Hydrology Calculations

The following calculations are based on Albuquerque's Development Process Manual Section 22.2

Subbasin	Area (ac)	Q_p (cfs)	WQ Vol (cu. ft.)
P1	0.47	8	
P2	0.405	11	
P3	1.28	7	
Total	2.155	26	3480

Q values based on equation A-11
Q values rounded up to nearest whole number
Water quality volume provided from "Drainage Report for Tracts A, B-1, and C-1 Sandia Addition"

Capacity of Drive Aisle Swale (North of Building)

Triangular Channel

Input

Depth	0.45 ft
Slope	0.037 ft/ft
Manning's n	0.017
Base Width	0 ft
Right Side Slope	50:1
Left Side Slope	50:1

Output

Flow	63.0 cfs
Flow Area	10.1 sf
Velocity	6.22 fps
Velocity Head	0.601 ft
Top Width	45.0 ft
Froude Number	2.31
Critical Depth	0.629 ft
Critical Slope	0.00619 ft/ft

Capacity of Drive Aisle Swale (South of Building)

Irregular Section

Input

WSElev	0.5 ft
Slope	0.0287 ft/ft

Sta	Elev	n	Sta	Elev
0	0.5	0.017	26	0

Output

Flow	38.2 cfs
Flow Area	6.50 sf
Velocity	5.87 fps
Velocity Head	0.536 ft
Top Width	26.0 ft
Froude Number	2.07
Critical WSElev	0.656 ft
Critical Slope	ft/ft

Landscape Swale Capacity (South of Building)

Triangular Channel

Input

Depth	0.9 ft
Slope	0.0161 ft/ft
Manning's n	0.025
Base Width	0 ft
Right Side Slope	3:1
Left Side Slope	3:1

Output

Flow	10.4 cfs
Flow Area	2.43 sf
Velocity	4.28 fps
Velocity Head	0.284 ft
Top Width	5.40 ft
Froude Number	1.12
Critical Depth	0.943 ft
Critical Slope	0.0126 ft/ft

Weir Calculation for 1' Curb Cut

Head Water Depth (h):	0.5	ft
Discharge Coeff. (C_w):	3.367	
Length (L):	1	ft
Flow (Q) = $C_w \cdot L \cdot h \wedge (1.5)$		
Flow (Q) =	**1.2**	**cfs**

Weir Calculation for 3' Curb Cut

Head Water Depth (h):	0.5	ft
Discharge Coeff. (C_w):	3.367	
Length (L):	3	ft
Flow (Q) = $C_w \cdot L \cdot h \wedge (1.5)$		
Flow (Q) =	**3.6**	**cfs**

Weir Calculation for 4' Curb Cut

Head Water Depth (h):	0.5	ft
Discharge Coeff. (C_w):	3.367	
Length (L):	4	ft
Flow (Q) = $C_w \cdot L \cdot h \wedge (1.5)$		
Flow (Q) =	**4.8**	**cfs**

Weir Calculation for 10' Curb Cut

Head Water Depth (h):	0.5	ft
Discharge Coeff. (C_w):	3.367	
Length (L):	10	ft
Flow (Q) = $C_w \cdot L \cdot h \wedge (1.5)$		
Flow (Q) =	**11.9**	**cfs**

LEGEND

- PROPERTY LINE
- 5205 EXISTING MAJOR CONTOUR
- 5204 EXISTING MINOR CONTOUR
- 5205 PROPOSED MAJOR CONTOUR
- 5204 PROPOSED MINOR CONTOUR
- PROPOSED 6" C&G
- SUBBASIN BOUNDARY
- FLOW ARROW INTO POND
- 01.66 FL PROPOSED FLOW LINE ELEVATION
- 01.66 TC PROPOSED TOP OF CURB ELEVATION
- 01.66 TA PROPOSED TOP OF ASPHALT ELEVATION
- 07.00 EX EXISTING GRADE
- 01.66 BLDG PROPOSED BUILDING ELEVATION
- S=1.0% FLOW ARROW AND GRADE

RIP-RAP NOTES:

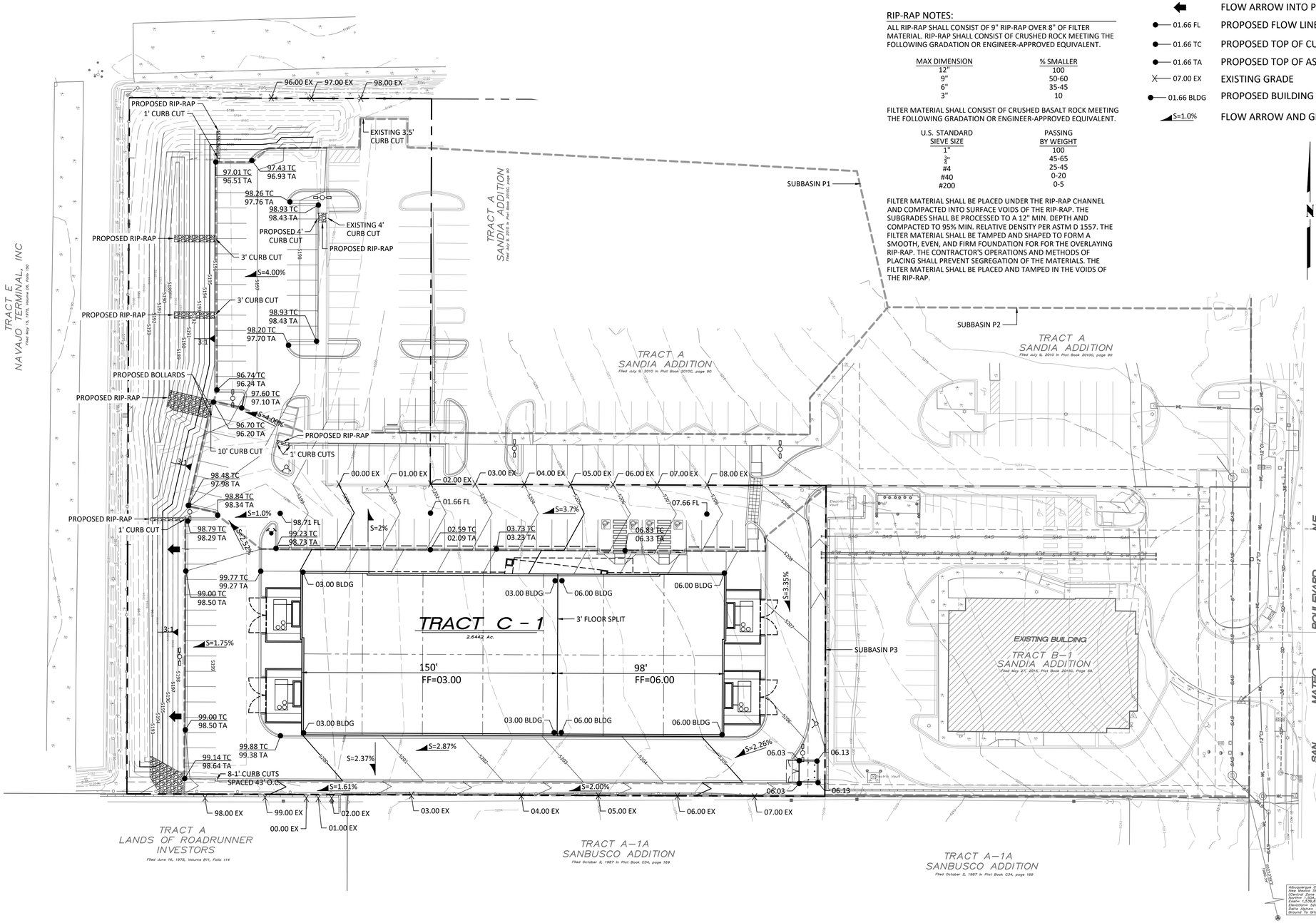
ALL RIP-RAP SHALL CONSIST OF 9" RIP-RAP OVER 8" OF FILTER MATERIAL. RIP-RAP SHALL CONSIST OF CRUSHED ROCK MEETING THE FOLLOWING GRADATION OR ENGINEER-APPROVED EQUIVALENT.

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 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 FOR THE OVERLAYING 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.



Background
Tract C-1 contains approximately 2.64 acres within the Plat of Tracts B-1 & C-1, Sandia Addition (a replat of Tracts B & C Sandia Addition). This site is located west of San Mateo Blvd. north of McLeod Rd. and south of Lincoln Rd. The site slopes to the west at approximately 3%. Referencing the "Drainage Report for Tracts A, B-1, and C-1 Sandia Addition" completed by Floyd Development Services in July 2015 (F17D095B), the site receives offsite runoff from the developed sites (A and B-1) adjacent to the east. See the drainage report for additional background information.

Methodology
Hydrology calculations for the site were performed in accordance with the Albuquerque Development Process Manual (DPM) Chapter 22 using AHYMO and the 100-year, 24-hour storm event. The water quality volume was calculated using the first 0.34 inches of runoff. The drainage report provides the analysis information.

Existing Conditions
The existing pond was designed to retain 3718 cubic feet for water quality treatment. Two outlets allow water to discharge downstream through 12-inch diameter pipes. The first flush volumes for Tract B-1 and C-1 (assumed proposed conditions) are held with the current ponds, and detention ponding is provided to limit the maximum discharge to 10 cfs. The assumed impervious area for Tract C-1 is 75%. Additional details for the tract can be seen in the drainage report. There is an emergency spillway that discharges into a soil cement channel in case storms greater than the 100-year occur.

Proposed Conditions
The proposed site follows the assumptions set up by the drainage report. 75% of the site is treatment type "D", and the remaining portions are proposed to be landscaped. This allows the existing pond to continue operating as intended without having to be adjusted. The proposed drainage concepts are outlined below:

Subbasin P1: Per the drainage report, this basin incorporates a portion of Tract A as well as approximately 0.47 acres of Tract C-1. This basin runs along the north section of the property to the existing sidewalk that runs east-west approximately at the center of the property. The developed peak flow generated by this basin is 8 cfs for the 100-year storm. This flow rate is rounded up to the nearest whole number to be conservative. The flows are conveyed mostly via sheet flow across the existing parking lot to the pond on the northwest side of the property. Several curb cuts are proposed to allow runoff to bypass the parking islands. See plan and curb cut calculations on this sheet for additional information.

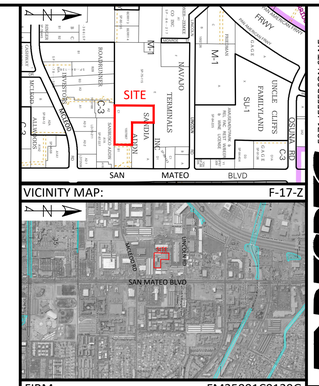
Subbasin P2: This subbasin incorporates the offsite flowrates coming from the developed Tract B-1 and a portion of the developed Tract A. The 100-year flow rates generated by these tracts are 4.5 cfs and 3.87 cfs, respectively. In addition, Tract C-1 generates 2.1 cfs for this portion of the property. Adding the flow rates, a total of 11 cfs is generated from in this subbasin. The flows are conveyed through the access road on the north side of the proposed building. See the road capacity analysis on this sheet for additional information. These flows continue west and through the proposed curb cuts into the pond.

Subbasin P3: This basin includes the building roof drainage and the rest of the property south of the proposed access location. The subbasin area is approximately 1.3 acres. The 100-year flowrate generated by this subbasin is 7 cfs. The road south of the building is super-elevated and will convey flows through the southern gutter of the road, transporting water away from the building. Eight 1' curb cuts are proposed along the southern curb and gutter of this road to allow water to discharge into the proposed landscape swale that runs along the south property line adjacent to the existing wall. The swale has a capacity of 10.4 cfs. These calculations can be seen on this sheet. Additional curb cuts are proposed at the west end of this road to allow runoff to discharge into the pond. Should the curb cuts fail or exceed capacity, the runoff will be conveyed to the north along the curb and gutter into an additional 1' curb cut.

Pond: It is proposed to pull the existing pond's east-side slopes further east to abut the proposed curb for the parking lot. This makes the pond bottom wider. In addition, it is proposed to make the pond deeper for additional retention volume.

The existing midway rundown with riprap that channels runoff into the pond is to be removed. Where there are any added curb cuts to convey runoff into the pond, 9" rip-rap over 8" filter material shall be provided.

Summary
The proposed Tract C-1 site improvements follow the drainage requirements set forth by the drainage report mentioned previously. No variance from the criteria is necessary. All grading and drainage improvements are shown to adequately convey the developed peak flows for the 100-year storm without adverse effects to existing infrastructure.



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

REVISION

DESIGNED	RLB		
DRAWN	JAL		
CHECKED	HWF		
DATE	04-13-2017		

PRELIMINARY NOT FOR CONSTRUCTION

LEGAL DESCRIPTION:
TRACT C-1
SANDIA ADDITION
ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO

COOL SPRINGZ TRAMPOLINE PARK

GRADING AND DRAINAGE PLAN

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

SHEET NUMBER:
C-1