Hydrology Calculations

The following calcualtions are based on Albuquerque's Development Process Manual, Seciton 22.2

Runoff Rate:

Treatment Type Areas

Subbasin	Area$_A$ (ac)	Area$_B$ (ac)	Area$_C$ (ac)	Area$_D$ (ac)	Total (ac)
Subbasin-1.1	0	0.0862	0.0862	0.6551	0.8275
Subbasin-1.2	0	0.0141	0.0141	0.1212	0.1494
Subbasin-1.3	0	0.0133	0.0133	0.1218	0.1484
Subbasin-1.4	0	0	0	0.0791	0.0791
Subbasin-2	0	0.0654	0.0654	0.0810	0.2117
Subbasin-3.1	0	0.0242	0.0242	0.0483	0.0967
Subbasin-3.2	0	0.0310	0.0310	0.3933	0.4553
Subbasin-4.1	0	0.0217	0.0217	0.0608	0.1042
Subbasin-4.2	0	0.0469	0.0469	0.1513	0.2451

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

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

Subbasin	Discharge (cfs)
Subbasin-1.1	3.8
Subbasin-1.2	0.7
Subbasin-1.3	0.7
Subbasin-1.4	0.4
Subbasin-2	0.8
Subbasin-3.1	0.4
Subbasin-3.2	2.2
Subbasin-4.1	0.4
Subbasin-4.2	1.0

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	808	WQ Pond 1	846
Subbasin-1.2	150	WQ Pond 2	-
Subbasin-1.3	150	WQ Pond 2	-
Subbasin-1.4	98	WQ Pond 2	-
Subbasin-1.2 thru 1.4	398	WQ Pond 2	449
Subbasin-3.1	60	WQ Pond 3	339
Subbasin-3.2	485	WQ Pond 4	3744
Total	1,751	WQ Ponds 1-4	5,378

HEC-HMS Input Summary Table

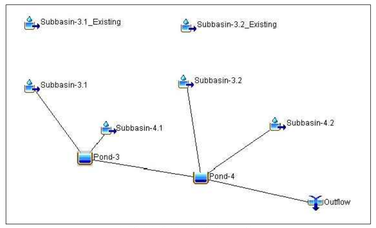
100-yr storm depths based on Zone 3 from Table A-2

P_{60} = 2.14 in P_{360} = 2.60 in P_{1440} = 3.10 in

Subbasin	IA (in)	INF (in/hr)	T_C (hr)	R (hr)
Subbasin 3.1 Existing	0.65	1.67	0.133	0.195
Subbasin 3.1	0.43	1.04	0.133	0.122
Subbasin 3.2 Existing	0.65	1.67	0.133	0.195
Subbasin 3.2	0.43	1.04	0.133	0.114
Subbasin 4.1	0.43	1.04	0.133	0.120
Subbasin 4.2	0.43	1.04	0.133	0.119

HEC-HMS Output Summary Table

Hydraulic Element	Drainage Area (mi^2)	Peak Discharge (cfs)	Time of Peak (h:mm)	Volume (cu. ft.)
Subbasin 3.1 Existing	0.00015	0.2	1:33	227
Subbasin 3.1	0.00015	0.4	1:30	728
Subbasin 3.2 Existing	0.00071	0.9	1:33	1072
Subbasin 3.2	0.00071	2.0	1:30	4652
Subbasin 4.1	0.00016	0.4	1:30	840
Subbasin 4.2	0.00038	1.0	1:30	2057
Pond 3	0.00031	0.8	1:33	1232
Pond 4	0.00140	2.4	1:42	4196



HEC-HMS Model Schematic

Water Quality Pond Rating Curves

WQ Pond 1

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5192.0	23	0	0
5192.4	293	63	63
5192.5	411	35	98
5193.0	1063	369	467
5193.3	1466	379	846

WQ Pond 2

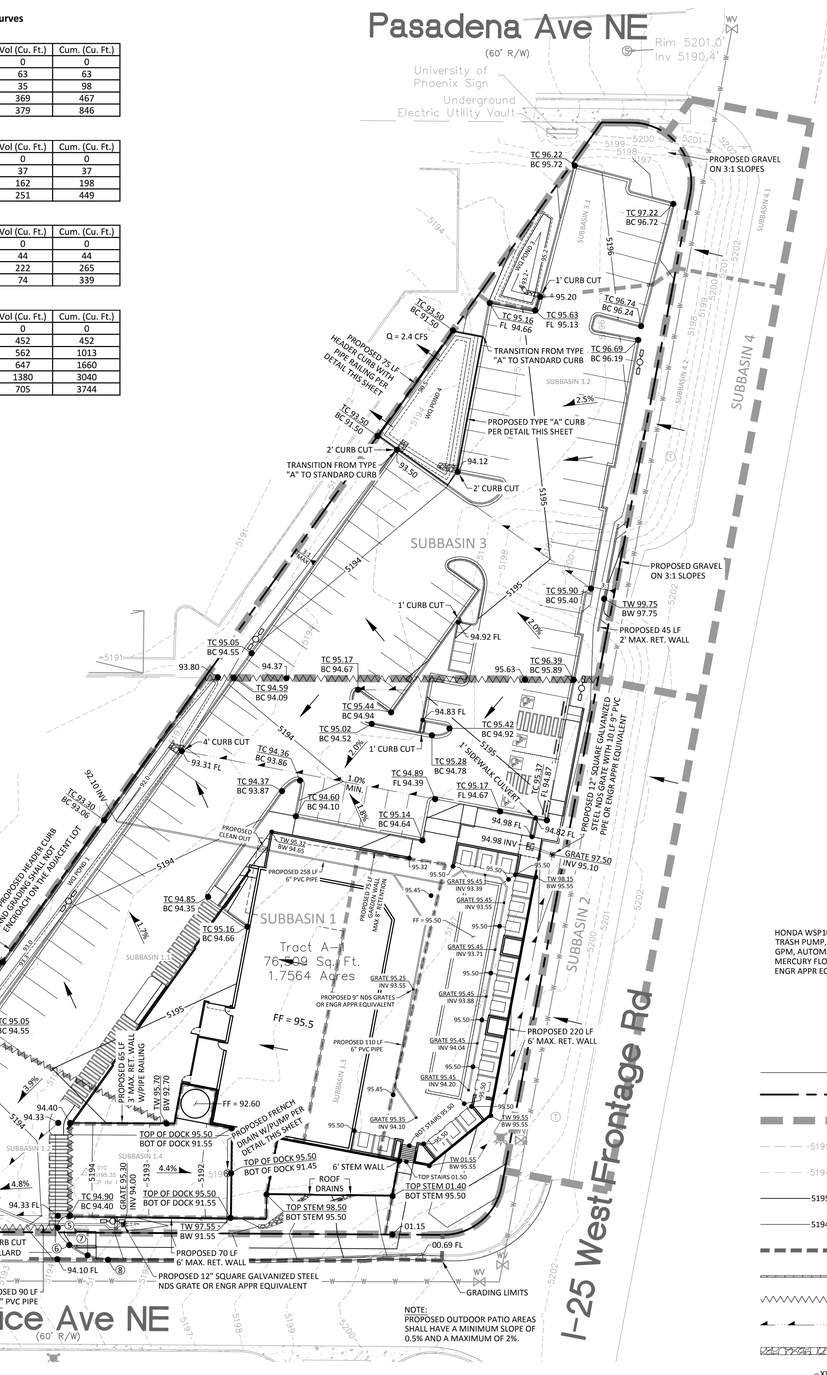
Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5189.0	0	0	0
5190.0	73	37	37
5191.0	251	162	198
5192.0	251	251	449

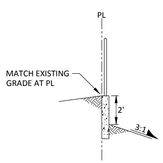
WQ Pond 3

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5193.2	6	0	0
5194.0	103	44	44
5195.0	340	222	265
5195.2	397	74	339

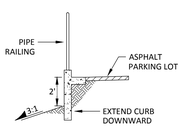
WQ Pond 4

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5190.5	798	0	0
5191.0	1009	452	452
5191.5	1237	562	1013
5192.0	1350	647	1660
5193.0	1409	1380	3040
5193.5	1409	705	3744

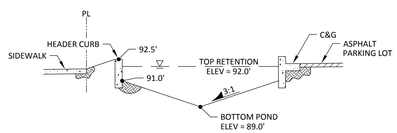




TYPE "A" CURB W/PIPE RAIL DETAIL
NTS



HEADER CURB W/PIPE RAIL DETAIL
NTS



POND SECTION A-A
NTS

RIP-RAP NOTES:

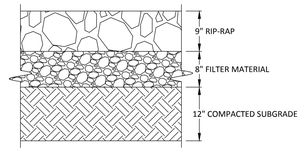
ALL RIP-RAP SHALL CONSIST OF 9" OF RIP-RAP OVER 8" OF FILTER MATERIAL. RIP-RAP SHALL CONSIST OF CRUSHED ROCK MEETING THE FOLLOWING GRADATION OR ENGINEER APPROVED EQUIVALENT.

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

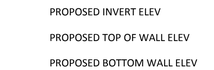
FILTER MATERIAL SHALL CONSIST OF CRUSHED BASALT ROCK MEETING THE FOLLOWING GRADATION OR ENGINEER APPROVED EQUIVALENT.

U.S. STANDARD SIEVE SIZE	PASSING BY WEIGHT
1"	100
¾"	45-65
#4	25-45
#40	0-20
#200	0-5

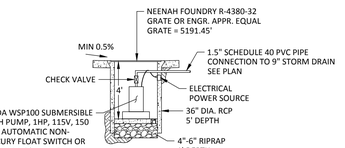
FILTER MATERIAL SHALL BE PLACED UNDER THE RIP-RAP CHANNEL PAVEMENT AND COMPACTED INTO SURFACE VOIDS OF THE RIP-RAP. THE SUBGRADES SHALL BE PROCESSED TO A 12" MIN. DEPTH AND COMPACTED TO 95% MIN. RELATIVE DENSITY PER ASTM D 1557. THE FILTER MTERIAL SHALL BE TAMPED AND SHAPED TO FORM A SMOOTH, EVEN, AND 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
NTS



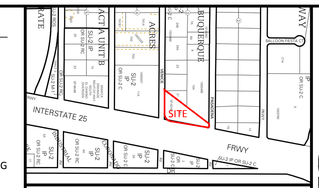
CURB CUT DETAIL
NTS



FRENCH DRAIN W/PUMP DETAIL
NTS

LEGEND

- PROPERTY BOUNDARY
- PROPOSED SUBBASIN BOUNDARY
- 5195 EXISTING MAJOR CONTOUR
- 5194 EXISTING MINOR CONTOUR
- 5195 PROPOSED MAJOR CONTOUR
- 5194 PROPOSED MINOR CONTOUR
- PROPOSED GRADING LIMITS
- PROPOSED WALL
- PROPOSED WATER BLOCK
- PROPOSED FLOW LINE
- PROPOSED RIP-RAP
- XX.XX PROPOSED SPOT ELEVATION
- XX.XX TC PROPOSED TOP OF CURB ELEV
- XX.XX BC PROPOSED BOTTOM CURB ELEV
- XX.XX FL PROPOSED FLOW LINE ELEV
- XX.XX INV PROPOSED INVERT ELEV
- XX.XX TW PROPOSED TOP OF WALL ELEV
- XX.XX BW PROPOSED BOTTOM WALL ELEV



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 Bohannan Huston, Inc. 1996, which is referenced in the SMBPDR, and the Drainage Report for Beverly Hills Ave & Venice Ave Office/Warehouse Public Improvements (BVOWPIDR) 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". Pond routing for the northern portion of the property is modeled using HEC-HMS 4.1. This methodology is consistent with SSCAFCA's DPM methodology which in turn is intended to match AHYMO results as modeled using COA DPM Chapter 22.2 methods. 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 BVOWPIDR.

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. This subbasin has been split into four smaller subbasins for water quality purposes. Subbasin 1.1 consists of the northern portion of Subbasin 1. It is 0.8 acres and generates 3.8 cfs. Subbasin 1.2 consists of the southwest corner of the property. It is 0.15 acres and generates 0.7 cfs. Subbasin 1.3 consists of the roof drainage discharging to the southern portion of the property. It is 0.15 acres and generates 0.7 cfs, as well. Subbasin 1.4 consists of the truck dock area southwest of the building. It is 0.1 acres and generates 0.4 cfs. Subbasin 2 consists of a potion of the I-25 West Frontage Road that enters Subbasin 1.1. Subbasin 2 is 0.2 acres and generates 0.8 cfs. Therefore, the southern portion of Tract A-1 has a peak rate of 6.4 cfs discharging into Venice Ave.

Water from Subbasin 1.1 enters WQ Pond 1 located along the western boundary of the property. There is also a small diameter storm drain that collects water in the patio area that discharges to WQ Pond 1. This pond holds 846 cubic feet, which is greater than the required 808 cubic feet. The water quality pond rating curves are included on the left side of this sheet. When full, water leaves WQ Pond 1 through a curb opening and enters subbasin 1.2. Runoff from WQ Pond 1 and Subbasin 1.2 then collects in the southwest corner of the property in WQ Pond 2. Subbasin 1.3 consists mostly of a portion of the roof that drains to the south. Once runoff discharges from the roof drains, water flows west in a swale along the southern property boundary. Runoff is collected by an inlet and storm drain that discharges to WQ Pond 2. Subbasin 1.4 drains to an inlet and french drain at the east end of the truck dock. A pump is proposed within the french drain in order to adequately drain the truck dock. See details this sheet. Runoff generated by Subbasin 1.4 eventually discharges to WQ Pond 2. This pond holds 449 cubic feet, which is greater than the required amount of 398 cubic feet for Subbasins 2-4. See pond details this sheet. Once WQ Pond 2 fills, water spills through a 6'x6" spillway at an elevation of 92.0'. Runoff is routed under the sidewalk in a 2' sidewalk culvert and discharges into Venice Avenue. Once the runoff is offsite, water flows west in the proposed gravel lined swale until reaching the proposed inlets located approximately 350' west of the subject property (see BVOWPIDR). 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 BVOWPIDR 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 has been split into two separate subbasins for water quality purposes. Subbasin 3.1 is 0.1 acres and generates 0.4 cfs. Subbasin 3.2 is 0.5 acres and generates 2.2 cfs. Subbasin 4 consists of a portion of the I-25 West Frontage Road that enters Subbasin 3 and has also been split into two smaller subbasins. Subbasin 4.1 is 0.1 acres and generates 0.4 cfs. Subbasin 4.2 is 0.2 acres and generates 1.0 cfs. Therefore, the northern portion of Tract A-1 has a peak flow rate of 4.0 cfs.

Runoff generated by Subbasin 3.1 flows southwest and enters WQ Pond 3. WQ Pond 3 holds 339 cubic feet, which is greater than the required 60 cubic feet. Once the pond has filled, water bypasses the pond and continues into Subbasin 3.2. Runoff generated by Subbasin 3.2 and water that bypasses WQ Pond 3 is collected in WQ Pond 4. WQ Pond 4 has a retention volume of 3,744 cubic feet, which is greater than the 485 cubic feet of required volume. Once the pond fills to an elevation of 93.5', water spills over the header curb into the adjacent property to the west as runoff has done historically. A HEC-HMS analysis was performed for this case in order to discharge only the historic flow rate at this point. The HEC-HMS input and output tables are included under the hydrology calculations and a schematic of the model is included on the left side of this sheet. The historic flow rate is 2.5 cfs and is the summation of existing subbasins 3.1 and 3.2 in addition to subbasins 4.1 and 4.2. According the the HMS analysis the ponds are adequately sized to discharge only 2.4 cfs from WQ Pond 4, which is less than the historic flow rate of 2.5 cfs.

RESPEC
WATER & NATURAL RESOURCES
5971 JEFFERSON ST NE
SUITE 101
ALBUQUERQUE, NM 87109
PHONE: 505.366.4187

REVISION

DESIGNED	HF	
DRAWN	JS	
CHECKED	HF	
DATE	11/7/17	

STAMP

HUGH W. FLOYD
NEW MEXICO
16633
REGISTERED PROFESSIONAL ENGINEER
11-7-17

NOT FOR CONSTRUCTION

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

CONCEPTUAL GRADING & DRAINAGE PLAN

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.
0 15 30 60

SHEET NUMBER:
C-1

03115