.00
21+47	3,550.00
22+31	3,555.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,540.00)	(22+31, 3,555.00)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	26.9 in
Elevation Range	3525.00 to 3555.00 ft
Flow Area	1,732.3 ft²
Wetted Perimeter	905.0 ft
Hydraulic Radius	23.0 in
Top Width	904.93 ft
Normal Depth	26.9 in

X-SEC-D

Results	
Critical Depth	21.8 in
Critical Slope	0.031 ft/ft
Velocity	5.61 ft/s
Velocity Head	0.49 ft
Specific Energy	2.73 ft
Froude Number	0.715
Flow Type	Subcritical

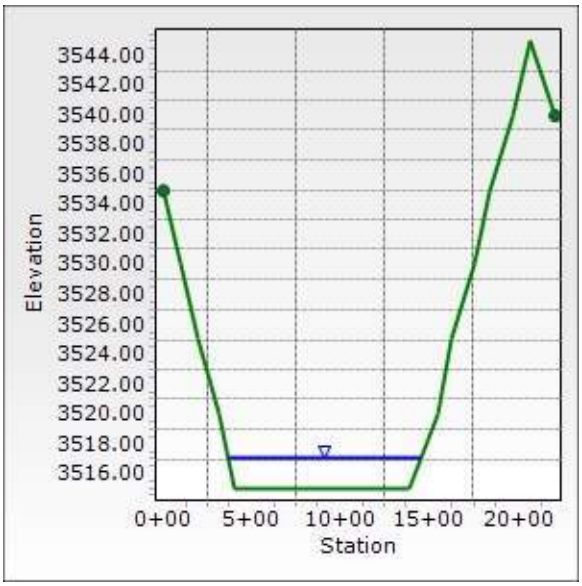
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	26.9 in
Critical Depth	21.8 in
Channel Slope	0.015 ft/ft
Critical Slope	0.031 ft/ft

Cross Section X-SEC-E

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.009 ft/ft
Normal Depth	25.4 in
Discharge	9,720.20 cfs



X-SEC-E

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.009 ft/ft
Discharge	9,720.20 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,535.00
0+97	3,530.00
2+00	3,525.00
3+11	3,520.00
4+06	3,515.00
13+82	3,515.00
15+50	3,520.00
16+20	3,525.00
17+54	3,530.00
18+44	3,535.00
19+68	3,540.00
20+66	3,545.00
22+10	3,540.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,535.00)	(22+10, 3,540.00)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	25.4 in
Elevation Range	3515.00 to 3545.00 ft
Flow Area	2,180.2 ft²
Wetted Perimeter	1,087.3 ft
Hydraulic Radius	24.1 in
Top Width	1,087.17 ft
Normal Depth	25.4 in
Critical Depth	17.2 in

X-SEC-E

Results	
Critical Slope	0.033 ft/ft
Velocity	4.46 ft/s
Velocity Head	0.31 ft
Specific Energy	2.42 ft
Froude Number	0.555
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	25.4 in
Critical Depth	17.2 in
Channel Slope	0.009 ft/ft
Critical Slope	0.033 ft/ft

X-Sec F

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 ft/ft
Discharge	2,015.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,590.00
0+89	3,585.00
1+95	3,580.00
4+10	3,575.00
7+99	3,570.00
10+67	3,570.00
11+83	3,575.00
12+97	3,580.00
13+69	3,585.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,590.00)	(13+69, 3,585.00)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	17.3 in
Elevation Range	3570.00 to 3590.00 ft
Flow Area	492.8 ft²
Wetted Perimeter	414.0 ft
Hydraulic Radius	14.3 in
Top Width	413.98 ft
Normal Depth	17.3 in
Critical Depth	13.4 in
Critical Slope	0.037 ft/ft
Velocity	4.09 ft/s
Velocity Head	0.26 ft
Specific Energy	1.71 ft

X-Sec F

Results	
Froude Number	0.661
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	17.3 in
Critical Depth	13.4 in
Channel Slope	0.015 ft/ft
Critical Slope	0.037 ft/ft

X-Sec G

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 ft/ft
Discharge	2,015.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	3,555.00
0+63	3,550.00
1+12	3,545.00
2+08	3,540.00
7+07	3,540.00
7+72	3,545.00
8+16	3,550.00
8+59	3,547.00
8+85	3,550.00
9+42	3,555.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3,555.00)	(9+42, 3,555.00)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	12.7 in
Elevation Range	3540.00 to 3555.00 ft
Flow Area	545.4 ft²
Wetted Perimeter	533.1 ft
Hydraulic Radius	12.3 in
Top Width	533.03 ft
Normal Depth	12.7 in
Critical Depth	9.5 in
Critical Slope	0.040 ft/ft
Velocity	3.69 ft/s
Velocity Head	0.21 ft

X-Sec G

Results	
Specific Energy	1.27 ft
Froude Number	0.644
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

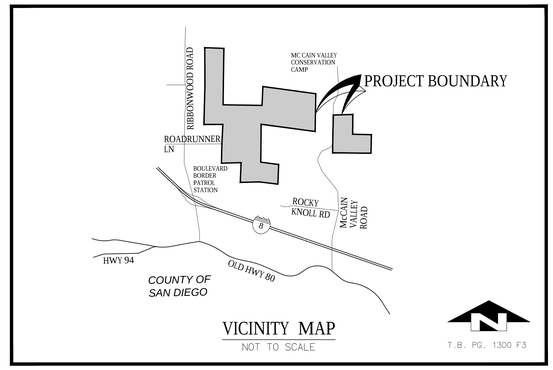
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.7 in
Critical Depth	9.5 in
Channel Slope	0.015 ft/ft
Critical Slope	0.040 ft/ft

Michael Baker
INTERNATIONAL

Appendix E – Grading Plan

RUGGED SOLAR

COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE



VICINITY MAP
NOT TO SCALE

T.B. PG. 1300 F3

GENERAL NOTES

1. APPROVAL OF THIS MODIFICATION TO EXISTING MAJOR USE PERMIT MUP 3300-12-007, AUTHORIZES THE FOLLOWING: THE CONSTRUCTION, OPERATION AND MAINTENANCE OF A SOLAR PHOTOVOLTAIC FACILITY ALLOWED UNDER SECTION 6950 OF THE ZONING ORDINANCE, COUNTY OF SAN DIEGO.

2. THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON AND AGREES TO OBTAIN VALID GRADING PERMISSION BEFORE COMMENCING SUCH ACTIVITY.

3. ASSOCIATED REQUESTS: NONE

4. GENERAL PLAN REGIONAL CATEGORY: RURAL LANDS

5. LAND USE DESIGNATION: RURAL LANDS (RL-80)

6. EXISTING ZONING:
   APN 611-100-07 S92/A72
   APN 611-110-01 GENERAL AGRICULTURE (A72)
   ALL REMAINING APN's GENERAL RURAL (S92)

7. PROJECT AREA: 765 ACRES

8. MAJOR USE PERMIT AREA: 765 ACRES

9. SOLAR DEVELOPMENT AREA: 393.3 ACRES

10. THIS PROJECT MAY BE IMPLEMENTED IN MULTIPLE PHASES WITHOUT REGARD TO IMPLIED SEQUENCING.

11. SOLAR RELATED FACILITIES SUCH AS PHOTOVOLTAIC PANELS, ARRAY RACKS, ELECTRICAL CONNECTIONS, INVERTERS, TRANSFORMERS, O&M BUILDINGS, CONTROL ROOMS, EMERGENCY GENERATORS, SUBSTATION, SWITCHGEAR YARD, FENCING, AND INTERNAL ACCESS, SHOWN ON THE PLOT PLAN MAY BE RELOCATED, RECONFIGURED, AND/OR RESIZED WITHIN THE SOLAR FACILITY DEVELOPMENT AREA, (EXCLUSIVE OF OPEN SPACE AREAS) WITH THE ADMINISTRATIVE APPROVAL OF THE DIRECTOR OF PDS WHEN FOUND IN CONFORMANCE WITH THE INTENT AND CONDITIONS OF THE PERMIT'S APPROVAL. THE LOCATION OF TRANSFORMERS, INVERTERS AND GENERATORS MAY BE RELOCATED/RECONFIGURED WITHOUT THE REQUIREMENT OF A MINOR DEVIATION PERMIT. THE LOCATIONS OF TRANSFORMERS, INVERTERS AND GENERATORS MUST COMPLY WITH THE COUNTY'S NOISE ORDINANCE AND MUST BE ELEVATED TO 1 FT. ABOVE THE BASE FLOOD ELEVATION.

12. NO DEVELOPMENT WILL OCCUR IN AREAS IDENTIFIED ON THE PLOT PLAN AS "OPEN SPACE".

13. ENTRANCE TO EACH SITE ACCESS GATE WILL BE FROM AN IMPROVED DRIVEWAY DESIGNED IN ACCORDANCE WITH RSD G-14E.

14. A SYSTEM IDENTIFICATION SIGN SHALL BE LOCATED AT GATED ENTRANCES. SIGN SHALL BE 12"X18". SIGN SHALL LIST NAME OF SITE AND CONTACT INFORMATION AS PROVIDED BY SDGE.

15. ALL SITE ACCESS GATES ARE TO BE EQUIPPED WITH FIRE AUTHORITY APPROVED STROBE LIGHT ACTIVATION AND KNOX KEY-OPERATED SWITCH.

16. PRIVATE PROPERTY/NO TRESPASSING AND HIGH VOLTAGE SIGNS SHALL BE LOCATED AT GATED ENTRANCES AND AT 100' INTERVALS ALONG FENCING, THE SIGN SHALL BE 10"X14". MISC. INTERIOR DIRECTIONAL AND SAFETY SIGNAGE ARE PERMITTED.

17. THE 24' PERIMETER FIRE ACCESS ROAD WIDTHS MAYBE REDUCED ADMINISTRATELY WITH THE APPROVAL OF THE COUNTY AND FIRE AUTHORITY HAVING JURISDICTION.

18. MAX. GRADIENT OF ALL ACCESS ROADS NOT TO EXCEED 10%.

19. TURNAROUND SHALL BE DESIGNED IN ACCORDANCE WITH COUNTY OF SAN DIEGO DESIGN STANDARD DS-06 FOR A COUNTY EMERGENCY FIRE APPARATUS.

20. 3-FT. WIDE PED-GATES WILL BE LOCATED ALONG THE LENGTH OF THE PERIMETER FENCING AT AN INTERVAL NOT TO EXCEED 800 FEET. GATES SHALL BE PADLOCKED WITH A CHAIN AND FIRE KEY.

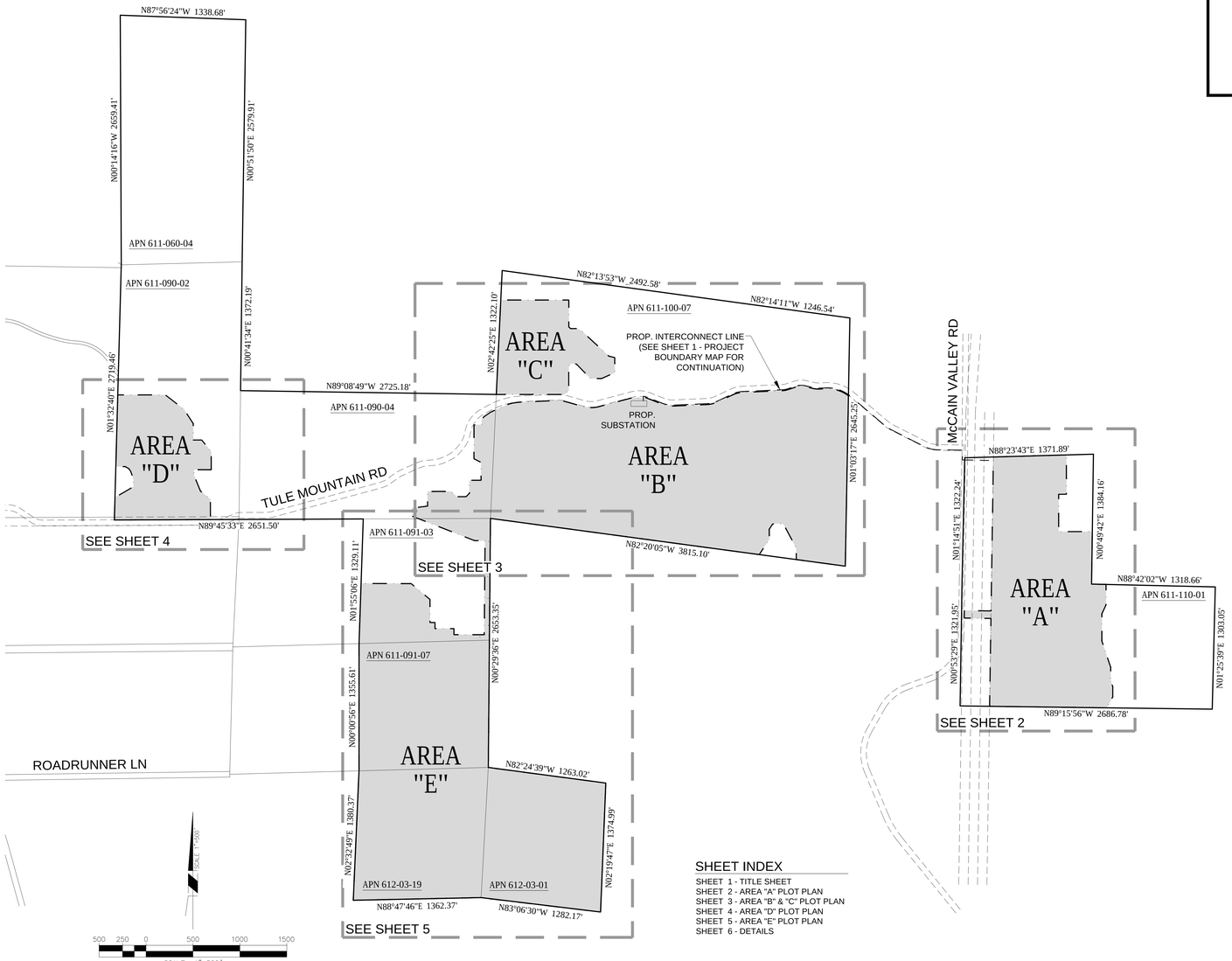
21. LIGHTING FOR MAINTENANCE AND SECURITY PURPOSES ONLY. OUTDOOR LIGHTING CIRCUITS SHALL INCORPORATE DUSK-TO-DAWN PHOTOCELL CONTROLLERS, OCCUPANCY SENSORS, AND/OR SWITCHES AS APPROPRIATE. SHIELDED LIGHTING LOCATED AT GATES AND SUBSTATION/O&M BUILDING SHALL CONFORM TO COUNTY OF SAN DIEGO OUTDOOR LIGHTING REQUIREMENTS.

22. SEE PRELIMINARY GRADING PLAN FOR PROPOSED GRADING.

23. A PORTION OF THE SITE IS SUBJECT TO INUNDATION BY THE 100-YEAR FLOOD. LIMITS OF THE 100-YEAR INUNDATION ARE SHOWN ON THE PLOT PLAN.

24. PROPOSED LANDSCAPE SCREENING ARE SHOWN ON THE PLOT PLAN WHERE REQUIRED.

25. All BUILDINGS ARE TO BE CONSTRUCTED OF NON-COMBUSTIBLE MATERIALS SUCH AS CONCRETE, METAL OR EQUIVALENT. EXTERIOR BUILDING COLOR SHALL BE OF EARTHTONE COLORS.



PROJECT BOUNDARY / SHEET INDEX MAP
SCALE: 1"=500'

SHEET INDEX

PARCEL ZONING SETBACK SCHEDULE

APN	SETBACK SCHEDULE DESIGNATION
611-100-07	C/D
611-060-04	D
611-090-02	D
611-090-04	D
611-091-03	D
611-091-07 POR.	D
611-110-01	C
612-030-01	D
612-030-19	D

SETBACKS

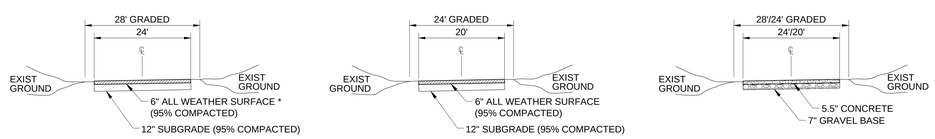
SETBACK	
FRONT YARD SETBACK (FROM C/L)	60'
EXTERIOR SIDE YARD	35'
INTERIOR SIDE YARD	15'
REAR YARD SETBACK	25'

APPLICANT

RUGGED SOLAR, LLC
150 MATHILDA PLACE
SUITE #106
SUNNYVALE, CA 94086
CONTACT: JIM WHALEN
(619) 683-5544

PLANNER/ENGINEER

MICHAEL BAKER
INTERNATIONAL
STEVE WRAGG
9755 CLAIREMONT MESA BLVD.
SAN DIEGO, CA. 92124
(858) 614-5000



TYPICAL SECTION
24' FIRE ACCESS ROAD
NOT TO SCALE
* ALL WEATHER 75,000 lbs. LOAD CAPACITY

TYPICAL SECTION
20' ACCESS ROAD
NOT TO SCALE

TYPICAL SECTION
CONCRETE ACCESS ROAD
NOT TO SCALE
WITHIN 100-YR LIMITS OF INUNDATION

NOTE: STRUCTURAL SECTIONS AS SHOWN ARE FOR PLANNING PURPOSES ONLY. GEOTECHNICAL ENGINEER TO PROVIDE CONSTRUCTION SPECIFICATIONS AT FINAL DESIGN.

RUGGED SOLAR
COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE
TITLE SHEET

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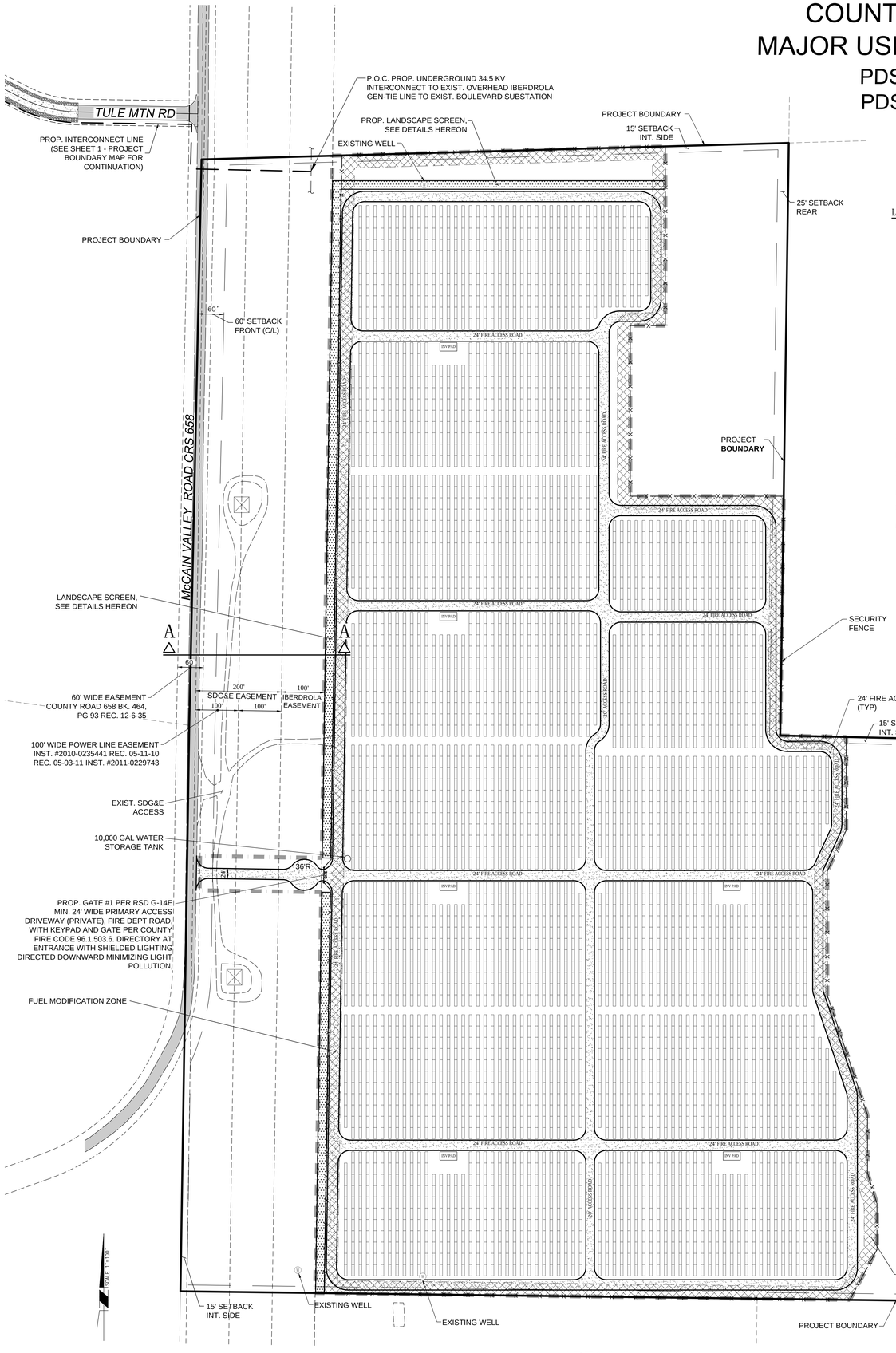
RUGGED SOLAR

COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE

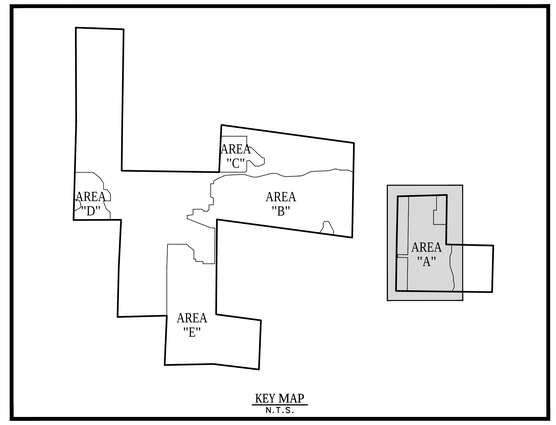


100 50 0 100 200 300
SCALE: 1"=100'

AREA "A"

LEGEND:

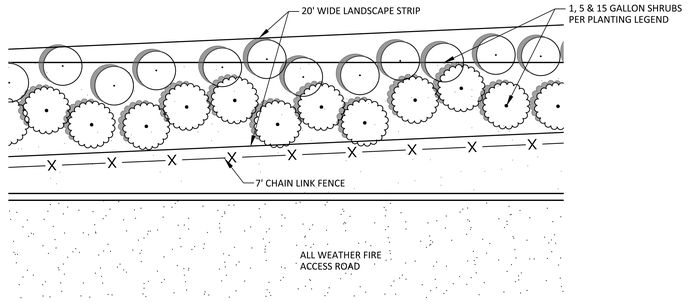
PROJECT BOUNDARY / MUP	
APN PARCEL	
EX. EASEMENT	
SETBACK LINE	
PROP. LIMITS OF DEVELOPMENT	
PROP. GATE	GATE
PROP. ALL WEATHER SURFACE (SEE DETAIL ON SHEET 1)	
PROP. CONCRETE SURFACE (SEE DETAIL ON SHEET 1)	
PROP. SECURITY FENCE	X X
PROP. 20' LANDSCAPE STRIP	
PROP. 30' FUEL MODIFICATION ZONE	
EXIST. PAVEMENT	
EXIST. CONCRETE	
EXIST. RIP-RAP	
PROP. INVERTER PAD	INV PAD
PROP. SOLAR PANEL ROW	
PROP. INTERCONNECT TO GEN-TIE LINE	
EXISTING WATER WELL	W



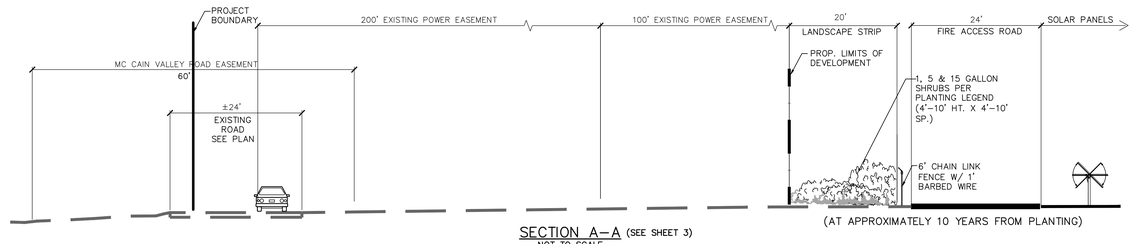
KEY MAP
N.T.S.

PLANT LEGEND

SHRUBS	BOTANICAL NAME / COMMON NAME	SIZE	SPACING	WATER USE
	QUERCUS BERBERIDIFOLIA / SCRUB OAK	1 & 5 GALLON	VARIES 15'–20'	L
	HETEROMELES ARBUTIFOLIA / TOYON	5 & 15 GALLON	VARIES 6'–10'	L

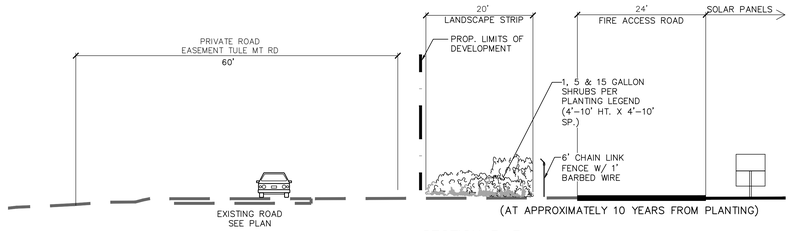


ENLARGEMENT TYPICAL
NOT TO SCALE



SECTION A–A (SEE SHEET 3)
NOT TO SCALE

(AT APPROXIMATELY 10 YEARS FROM PLANTING)



SECTION B–B (SEE SHEET 2)
NOT TO SCALE

(AT APPROXIMATELY 10 YEARS FROM PLANTING)

RUGGED SOLAR
COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE
AREA "A" PLOT PLAN

OCTOBER 8, 2019

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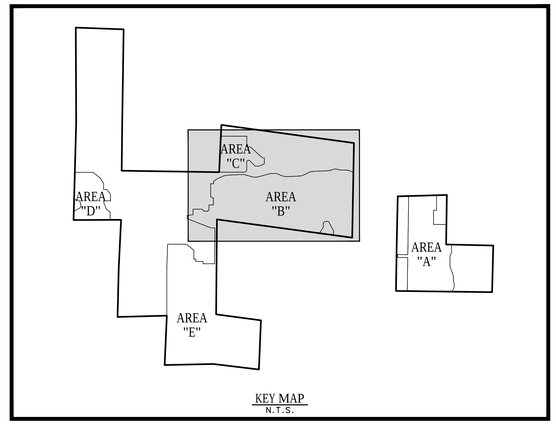
RUGGED SOLAR

COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE

LEGEND:

- PROJECT BOUNDARY / MUP
- APN PARCEL
- EX. EASEMENT
- SETBACK LINE
- PROP. LIMITS OF DEVELOPMENT
- PROP. GATE
- PROP. ALL WEATHER SURFACE (SEE DETAIL ON SHEET 1)
- PROP. CONCRETE SURFACE (SEE DETAIL ON SHEET 1)
- PROP. SECURITY FENCE
- PROP. 20' LANDSCAPE STRIP
- PROP. 30' FUEL MODIFICATION ZONE
- EXIST. PAVEMENT
- EXIST. CONCRETE
- EXIST. RIP-RAP
- PROP. INVERTER PAD
- PROP. SOLAR PANEL ROW
- 100-YR LIMITS OF INUNDATION
- PROP. INTERCONNECT TO GEN-TIE LINE
- OAKS W/ 50' RPO BUFFER



KEY MAP
N.T.S.

15' SETBACK INT. SIDE
FUEL MODIFICATION ZONE
PROJECT BOUNDARY AND SECURITY FENCE
25' SETBACK REAR
INVERTER PAD (TYP.)
PROP. GATE #3 PER RSD G-14E MIN. 24' WIDE PRIMARY ACCESS DRIVEWAY (PRIVATE), FIRE DEPT ROAD, WITH KEYPAD AND GATE PER COUNTY FIRE CODE 96.1.503.6. DIRECTORY AT ENTRANCE WITH SHIELDED LIGHTING DIRECTED DOWNWARD MINIMIZING LIGHT POLLUTION,
60' SETBACK FRONT (C/L)
20,000 GAL WATER STORAGE TANK
PROP. UNDERGROUND 34.5 KV INTERCONNECT TO EXIST. IBERDROLA GEN-TIE LINE TO EXIST. BOULEVARD SUBSTATION (SEE SHEET 1 - PROJECT BOUNDARY MAP FOR CONTINUATION)
SECURITY FENCE
EXIST. 60' WIDE ACCESS EASEMENT
LANDSCAPE SCREEN SEE SHEET 2 FOR DETAILS
PROP. GATE #2 PER RSD G-14E MIN. 24' WIDE PRIMARY ACCESS DRIVEWAY (PRIVATE), FIRE DEPT ROAD, WITH KEYPAD AND GATE PER COUNTY FIRE CODE 96.1.503.6. DIRECTORY AT ENTRANCE WITH SHIELDED LIGHTING DIRECTED DOWNWARD MINIMIZING LIGHT POLLUTION,
O&M ANNEX SEE SHT 4 FOR DETAILS
TULE MTN RD
SUBSTATION
173'
24' FIRE ACCESS ROAD
20' ACCESS ROAD
INV PAD
MATCHLINE SEE SHEET 4
100-YR LIMITS OF INUNDATION
24' FIRE ACCESS (TYP)
PROJECT BOUNDARY & SECURITY FENCE

AREA "B" & "C"

SCALE: 1"=100'

100 50 0 100 200 300
SCALE: 1"=100'

RUGGED SOLAR
COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE
AREA "B" & "C" PLOT PLAN

SHEET 3 OF 6
OCTOBER 8, 2019

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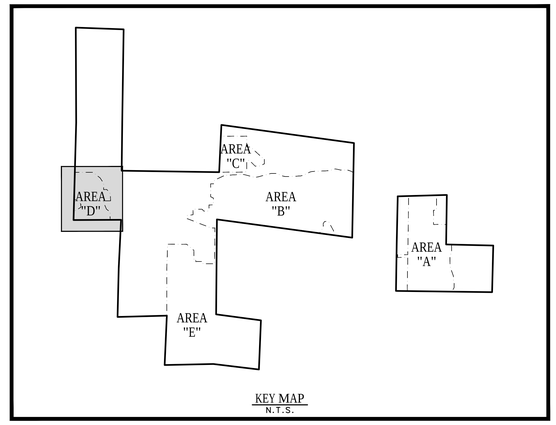
RUGGED SOLAR

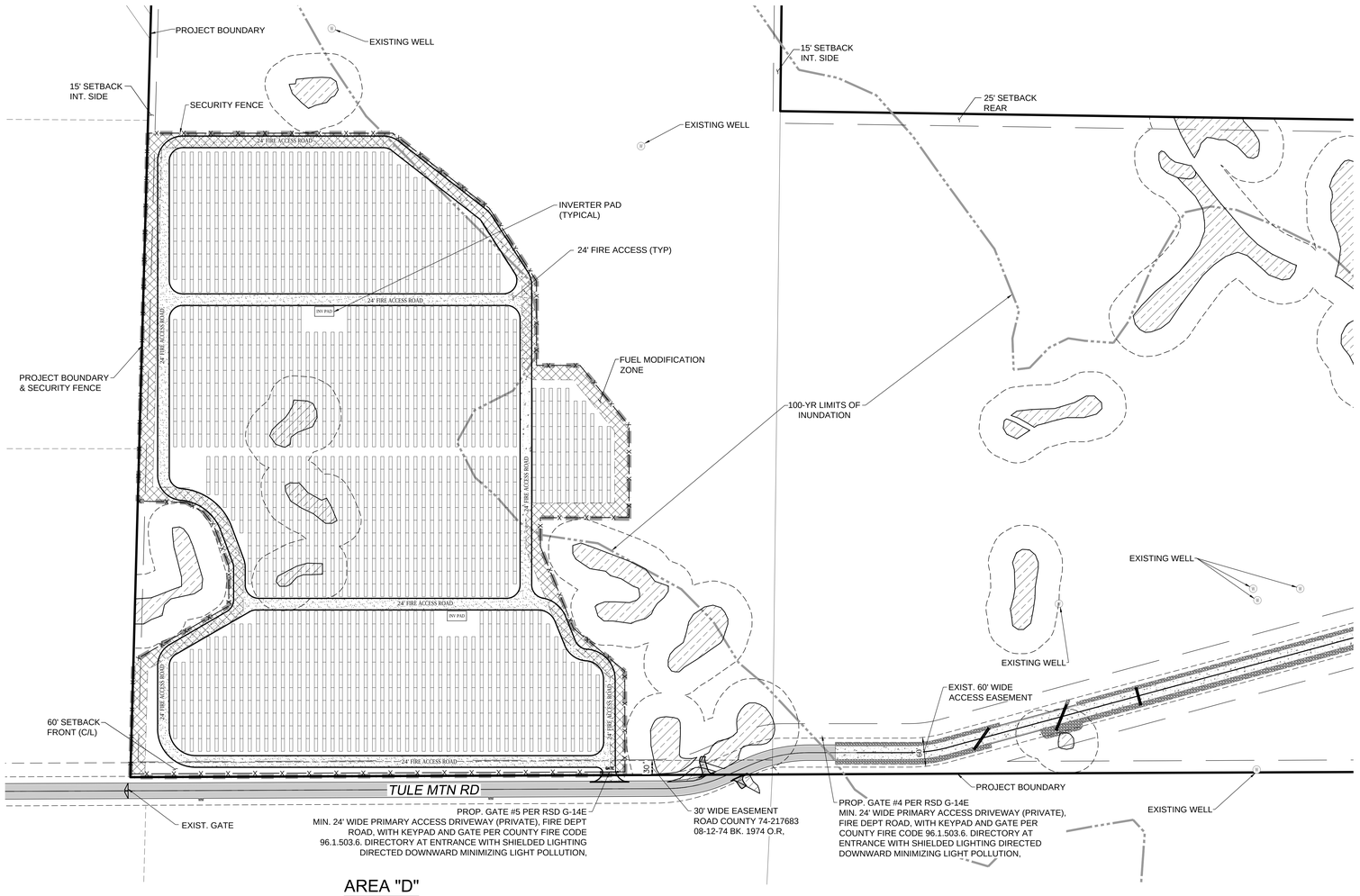
COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE

LEGEND:

- PROJECT BOUNDARY / MUP
- APN PARCEL
- EX. EASEMENT
- SETBACK LINE
- PROP. LIMITS OF DEVELOPMENT
- PROP. GATE
- PROP. ALL WEATHER SURFACE (SEE DETAIL ON SHEET 1)
- PROP. CONCRETE SURFACE (SEE DETAIL ON SHEET 1)
- PROP. SECURITY FENCE
- PROP. 20' LANDSCAPE STRIP
- PROP. 30' FUEL MODIFICATION ZONE
- EXIST. PAVEMENT
- EXIST. CONCRETE
- EXIST. RIP-RAP
- PROP. INVERTER PAD (INV PAD)
- PROP. SOLAR PANEL ROW
- 100-YR LIMITS OF INUNDATION
- PROP. INTERCONNECT TO GEN-TIE LINE
- EXISTING WATER WELL
- OAKS W/ 50' RPO BUFFER



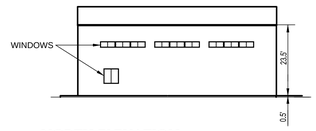
KEY MAP
N.T.S.



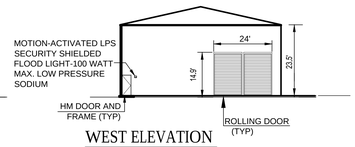
AREA "D"

SCALE 1"=100'

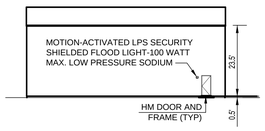
100 50 0 100 200 300
SCALE: 1"=100'



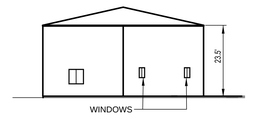
NORTH ELEVATION



WEST ELEVATION

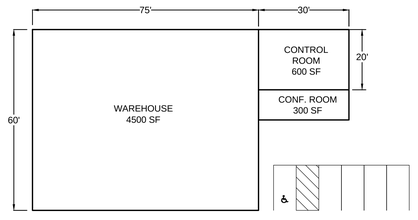


SOUTH ELEVATION



EAST ELEVATION

ELEVATIONS



PLAN VIEW
OPERATION & MAINTENANCE (O&M) ANNEX
N.T.S.

RUGGED SOLAR
COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE

AREA "D" PLOT PLAN

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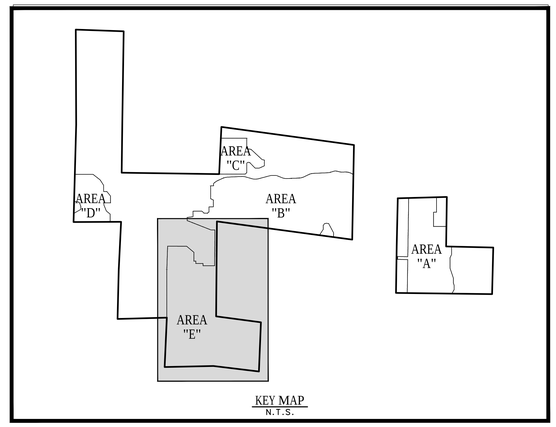
RUGGED SOLAR

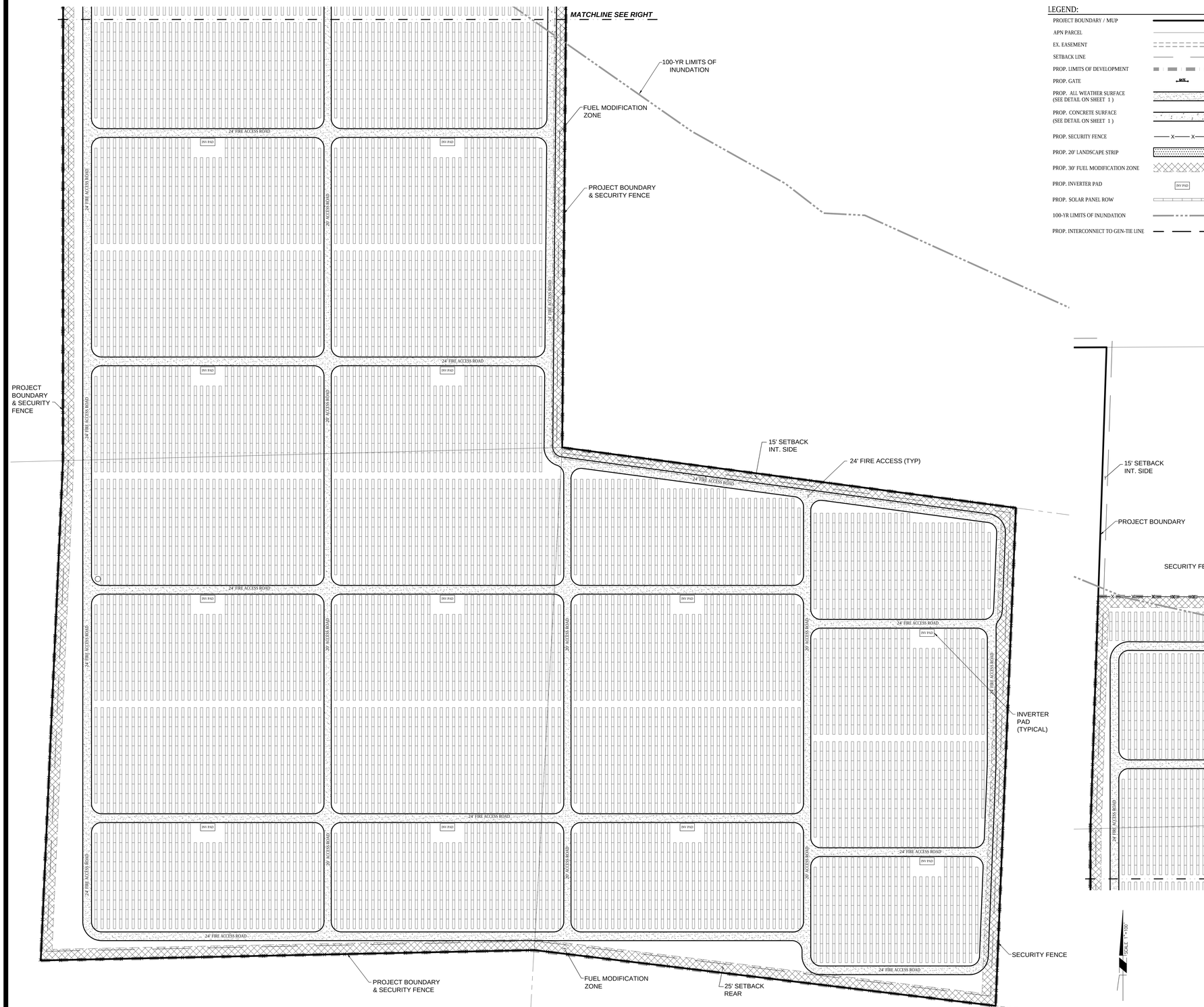
COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE



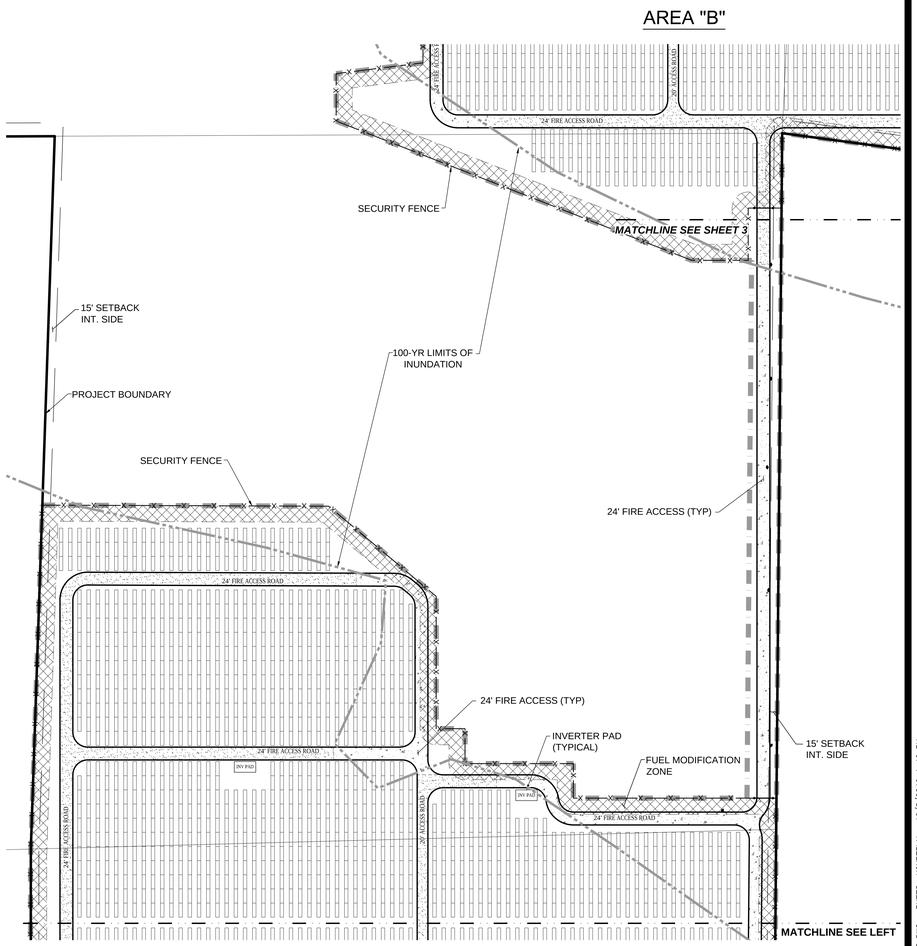
KEY MAP
N.T.S.

LEGEND:

- PROJECT BOUNDARY / MUP
- APN PARCEL
- EX. EASEMENT
- SETBACK LINE
- PROP. LIMITS OF DEVELOPMENT
- PROP. GATE
- PROP. ALL WEATHER SURFACE (SEE DETAIL ON SHEET 1)
- PROP. CONCRETE SURFACE (SEE DETAIL ON SHEET 1)
- PROP. SECURITY FENCE
- PROP. 20' LANDSCAPE STRIP
- PROP. 30' FUEL MODIFICATION ZONE
- PROP. INVERTER PAD
- PROP. SOLAR PANEL ROW
- 100-YR LIMITS OF INUNDATION
- PROP. INTERCONNECT TO GEN-TIE LINE



AREA "E"



SCALE: 1"=100'

100 50 0 100 200 300

SCALE: 1"=100'

RUGGED SOLAR
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MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
PDS 2017-MUP-12-007TE
AREA "E" PLOT PLAN

OCTOBER 8, 2019

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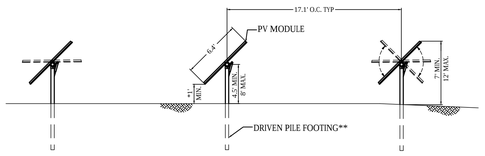


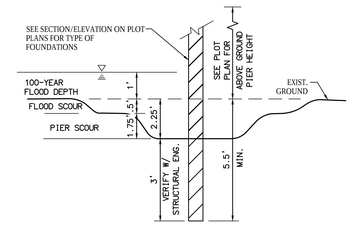
DRIVEN PILE FOOTING

POLE HEIGHTS MAY VARY TO FIT EXISTING TERRAIN

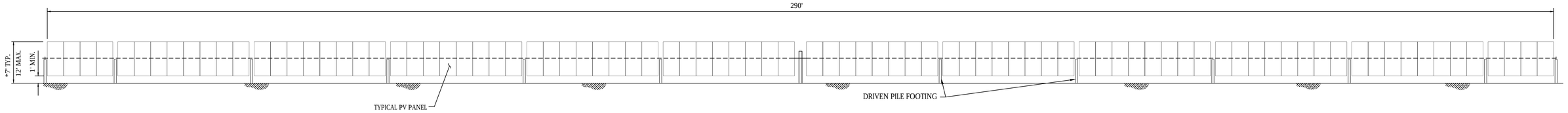
** DEPTH OF FOOTING TO BE DETERMINED BY STRUCTURAL ENGINEER

TRACKER ELEVATION W-E
N.T.S.

* NOTE: BOTTOM OF PANEL TO BE A MIN. 1' ABOVE BASE FLOOD ELEVATION (BFE).



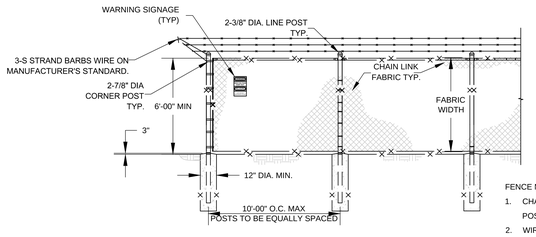
TYPICAL SECTION
PIER FOUNDATION DETAIL
N.T.S.



TRACKER ELEVATION N-S
N.T.S.

- DRIVEN PILE FOOTING MAY BE H-PILES OR PIPE COLUMNS
- DEPTH / TYPE OF FOOTING TO BE DETERMINED BY STRUCTURAL ENGINEER.
- ALL SOLAR PANELS (AT MAXIMUM TILT) SHALL BE ELEVATED SO THAT THE LOWEST HORIZONTAL STRUCTURAL MEMBER IS AT LEAST ONE FOOT ABOVE THE BASE FLOOD ELEVATION (BFE) PER PRELIMINARY DRAINAGE STUDY.

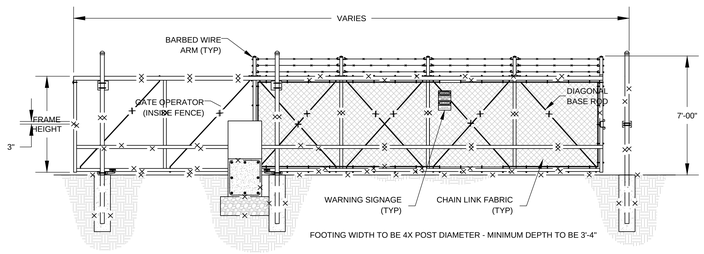
* SOIL UNDER PV ARRAY MAY UNDULATE WHICH MAY RESULT IN A MAXIMUM PANEL HEIGHT OF 12'.



DETAIL-CHAIN LINK FENCE
N.T.S.

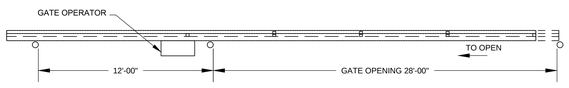
FENCE NOTES:

1. CHAIN LINK FABRIC SHALL BE 2" MESH NO.9 GAGE WERE SECURITY FASTED TO LINE POSTS AND RAILS.WIRE FASTENERS AND THE CLIPS SHALL BE NO.11 GAGE
2. WIRE.CONCRETE FOOTINGS SHALL HAVE TOPS CROWNED AT GROUND LEVEL.
3. CHAIN LINK FENCE TO BE FITTED WITH UV- RESISTANT MESH FABRIC, COLOR PER CUSTOMER REQUEST.
4. ELECTRICAL SAFETY SIGNAGE TO BE PLACED ALONG PERIMETER.

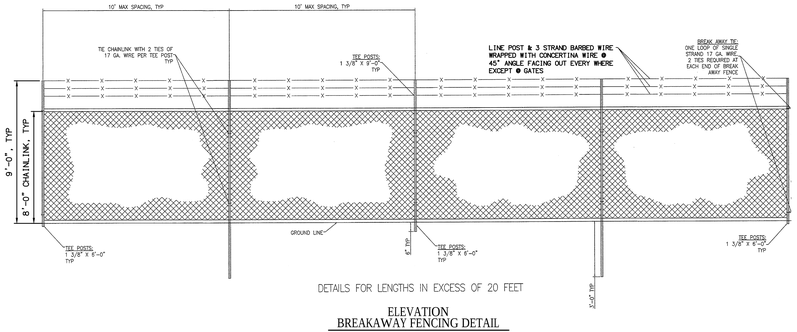


DETAIL - GATE SINGLE MOTORIZED SLIDING GATE
N.T.S.

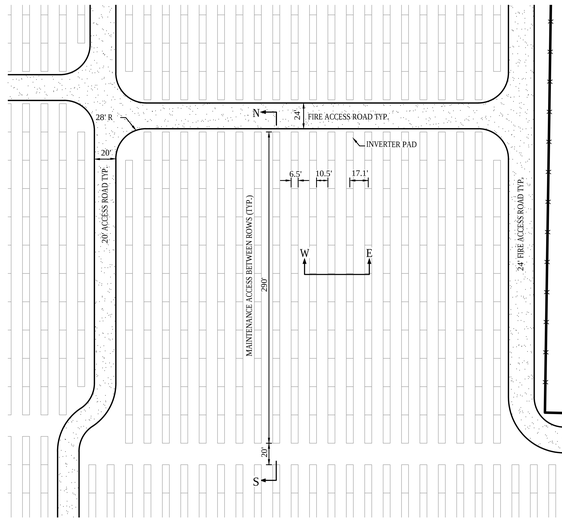
* 4" DIAMETER POST FOR GATE LEAF LENGHT 35'-0" AND LESS



GATE PLAN
N.T.S.



ELEVATION
BREAKAWAY FENCING DETAIL
N.T.S.



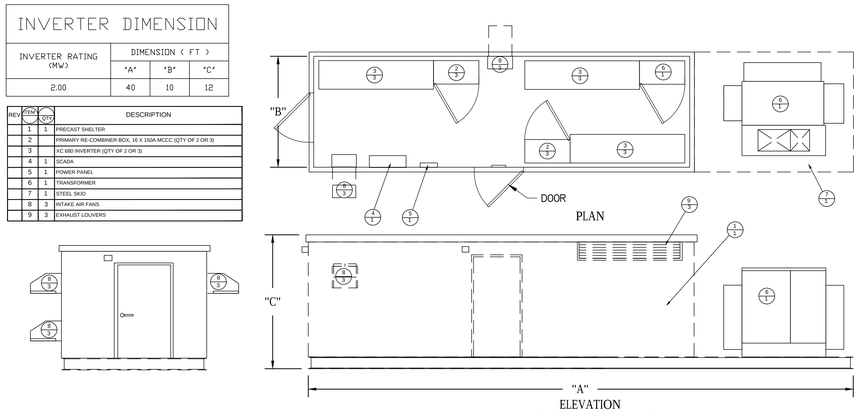
PLAN VIEW
TYPICAL BLOCK LAYOUT
N.T.S.

WARNING SIGNAGE
N.T.S.

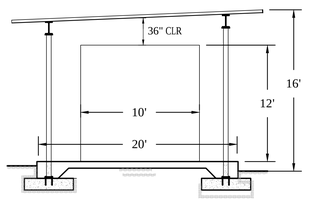
INVERTER DIMENSION

INVERTER RATING (MW)	DIMENSION (FT)		
	"A"	"B"	"C"
2.00	40	10	12

REV	QTY	DESCRIPTION
1	1	PRECAST SHELTER
2		PRIMARY RE-COMBINER BOX, 16 X 150A MCCC (QTY OF 2 OR 3)
3		XC 680 INVERTER (QTY OF 2 OR 3)
4	1	SCADA
5	1	POWER PANEL
6	1	TRANSFORMER
7	1	STEEL SKID
8	3	INTAKE AIR FANS
9	3	EXHAUST LOUVERS



ELEVATION
OPEN INVERTER ON SKID
N.T.S.



ELEVATION
SKID WITH SUN SHADE
N.T.S.

NOTE: INVERTER PAD/SKID DIMENSIONS AS SHOWN ARE FOR PLANNING PURPOSES ONLY. ELECTRICAL ENGINEER TO PROVIDE CONSTRUCTION SPECIFICATIONS AT FINAL DESIGN.

RUGGED SOLAR
COUNTY OF SAN DIEGO, CA
MAJOR USE PERMIT MODIFICATION
PDS 2017-MUP-12-007W1
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ELEVATIONS/DETAILS

SHEET 6 OF 6
OCTOBER 8, 2019

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