

**Hydrology Calculations**  
The following calculations are based on Albuquerque's Development Process Manual, Section 22.2

**Runoff Rate:**

Treatment Type Areas

Subbasin	Area <sub>a</sub> (ac)	Area <sub>b</sub> (ac)	Area <sub>c</sub> (ac)	Area <sub>d</sub> (ac)	Total (ac)
Subbasin-1	0	0.1204	0.1204	0.9635	1.2044
Subbasin-2	0	0.0654	0.0654	0.1620	0.2927
Subbasin-3	0	0.0552	0.0552	0.4416	0.5520
Subbasin-4	0	0.0686	0.0686	0.2121	0.3493

Peak Discharge values based on Zone 3 from Table A-9  
 $Q_a = 1.87$  cfs/ac     $Q_b = 2.60$  cfs/ac     $Q_c = 3.45$  cfs/ac     $Q_d = 5.02$  cfs/ac

Peak Discharge calculation for a 100-yr, 24-hr storm event from equation A-10

Subbasin	Discharge (cfs)
Subbasin-1	5.6
Subbasin-2	1.2
Subbasin-3	2.6
Subbasin-4	1.5

**Water Quality:**  
Required Water Quality volume for first flush of 0.34"

Subbasin	Required Volume (cu. ft.)	Drains to	Volume Provided (cu. Ft.)
Subbasin-1	1,189	WQ Ponds 1-3	1,627
Subbasin-3	545	WQ Pond 4	700
Total Required	1,734	WQ Ponds 1-4	2,327

**Water Quality Pond Rating Curves**

**WQ Pond 1**

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5193.90	8	0	0
5194	14	1	1
5195	127	70	71
5196	351	239	310
5196.40	471	164	475

**WQ Pond 2**

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5191.80	15	0	0
5192	27	4	4
5193	137	82	86
5194	329	233	319
5195	596	462	782
5195.30	689	193	974

**WQ Pond 3**

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5189.88	21	0	0
5190	30	3	3
5191	166	98	101
5191.38	242	77	178

**WQ Pond 4**

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5193.30	943	0	0
5193.80	1858	700	700

**6'-4" CHANNEL MANNING'S CAPACITY**

**Rectangular Channel Input**

Flow	4.9 cfs
Slope	0.014286 ft/ft
Manning's n	0.013
Base Width	6.3333 ft
Right Side Slope	0:1
Left Side Slope	0:1

**Rectangular Channel Output**

Depth	0.183 ft
Flow Area	1.16 sf
Velocity	4.24 fps
Velocity Head	0.279 ft
Top Width	6.33 ft
Froude Number	1.75
Critical Depth	0.265 ft
Critical Slope	0.00427 ft/ft

**2' SIDEWALK CULVERT MANNING'S CAPACITY**

**Rectangular Channel Input**

Flow	6.8 cfs
Slope	0.02 ft/ft
Manning's n	0.013
Base Width	2 ft
Right Side Slope	0:1
Left Side Slope	0:1

**Rectangular Channel Output**

Depth	0.456 ft
Flow Area	0.912 sf
Velocity	7.46 fps
Velocity Head	0.864 ft
Top Width	2.00 ft
Froude Number	1.95
Critical Depth	0.711 ft
Critical Slope	0.00565 ft/ft

**Weir Calculation for 6.33' Curb Opening**

**Weir:**

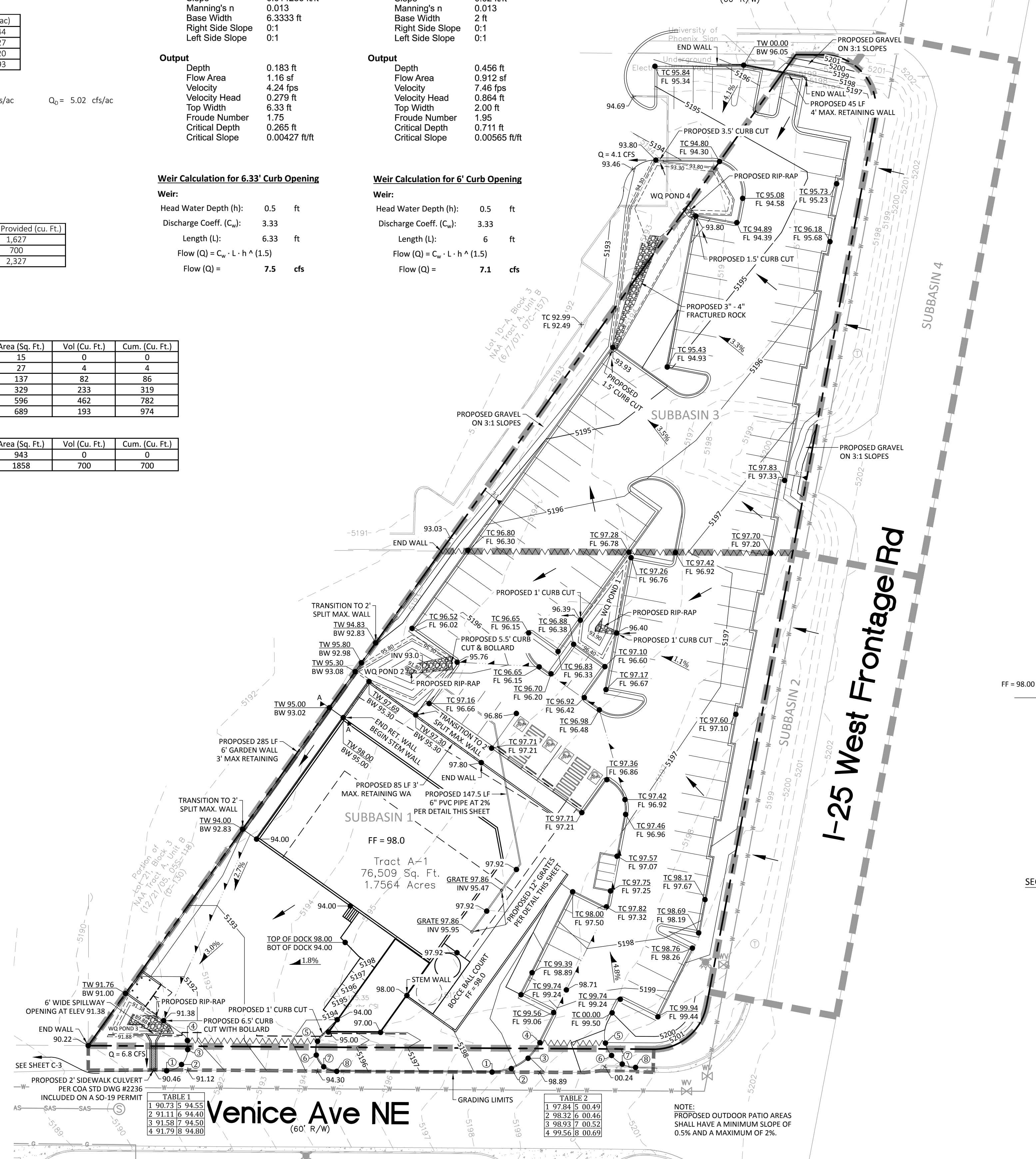
Head Water Depth (h):	0.5 ft
Discharge Coeff. (C <sub>w</sub> ):	3.33
Length (L):	6.33 ft
Flow (Q) = C <sub>w</sub> · L · h <sup>1.5</sup>	
Flow (Q) =	7.5 cfs

**Weir Calculation for 6' Curb Opening**

**Weir:**

Head Water Depth (h):	0.5 ft
Discharge Coeff. (C <sub>w</sub> ):	3.33
Length (L):	6 ft
Flow (Q) = C <sub>w</sub> · L · h <sup>1.5</sup>	
Flow (Q) =	7.1 cfs

**Pasadena Ave NE**  
(60' R/W)



**RIP-RAP NOTES:**

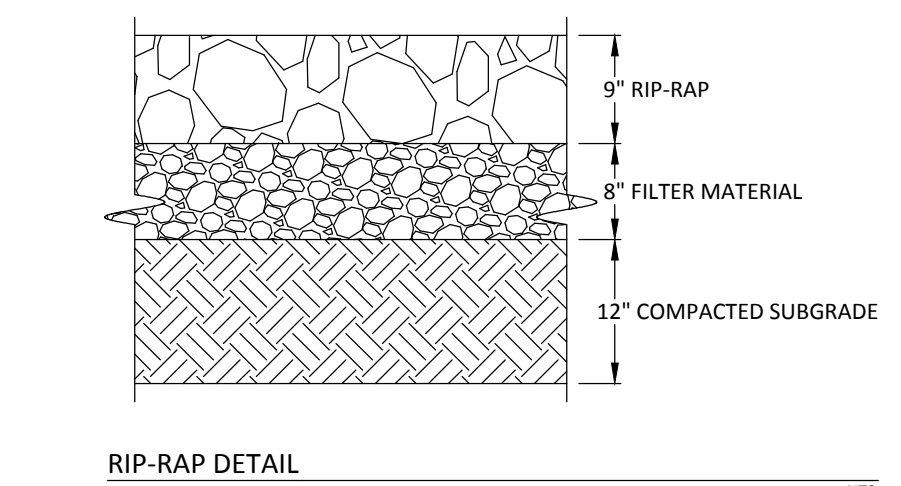
ALL RIP-RAP SHALL CONSIST OF 9" OF RIP-RAP OVER 8" OF FILTER MATERIAL. RIP-RAP SHALL CONSIST OF CRUSHED ROCK MEETING THE FOLLOWING GRADATION OR ENGINEER APPROVED EQUIVALENT.

MAX. DIMENSION	% SMALLER
12"	100
9"	50-60
6"	35-45
3"	10

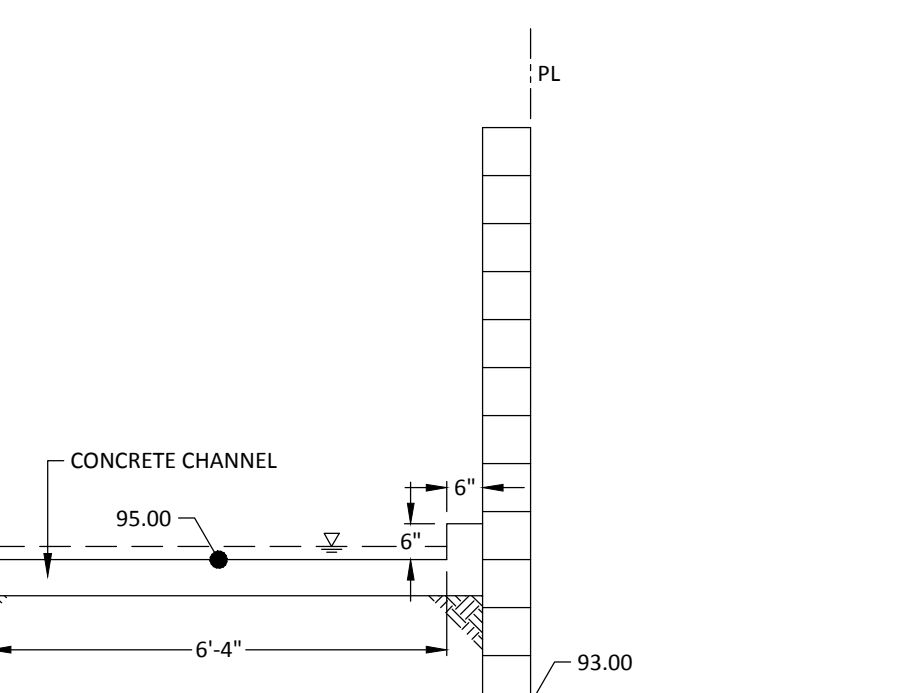
FILTER MATERIAL SHALL CONSIST OF CRUSHED BASALT ROCK MEETING THE FOLLOWING GRADATION OR ENGINEER APPROVED EQUIVALENT.

U.S. STANDARD SIEVE SIZE	PASSING BY WEIGHT
1"	100
3/4"	45-65
#4	25-45
#10	0-20
#20	0-5

FILTER MATERIAL SHALL BE PLACED UNDER THE RIP-RAP CHANNEL PAVEMENT AND COMPACTED INTO SURFACE VOIDS OF THE RIP-RAP. THE SUBGRADES SHALL BE PROCESSED TO A 12" MIN. DEPTH AND COMPACTED TO 95% MIN. RELATIVE DENSITY PER ASTM D 1557. THE FILTER MATERIAL SHALL BE TAMPED AND SHAPED TO FORM A SMOOTH, EVEN, AND FIRM FOUNDATION FOR THE OVERLYING RIP-RAP. THE CONTRACTOR'S OPERATIONS AND METHODS OF PLACING SHALL PREVENT SEGREGATION OF THE MATERIALS. THE FILTER MATERIAL SHALL BE PLACED AND TAMPED IN THE VOIDS OF THE RIP-RAP.



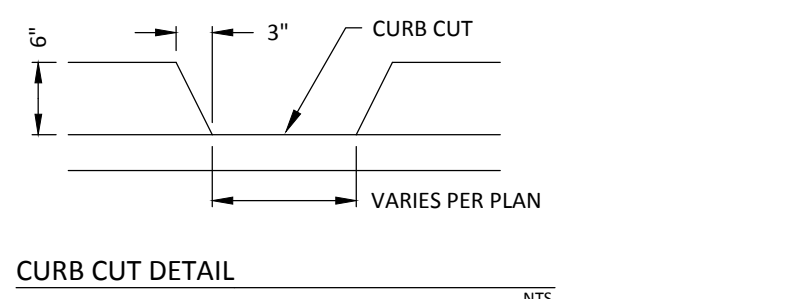
RIP-RAP DETAIL



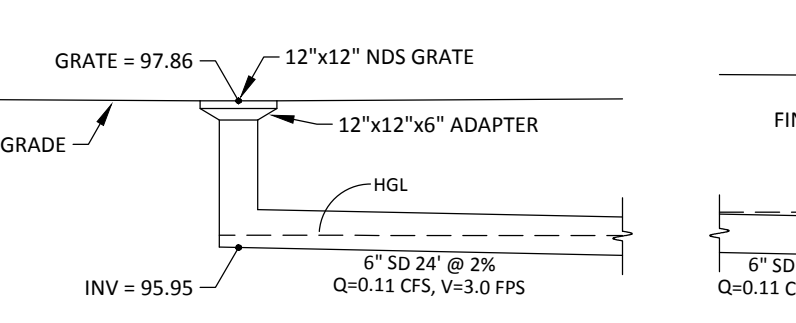
SECTION A-A CHANNEL DETAIL

**LEGEND**

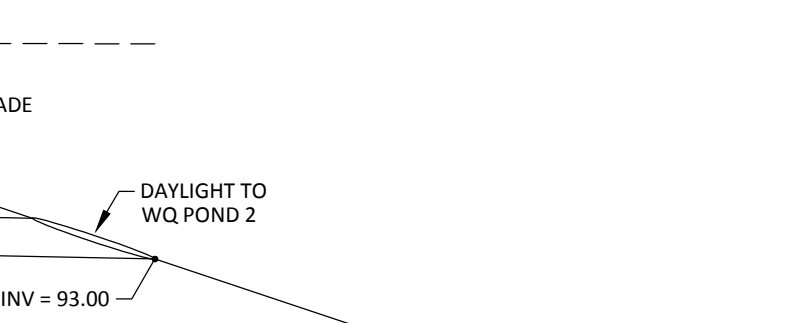
- PROPERTY BOUNDARY
- PROPOSED SUBBASIN BOUNDARY
- - - EXISTING MAJOR CONTOUR
- - - EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED GRADING LIMITS
- PROPOSED WALL
- PROPOSED WATER BLOCK
- PROPOSED FLOW LINE
- PROPOSED SPOT ELEVATION



CURB CUT DETAIL



STORM DRAIN DETAILS



STORM DRAIN DETAILS

**Background**

Tract A-1 accounts for approximately 1.75 acres in Block 3, NAA Tract A, Unit B within the City of Albuquerque, Bernalillo County, New Mexico. This property is located west of the I-25 West Frontage Road between Venice Avenue and Pasadena Avenue. The site is currently undeveloped. The site receives offsite flows from the I-25 West Frontage Road located east of the property. The flow rate from the frontage road is accounted for in the runoff calculations. There is no floodplain on the site.

The southern portion of Tract A-1 is allowed free discharge to Venice Avenue and the northern portion of Tract A-1 is allowed free discharge to Pasadena Avenue per the San Mateo Business Park Drainage Report (SMBPDR) by C.L. Weiss Engineering, Inc. 1999 (B18-D008). Other background reports include the Citicorp Site Drainage Report (CSDR) by Bohannon Huston, Inc. 1996, which is referenced in the SMBPDR, and the Drainage Report for Beverly Hills Ave & Venice Ave Office/Warehouse Public Improvements (BVOWPDR) by Isaacson & Arfman, P.A. 2000 (B18-D007), which references both the SMBPDR and CSDR.

**Methodology**

Hydrology Calculations for the site are performed in accordance with the Albuquerque Development Process Manual (DPM) Section 22.2 using the Rational Method to calculate peak flow rates in order to ensure all flow paths are sufficient to carry flows effectively throughout the site. The water quality pond volumes are calculated using a first flush runoff value of 0.34". All hydrologic and hydraulic calculations can be found on this sheet.

**Existing Conditions**

The existing property slopes from east to west at approximately 3%. Historically, the site drains across the adjacent property to the west. Runoff eventually reaches Venice Avenue and enters a storm drain system designed in the BVOWPDR.

**Proposed Conditions**

The property has been split into four separate subbasins. See the Hydrology Calculations located at the top left corner of this sheet for peak flow rates and required water quality volumes.

Subbasin 1 consists of the southern portion of the site. It is 1.2 acres and generates 5.6 cfs. Subbasin 2 consists of a portion of the I-25 West Frontage Road that enters Subbasin 1. Subbasin 2 is 0.3 acres and generates 1.2 cfs. Therefore, the southern portion of Tract A-1 has a peak rate of 6.8 cfs discharging into Venice Ave. Water from Subbasin 1 first enters WQ Pond 1, which provides 475 cubic feet of water quality volume in a parking lot median at the north end of the subbasin, and discharges back into the parking lot. The water quality pond rating curves are included on the left side of this sheet. The northern and eastern portion of the subbasin enters WQ Pond 2, which is 974 cubic feet. There is also a small diameter storm drain that drains to WQ Pond 2 from the patio area located east of the proposed building. See details this sheet. Once full, 4.9 cfs spills into a 6'-4"x6" concrete channel at an elevation of 95.3'. See detail and Manning's & Weir calculations on this sheet. This channel discharges into the truck dock area southwest of the proposed building. Runoff is collected in WQ Pond 3, which provides 178 cubic feet of water quality volume. The total amount of water quality volume provided for this site is 1,627 cubic feet, which is greater than the required amount of 1,189 cubic feet. Water then discharges into a 2' sidewalk culvert through a 6' opening. The Manning's & Weir calculations are included on this sheet. Once the runoff is offsite, water flows west in the proposed earthen swale until reaching the proposed inlets located approximately 350' west of the subject property (see BVOWPDR). These inlets will connect to an existing storm drain. This existing storm drain has capacity to accept the proposed flows from the southern portion of Tract A-1 per the BVOWPDR referenced above. The owner of Tract A-1 has agreed to maintain these interim facilities in the public right-of-way until such time that the downstream roadway is constructed. See sheet C-2 for more details.

Subbasin 3 consists of the northern portion of Tract A-1. It is 0.6 acres and generates 2.6 cfs. Subbasin 4 consists of a portion of the I-25 West Frontage Road that enters Subbasin 3. Subbasin 4 is 0.3 acres and generates 1.5 cfs. Therefore, the northern portion of Tract A-1 has a peak flow rate of 4.1 cfs discharging to Pasadena Ave. Water from Subbasin 3 flows generally to the northwest and enters WQ Pond 4. WQ Pond 4 is 700 cubic feet, which is greater than the required water quality volume of 545 cubic feet. Once full, WQ Pond 4 discharges water into the University of Phoenix (UoP) property located northwest of the property. The owner of the UoP property has agreed to allow cross-lot drainage. The site plan is included on sheet C-3. See Hydrology file B18-D014. Runoff eventually reaches 8'-2" sidewalk culverts at the northwest corner of the UoP site. The amount of flow reaching the sidewalk culverts from the UoP site is 11.0 cfs. See Hydrology Calculations on sheet C-3. The proposed 4.1 cfs from the northern portion of Tract A-1 brings the total amount of proposed flow to these 8'-2" sidewalk culverts is 15.1 cfs. The sidewalk culverts have capacity for 18.8 cfs. See the Manning's & Weir calculations on sheet C-3. Therefore, the UoP property has capacity for the proposed flows. Once runoff discharges out of the sidewalk culverts, the downstream system in Pasadena has capacity to accept the proposed flows from the northern portion of Tract A-1 per the SMBPDR referenced above.

REVISION

NO.	DATE	DESCRIPTION

DESIGNED: JF  
DRAWN: JS  
CHECKED: HF  
DATE: 8/3/17

**RESPEC**  
WATER & NATURAL RESOURCES

9971 JEFFERSON ST NE  
ALBUQUERQUE, NM 87109  
PHONE: 505.366.4187

REGISTERED PROFESSIONAL ENGINEER  
NEW MEXICO  
16633

LEGAL DESCRIPTION:  
TRACT A-1, BLOCK 3, NORTH ALBUQUERQUE ACRES, TRACT A, UNIT B, CITY OF ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

I-25 WEST FRONTAGE ROAD VENICE & PASADENA GRADING & DRAINAGE PLAN

GRAPHIC SCALE  
( IN FEET )  
1 inch = 30 ft.

SHEET NUMBER:  
**C-1**