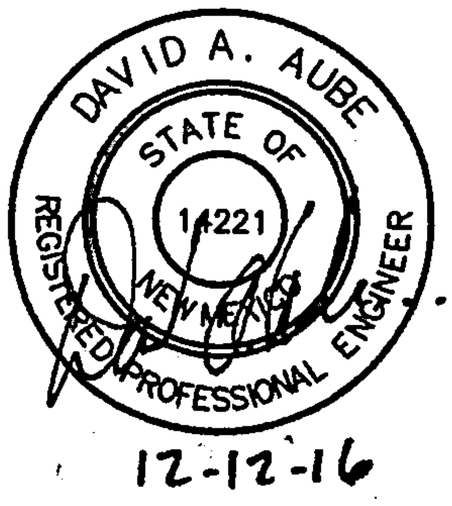
THE HARTMAN+MAJEWSKI DESIGN GROUP

Drainage Summary Report

Desert Willow Family School

Dave Aube P.E., Caden Gigliotti

12/12/2016



I. PURPOSE AND SCOPE

The purpose of this drainage plan is to present the existing and proposed drainage management plans for Phase II of the proposed Albuquerque Public Schools Family School Facility located at the SE Corner of the existing McKinley Middle School Campus at the intersection of Monroe Street NE and Headingly Road NE. The site is near the intersection of Comanche Road NE and Monroe Street NE. The site is located in Zone Atlas Page G-17 one block south of Comanche Road NE between Cherokee Road NE and Headingly Road NE. The site was previously used as ball fields and portable buildings site for APS and is now primarily vacant. The portable buildings located on the site were removed in 2008.

II. SITE DESCRIPTION AND HISTORY

This site has previously been developed as ball fields and portable building site for APS. There were eight (8) existing building portables on site that were removed and relocated in 2008. The backstops are all that remains from the old ball fields. There is a concrete drainage channel located on northeast side of this APS property that drains the public park on the east side of Monroe Street NE. The concrete drainage channel is separated from the proposed development by the existing Bus pick up and drop off lane for McKinley Middle School.

III. COMPUTATIONAL PROCEDURES

Hydrologic analysis was performed utilizing the design criteria found in the COA_DPM Section 22.2 released in June 1997.

IV. PRECIPITATION

The 100-yr. 6-hr duration storm was used as the design storm for this analysis. This site is within Zone 2 as identified in the DPM Section 22.2. Tables within the section were used to establish the 6-hr precipitation, excess precipitation and peak discharge.

V. EXISTING DRAINAGE CONDITIONS OVERVIEW

Phase I of Desert Willow site was approximately 157,675 square feet (3.62 acres). The site was developed in the first phase with improvements including approximately 34,000 sf of new classroom buildings, asphalt parking lots and concrete sidewalks. A large courtyard was constructed at the interior of the buildings. The courtyard has several small depressions that are used for both water harvesting and to collect the water so that

storm drainage discharge pipes can release the excess runoff away from the courtyard area.

The buildings have metal (standing seam metal roofs) with a ridge line located in the middle (sending 1/2 of the water into the courtyard and the other 1/2 away from the building to the perimeter.

The peak runoff that is generated by the 100 year 6 hour storm for Basin #2 the courtyard area is 2.70 cfs. There are three (3) discharge pipes that drain the water toward the west under the proposed building. Each of these pipes are 12" diameter with a capacity of 3.7 cfs. The factor of safety for these pipes is 3.4.

Runoff from the storm drainage pipes was diverted south around the existing portables and eventually west into the access road and parking lot. The final outfall for the storm runoff is into Comanche Road NE merged with the water within the concrete lined drainage channel to the north of the project site.
The entire site drainage basin combined in the existing configuration generates a peak discharge of 14.24 cfs. The ponding volume inside the courtyard is 1220 cf.

VI. DRAINAGE MANAGEMENT PLAN

The Basin #3 portion of the Phase II site generally slopes from east to west with excess runoff being directed into the access drive and parking lot for the Senior Citizens Center. This excess runoff joins the water that is flowing in the concrete lined drainage channel and eventually back into Comanche Road NE.

The existing Phase II portion of the site, Basin #3, has all been disturbed by human activity and generates a peak runoff rate of 3.83 cfs in the current conditions.

The proposed building and associated parking, and sidewalks will increase the peak runoff to 4.42 cfs. The site was previously submitted with Phase II and was permitted free discharge into the concrete drainage channel. The proposed layout now incorporates a retention area for the first flush.

Roof runoff will be collected in gutters and downspouts to an underground collection and conveyance system that directs the runoff into the retention pond at the North West corner of the site.

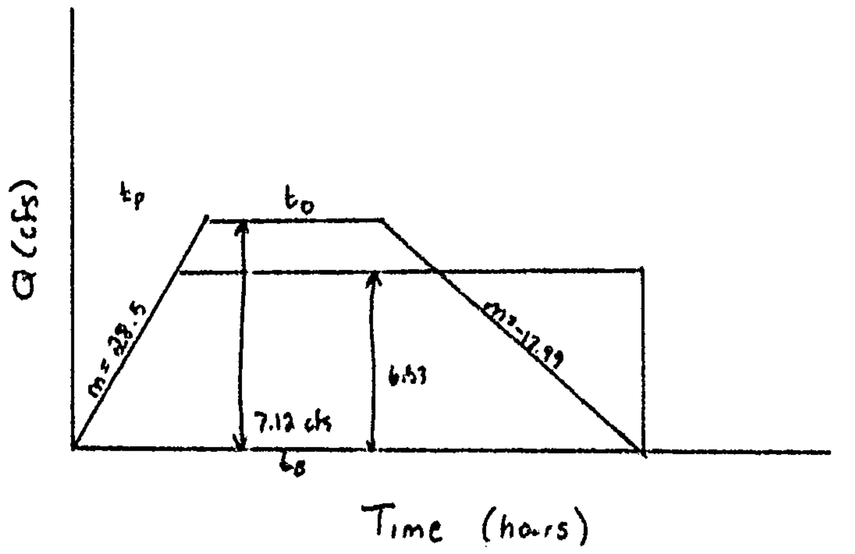
The peak incoming flow rate into the first flush pond is 7.12 cfs (combining the courtyard runoff from Phase I(Basin #2) with the roof runoff from Phase II (Basin #3). The peak flow rate from the pond is 6.53 cfs, with the intent to only collect the first flush volume without detaining the larger storm events. The first flush volume that is needed for Phase II is 616 cf. The pond located in the northwest corner has a capacity of 671 cf.

Drainage Basins #1 and #2 will not be affected by this site improvement.

VII. CONCLUSION

The project site was previously developed as ball fields and portable building campus for APS. The proposed Phase II building construction will have a small increase (0.59 cfs) in the peak discharge. The site will still drain to Comanche Road NE as it has historically. There should be minimal impact to downstream users. The site also contains a first flush ponding area that is sized for the Phase II development.

4/21/2016



Excess Precipitation (Zone 3)

$$E = \frac{0 + .92(.12) + 1.29(1.11) + 2.36(.48)}{.12 + 1.11 + .48}$$

$= 1.564$

Time to Peak (7.12 cfs)

$$t_p = .7\,t_c + \frac{(1.6 - \frac{A_D}{A_T})}{12}$$

$= .7(.2\text{ hrs}) + \frac{(1.6 - \frac{.48}{1.7})}{12}$

$= .2498$ hours

$= 899.28$ secs

Time of Duration (7.12 cfs)

$$t_D = .25\left(\frac{A_D}{A_T}\right)$$

$= .25\left(\frac{.48}{1.7}\right)$

$= .0706$ hrs

$= 254.16$ secs

Time of Base (7.12 cfs)

$$t_B = \frac{2.107 * E * A_T}{Q_p} - .25\left(\frac{A_D}{A_T}\right)$$

$= \frac{2.107 * (1.564) * (1.7)}{7.12} - .0706$

$= .7162$ hrs

$= 2,578$ secs

Slope

$$\frac{\text{Rise}}{\text{Run}} = \frac{7.12}{.2498} = 28.50$$

Time to Peak (6.53 cfs)

$\frac{6.53\text{ cfs}}{28.5} = .229$ hours

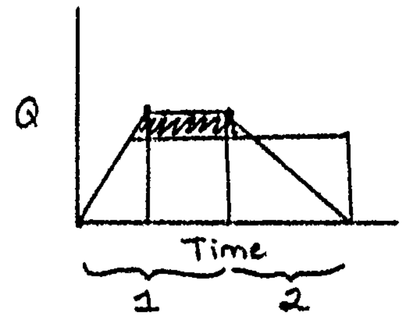
$= 824.84$ secs

Time of Duration (6.53 cfs)

$(T_{P7.12} + T_{D7.12}) - T_{P6.53}$

$T_{D6.53} = 899.28 + 254.16 - 824.84$

$= 328.6$ secs



1) $\frac{1}{2}(t_{p7.12} * 7.12\text{ cfs}) + (t_{D7.12} * 7.12\text{ cfs})$

Area under the graph for 7.12 cfs $T_P + T_D$ combined.

$\frac{1}{2}(899.28 * 7.12) + (254.16 * 7.12)$

$= 5,011.06$ cf

$\frac{1}{2}(t_{p6.53} * 6.53\text{ cfs}) + (t_{D6.53} * 6.53\text{ cfs})$

Area under graph for 6.53 cfs $T_P + T_D$ combined

$\frac{1}{2}(824.84 * 6.53) + (328.6 * 6.53)$

$= 4,838.84$ cf

$V_{diff_1} = 5,011.06 - 4,838.84$

$= 172.22$ cubic feet

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2) $t_B - t_p - t_D$ = Back of graph

Slope $= \frac{7.12}{.3957} = -17.99$

$2.578 - 899.28 - 254.16 = .3957$ hrs

so $\frac{6.53}{-17.99} = .3629$ hours

$.3957 - .3629 = .0328 = 118.08$ secs

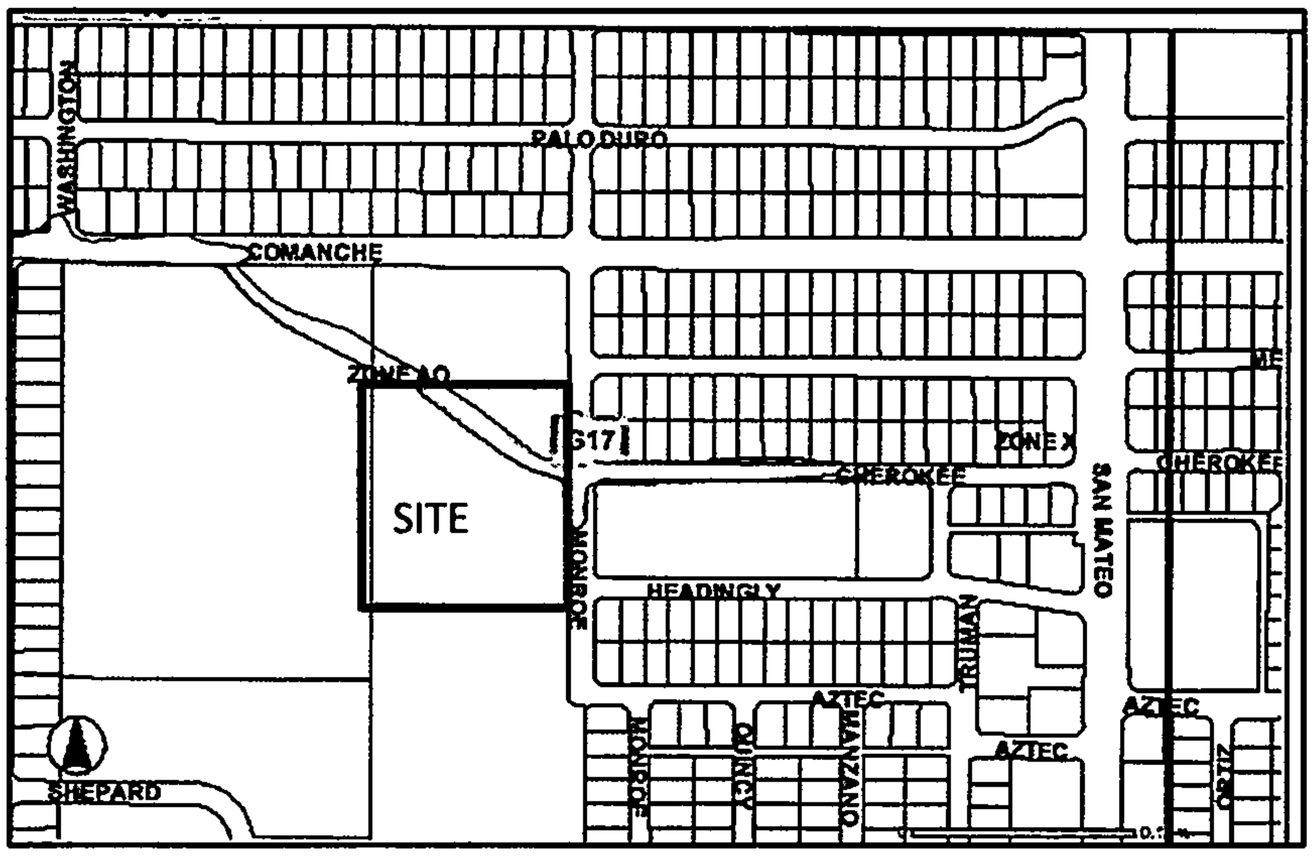
$\frac{1}{2}[118.08 * (7.12 - 6.53)] = 34.83$ cf

Total Volume Difference 7.12 + 6.53

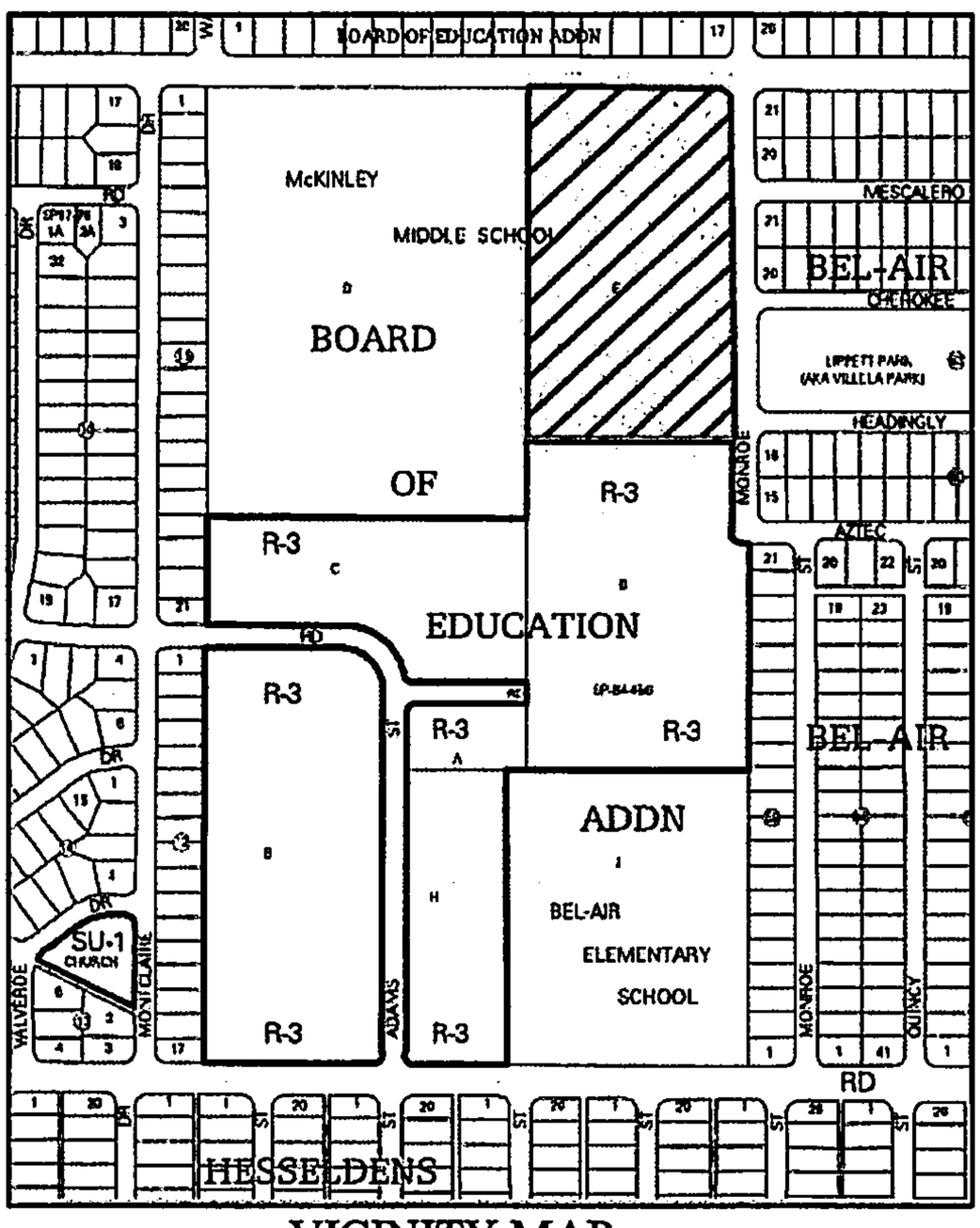
172.22 cf

34.83 cf

$\boxed{207.05}$ cubic feet



FLOOD ZONE MAP



VICINITY MAP

Drainage Summary

Project:	APS DESERT WILLOW
Project Numbe:	3043
Date:	06/15/16
By:	Dave A

Site Location

Precipitaion Zone 3 Per Table A-1 COA DPM Section 22.2

Existing summary

Basin Name	Ex 1	Ex 2	Ex #3
Area (sf)	83411	25907	48298
Area (acres)	1.91	0.59	1.11
%A Land treatment			
%B Land treatment	15	20	0
%C Land treatment	40	0	100
%D Land treatment	45	80	0
Soil Treatment (acres)			
Area "A"	0.00	0.00	0.00
Area "B"	0.29	0.12	0.00
Area "C"	0.77	0.00	1.11
Area "D"	0.86	0.48	0.00
Excess Runoff (acre-feet)			
100yr. 6hr.	0.2738	0.1027	0.1192
10yr. 6hr.	0.1559	0.0630	0.0573
2yr. 6hr.	0.0781	0.0359	0.0185
100yr. 24hr.	0.3097	0.1225	0.1192
Peak Discharge (cfs)			
100 yr.	7.71	2.70	3.83
10yr.	4.79	1.75	2.22
2yr.	2.42	1.00	0.86

Proposed summary

Basin Name	Pro 1	Pro 1A	Pro 3
Area (sf)	83411	25907	48298
Area (acres)	1.91	0.59	1.11
%A Land treatment			
%B Land treatment	15	20	20
%C Land treatment	40	0	35
%D Land treatment	45	80	45
Soil Treatment (acres)			
Area "A"	0.00	0.00	0.00
Area "B"	0.29	0.12	0.22
Area "C"	0.77	0.00	0.39
Area "D"	0.86	0.48	0.50
Excess Runoff (acre-feet)			
100yr. 6hr.	0.2738	0.1027	0.1568
10yr. 6hr.	0.1559	0.0630	0.0891
2yr. 6hr.	0.0781	0.0359	0.0446
100yr. 24hr.	0.3097	0.1225	0.1776
Peak Discharge (cfs)			
100 yr.	7.71	2.70	4.42
10yr.	4.79	1.75	2.73
2yr.	2.42	1.00	1.37

THE DESIGN GROUP

PROJECT APS DESERT WILLOW
PROJECT NO. 3022
DATE 06/15/16
BY Dave A

DPM Section 22.2 - Hydrology

Part A-Watersheds less than 40 acres.
January, 1993

INSTRUCTIONS

* Spread sheet requires three input areas (dark cells):
  - Location
  - >A.1 Precipitation Zone
  - >A.3 Land Treaments
* Values from the tables are automatically placed using "if" statements.
* Table values should be checked for correctness for each use.

SUMMARY

Location	**Pro 1**	
Precipitation Zone	3	
Land Area	1.91	acres
Excess Precipitation Volume		
>>> 100-year 6-hour (design)	**0.27**	**acre-ft.**
10-year 6-hour	0.16	acre-ft.
2-year 6-hour	0.08	acre-ft.
100-year 24-hour	0.31	acre-ft.
Peak Discharge Rates (DPM)		
>>> Q100 (design)	**7.71**	**cfs**
Q10	4.79	cfs
Q2	2.42	cfs
Peak Discharge Rates (DPM-Rational Method)		
>>> Q100 (design)	**7.69**	**cfs**
Q10	4.81	cfs
Q2	2.41	cfs

CALCULATIONS FOLLOW

INPUT AND CALCULATIONS

LOCATION	Pro 1		
>A.1 PRECIPITATION ZONE (from Table A-1)	3		
>A.2 DEPTHS			
(from Table A-2)			
100-YEAR STORM (P60)		2.14	inches
100-YEAR STORM (P360)		2.60	inches
100-YEAR STORM (P1440)		3.10	inches
10-YEAR (P360) (Calculated: P360*RPF10)		1.73	inches
2-YEAR (P360) (Calculated: P360*RPF2)		1.13	inches
>A.3 LAND TREATMENTS (Ai)			
Treatment A		0.00	acres
Treatment B		0.29	acres
Treatment C		0.77	acres
Treatment D		0.86	acres
Total Area		1.91	acres
>A.4 ABSTRACTIONS	See A.5		

CALCULATIONS FOLLOW

INPUT AND CALCULATIONS (CON'T)

>A.5 EXCESS PRECIPITATION 6 HOUR AND 24 HOUR (Ei) from Table A-8		
100-year 6-hour		
Treatment A	0.66	inches
Treatment B	0.92	inches
Treatment C	1.29	inches
Treatment D	2.36	inches
WEIGHTED E (Sum Ei*Ai/A)	1.72	inches
VOLUME V100:6h (E*A)	0.27	acre-ft.
	11,927.77	ft^3
10-year 6-hour		
Treatment A	0.19	inches
Treatment B	0.36	inches
Treatment C	0.62	inches
Treatment D	1.50	inches
WEIGHTED E (Sum Ei*Ai/A)	0.98	inches
VOLUME V10:6h (E*A)	0.16	acre-ft.
	6,791.05	ft^3
2-year 6-hour		
Treatment A	0.00	inches
Treatment B	0.06	inches
Treatment C	0.20	inches
Treatment D	0.89	inches
WEIGHTED E (Sum Ei*Ai/A)	0.49	inches
VOLUME V2:6h (E*A)	0.08	acre-ft.
	3,402.47	ft^3
100-year 24-hour		
VOLUME V100:24h (V100-6h+Ad*P1440-P360)/12)	0.31	acre-ft.
	13,491.73	ft^3

CALCULATIONS FOLLOW

INPUT AND CALCULATIONS (CON'T)

>A.6 PEAK DISCHARGE RATE FOR SMALL WATERSHEDS (Qi) from Table A-9		
100-year		
Treatment A	1.87	cfs/acre
Treatment B	2.60	cfs/acre
Treatment C	3.45	cfs/acre
Treatment D	5.02	cfs/acre
Q100 (Sum Qi*Ai)	7.71	cfs
10-year		
Treatment A	0.58	cfs/acre
Treatment B	1.19	cfs/acre
Treatment C	2.00	cfs/acre
Treatment D	3.39	cfs/acre
Q10 (Sum Qi*Ai)	4.79	cfs
2-year		
Treatment A	0.00	cfs/acre
Treatment B	0.21	cfs/acre
Treatment C	0.78	cfs/acre
Treatment D	2.04	cfs/acre
Q2 (Sum Qi*Ai)	2.42	cfs

CALCULATIONS FOLLOW

RATIONAL METHOD

PEAK INTENSITY (in/hr at tc=0.2 hour)
from Table A-10

Peak Intensity (I) 100-year	5.38
Peak Intensity (I) 10-year	3.65
Peak Intensity (I) 2-year	2.21

RATIONAL METHOD COEFFICIENT, C
from Table A-11

100-year

Treatment A	0.35	cfs/acre
Treatment B	0.48	cfs/acre
Treatment C	0.64	cfs/acre
Treatment D	0.93	cfs/acre
Q100 (Sum Qi*I*Ai)	7.69	cfs

10-year

Treatment A	0.16	cfs/acre
Treatment B	0.33	cfs/acre
Treatment C	0.55	cfs/acre
Treatment D	0.93	cfs/acre
Q10 (Sum Qi*I*Ai)	4.81	cfs

2-year

Treatment A	0.00	cfs/acre
Treatment B	0.10	cfs/acre
Treatment C	0.35	cfs/acre
Treatment D	0.92	cfs/acre
Q2 (Sum Qi*I*Ai)	2.41	cfs

Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Dec 28 2016

<Name>

Rectangular Weir

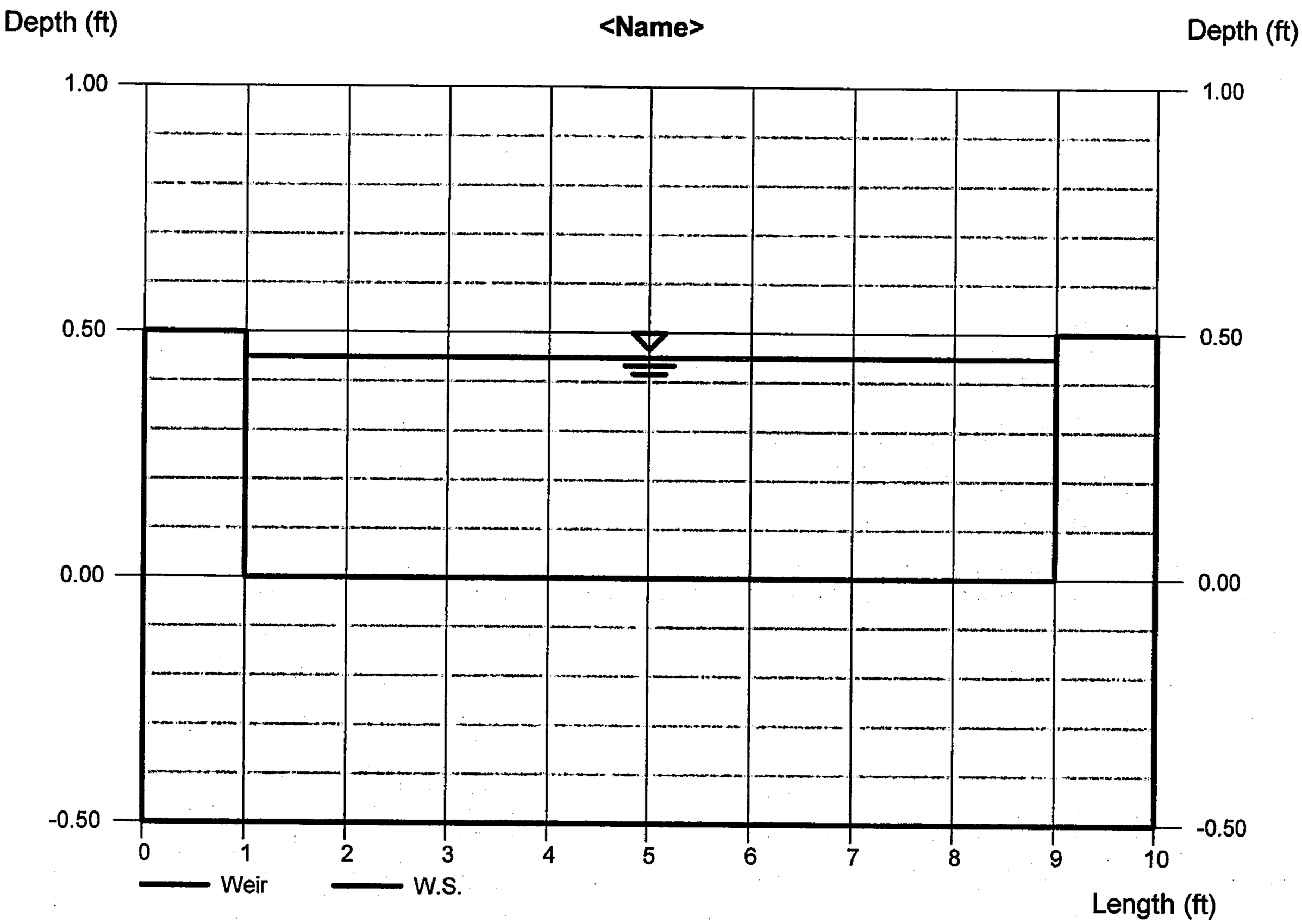
Crest	= Broad
Bottom Length (ft)	= 8.00
Total Depth (ft)	= 0.50

Calculations

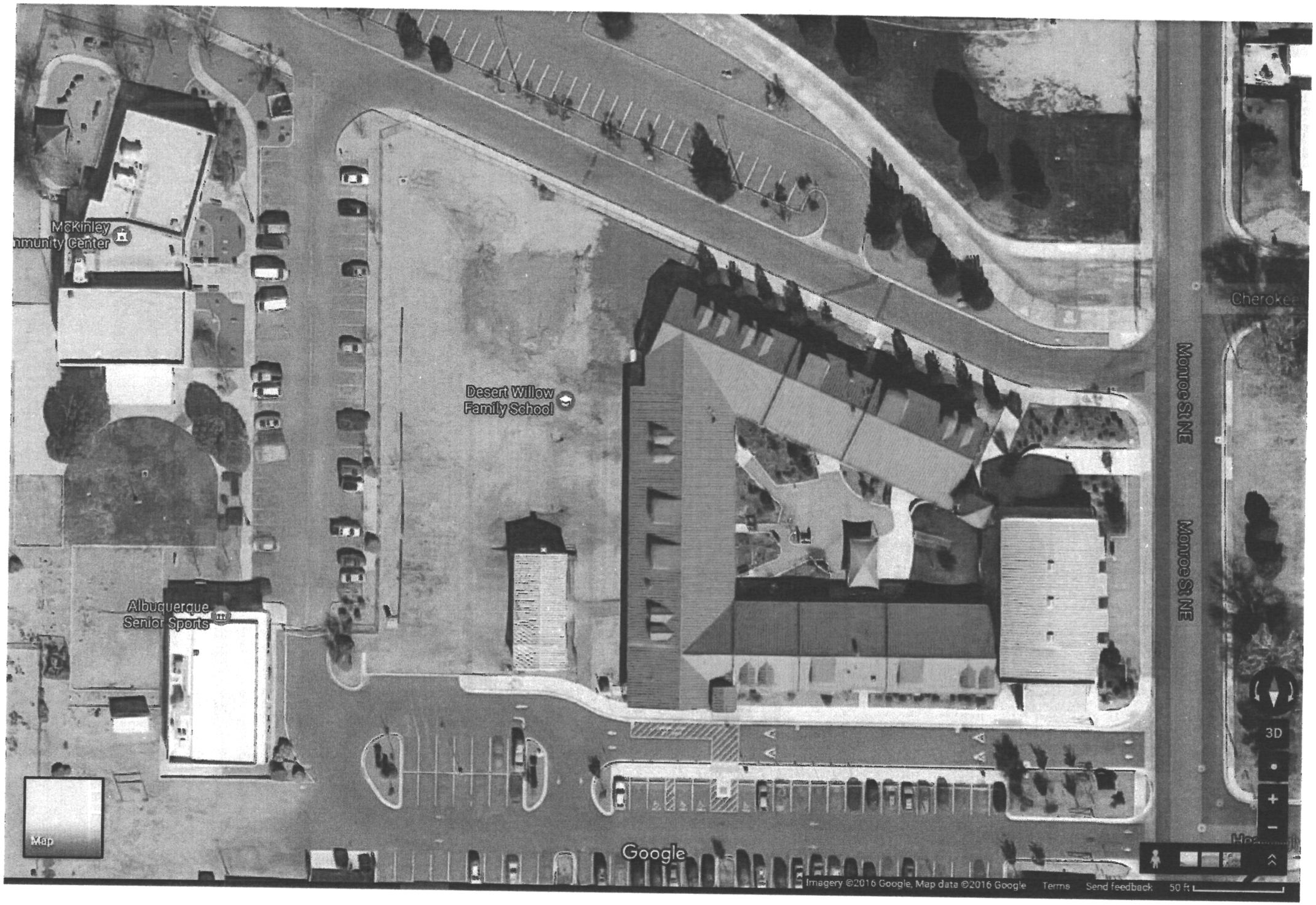
Weir Coeff. Cw	= 2.60
Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 0.45
Q (cfs)	= 6.279
Area (sqft)	= 3.60
Velocity (ft/s)	= 1.74
Top Width (ft)	= 8.00



Depth	Q	Area	Veloc	TopWidth	Energy
(ft)	(cfs)	(sqft)	(ft/s)	(ft)	(ft)
0.05	0.233	0.40	0.58	8.00	0.06
0.10	0.658	0.80	0.82	8.00	0.11
0.15	1.208	1.20	1.01	8.00	0.17
0.20	1.860	1.60	1.16	8.00	0.22
0.25	2.600	2.00	1.30	8.00	0.28
0.30	3.418	2.40	1.42	8.00	0.33
0.35	4.307	2.80	1.54	8.00	0.39
0.40	5.262	3.20	1.64	8.00	0.44
0.45	6.279	3.60	1.74	8.00	0.50
0.50	7.354	4.00	1.84	8.00	0.55



Desert Willow Existing Conditions Aerial

CITY OF ALBUQUERQUE

Richard J. Berry, Mayor

February 17, 2017

David Aube, P.E.
Design Group
120 Vassar SE, Suite 100
Albuquerque, NM, 87106

RE: **APS Family School East Side**
3303 Monroe St NE
Drainage Plan and Report
Engineer's Stamp Date: 1/30/2017 & 12/12/2016
Hydrology File: G17D019A

Dear Mr. Aube:

Based upon the information provided in your submittal received 1/31/17, the Drainage Plan and report is not approved for Building Permit. The following comments need to be addressed for approval of the above referenced project:

1. Define the limits of construction and provide area. Submittal of an erosion and sediment control plan is required prior to building permit approval if the disturbed area is over 1 acre. Please contact Curtis Cherne P.E at 924-3420 for question regarding ESC plans.
2. Clarify how the storm drain outfalls though the wall and into the pond with a detail view/notes and include dimensions and inverts. In your previous submittal, this information was added for the overflow weir, but not the storm drain outfall.

The following are recommendations, not required for approval:

1. Use RVP Class IV underneath the building and the wall
2. Call out Section and detail views for the weir
3. Correct invert elevation on SD Manhole #2

If you have any questions, contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

Orig: Drainage File

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

G17D0194

PROJECT TITLE: APS Family School East Side
DRB #: ___ EPC#:_____

ZONE MAP/DRG. FILE #: ~~G-17-Z~~
WORK ORDER#:_____

LEGAL DESCRIPTION: Portions of Tracts D and E, Board of Education Addition.
CITY ADDRESS: 3303 Monroe Street NE.

ENGINEERING FIRM: Design Group
ADDRESS: 120 Vassar SE, Suite 100
CITY, STATE: Albuquerque, NM

CONTACT: David Aube
PHONE: 998-6430
ZIP CODE: 87106

OWNER: APS Facilities
ADDRESS: __
CITY, STATE: Albuquerque, NM

CONTACT: Richard Miller
PHONE: 848-8835
ZIP CODE: _____

ARCHITECT: The Design Group
ADDRESS: 120 Vassar SE, Suite 100
CITY, STATE: Albuquerque, NM

CONTACT: Wendy Caruso
PHONE: 242-6880
ZIP CODE: 87106

SURVEYOR: · High Mesa Consulting
ADDRESS: _____
CITY, STATE: _

CONTACT: Chuck Cala
PHONE: 345-4250
ZIP CODE:

CONTRACTOR: TBD
ADDRESS: _
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: 871

CHECK TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL, ***REQUIRES TCL or equal***
- ☒ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION (TCL)
- ☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SIA / FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☒ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM.)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☒ YES
- ☐ NO
- ☐ COPY PROVIDED

RECEIVED
JAN 31 2017
LAND DEVELOPMENT SECTION

DATE SUBMITTED: 1-31-17

BY: David Aube P.E.

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature , location and scope ot the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan**: Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

[redacted]

Dave Aube

From: Dave Aube
Sent: Saturday, January 14, 2017 7:53 AM
To: Carrillo, Abiel X.
Cc: Dave Aube
Subject: RE: APS East Side Family School - G17D19A - Stamp Date 12-12-2016

Abiel
Please see the comments below. We will resubmit early next week.
Thanks
Dave

From: Carrillo, Abiel X. [mailto:acarrillo@cabq.gov]
Sent: Tuesday, December 27, 2016 4:33 PM
To: Dave Aube <daube@designgroupnm.com>
Subject: APS East Side Family School - G17D19A - Stamp Date 12-12-2016

SORRY, Ignore previous, it was a draft that I did not intend to send yet...

Dave,

This email is being sent in lieu of a letter attached. A reply to this email will not substitute a resubmittal.

Based on the information provided in your submittal dated 12-12-2016, received 12-12-2016, the above-referenced Grading and Drainage Plan cannot be approved for Building Permit until the following items are addressed:

1. In general, clarify in the report and in the plan what is existing and what is proposed.

    a. The Plan shows bold line work, which implies new facilities/infrastructure, for the entire site. It is not clear where sidewalk, curb, etc ties to existing improvements built with Phase I. Bold Line Work has been changed to better clarify the difference between the existing conditions and the proposed conditions.

2. Provide proposed Finished Floor elevations for all proposed buildings. Finished Floor elevations have been provided.

3. Tabulate the assumptions that are used for the inputs in the calculations, mainly the land treatment acreages/percentages and first flush calculations. Additional paperwork has been provided to clarify the assumptions made for drainage calculations and to clarify locations and volumes for the first flush.

    a. The first phase appears to have been built prior to the First Flush ordinance. You can base the ponding requirement on the new impervious area that is proposed in this phase, and base the exhibits/calculations on that criteria. Otherwise, the plan appears to lack first flush ponding volume.

    b. Generally label the water quality/retention ponding that already exists in the courtyard (EX Inlet, EX Water Q Pond, etc.).

4. Provide a legend for the Plan showing major existing and proposed features. An aerial has been provided to show the existing conditions in place of a legend. The goal is to clarify limits of existing conditions and the changes taking place during the second phase of construction at Desert Willow.

5. Clarify the company-specific (?) acronyms that are shown throughout the plan, such as HCS, BNH, LS, DCO, etc. They can be removed or otherwise noted if they are needed for Hydrology's review. Surveyor's acronyms and parking space numbers have been removed to simplify the drawing.

6. There are keyed notes (?) on the plan but no build notes. We think the notes you are referring to are related to parking counts. These have been removed for clarity.

7. It is not advisable to propose a storm drain under the new building. It also appears to only be 5' deep under the building, which could impact or be in the way of the foundation structure. Storm drain will remain because alternative options are limited. Previously the plan was to surface drain out to the south into the parking lot. With the incorporation of the playground equipment the underground conveyance system needed to extend to beyond the new building to the west. We would much rather not go under the building but do not have any other option.

8. Clarify on the plan with details/notes how the storm drain outfalls through the wall. RCP Class IV should be considered under the wall. Additional details for connection between underground piping through the wall into the concrete rundown channel have been provided.

9. Provide information for the overflow rundown/weir from the above-mentioned pond (invert elevation, tie-in elevation). Information concerning the weir has been provided both on the plan and in the additional paperwork.

Any question just let me know.

Abiel Carrillo, PE, CFM

Principal Engineer - Hydrology
Planning Department
Development Review Services Division
City of Albuquerque
505-924-3986
acarrillo@cabq.gov
600 2nd Street NW
Albuquerque, NM 87102

CITY OF ALBUQUERQUE

Richard J. Berry, Mayor

February 22, 2017

David Aube, P.E.
Design Group
120 Vassar SE, Suite 100
Albuquerque, NM, 87106

RE: **APS Family School East Side**
3303 Monroe St NE
Drainage Plan and Report
Engineer's Stamp Date: 2/20/2017 & 12/12/2016
Hydrology File: G17D019A

Dear Mr. Aube:

Based upon the information provided in your submittal received 2/21/17, the Drainage Plan and Report are approved for Building Permit.

If you have any questions, contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

Orig: Drainage File

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: APS Family School East Side
DRB #: ___ EPC#:_____

ZONE MAP/DRG. FILE #:G-17 D019A
WORK ORDER#:_____

LEGAL DESCRIPTION: Portions of Tracts D and E, Board of Education Addition.
CITY ADDRESS: 3303 Monroe Street NE.

ENGINEERING FIRM: Design Group
ADDRESS: 120 Vassar SE, Suite 100
CITY, STATE: Albuquerque, NM

CONTACT: David Aube
PHONE: 998-6430
ZIP CODE: 87106

OWNER: APS Facilities
ADDRESS: __
CITY, STATE: Albuquerque, NM

CONTACT: Richard Miller
PHONE: 848-8835
ZIP CODE: _____

ARCHITECT: The Design Group
ADDRESS: 120 Vassar SE, Suite 100
CITY, STATE: Albuquerque, NM

CONTACT: Wendy Caruso
PHONE: 242-6880
ZIP CODE: 87106

SURVEYOR: High Mesa Consulting
ADDRESS: _____
CITY, STATE: _

CONTACT: Chuck Cala
PHONE: 345-4250
ZIP CODE:

CONTRACTOR: TBD
ADDRESS: _
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: 871

CHECK TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL, ***REQUIRES TCL or equal***
- ☒ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION (TCL)
- ☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SIA / FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☒ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM.)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☒ YES
- ☐ NO
- ☐ COPY PROVIDED

RECEIVED
FEB 21 2017
LAND DEVELOPMENT SECTION

DATE SUBMITTED:2-20-17

BY:David Aube P.E.

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature , location and scope ot the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan**: Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

CITY OF ALBUQUERQUE

Richard J. Berry, Mayor

February 17, 2017

David Aube, P.E.
Design Group
120 Vassar SE, Suite 100
Albuquerque, NM, 87106

RE: **APS Family School East Side**
3303 Monroe St NE
Drainage Plan and Report
Engineer's Stamp Date: 1/30/2017 & 12/12/2016
Hydrology File: G17D019A

Dear Mr. Aube:

Based upon the information provided in your submittal received 1/31/17, the Drainage Plan and report is not approved for Building Permit. The following comments need to be addressed for approval of the above referenced project:

1. Define the limits of construction and provide area. Submittal of an erosion and sediment control plan is required prior to building permit approval if the disturbed area is over 1 acre. Please contact Curtis Cherne P.E at 924-3420 for question regarding ESC plans. Area disturbed = 43,658. Plan submitted to Mr. Cherne.
2. Clarify how the storm drain outfalls though the wall and into the pond with a detail view/notes and include dimensions and inverts. In your previous submittal, this information was added for the overflow weir, but not the storm drain outfall. Details Added.

The following are recommendations, not required for approval:

1. Use RVP Class IV underneath the building and the wall
2. Call out Section and detail views for the weir
3. Correct invert elevation on SD Manhole #2 (thank you for noticing).

If you have any questions, contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

Orig: Drainage File

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

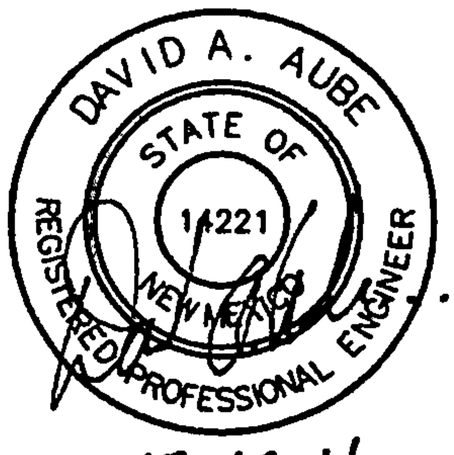
THE HARTMAN+MAJEWSKI DESIGN GROUP

Drainage Summary Report

Desert Willow Family School

Dave Aube P.E., Caden Gigliotti

12/12/2016



12-12-16

I. PURPOSE AND SCOPE

The purpose of this drainage plan is to present the existing and proposed drainage management plans for Phase II of the proposed Albuquerque Public Schools Family School Facility located at the SE Corner of the existing McKinley Middle School Campus at the intersection of Monroe Street NE and Headingly Road NE. The site is near the intersection of Comanche Road NE and Monroe Street NE. The site is located in Zone Atlas Page G-17 one block south of Comanche Road NE between Cherokee Road NE and Headingly Road NE. The site was previously used as ball fields and portable buildings site for APS and is now primarily vacant. The portable buildings located on the site were removed in 2008.

II. SITE DESCRIPTION AND HISTORY

This site has previously been developed as ball fields and portable building site for APS. There were eight (8) existing building portables on site that were removed and relocated in 2008. The backstops are all that remains from the old ball fields. There is a concrete drainage channel located on northeast side of this APS property that drains the public park on the east side of Monroe Street NE. The concrete drainage channel is separated from the proposed development by the existing Bus pick up and drop off lane for McKinley Middle School.

III. COMPUTATIONAL PROCEDURES

Hydrologic analysis was performed utilizing the design criteria found in the COA_DPM Section 22.2 released in June 1997.

IV. PRECIPITATION

The 100-yr. 6-hr duration storm was used as the design storm for this analysis. This site is within Zone 2 as identified in the DPM Section 22.2. Tables within the section were used to establish the 6-hr precipitation, excess precipitation and peak discharge.

V. EXISTING DRAINAGE CONDITIONS OVERVIEW

Phase I of Desert Willow site was approximately 157,675 square feet (3.62 acres). The site was developed in the first phase with improvements including approximately 34,000 sf of new classroom buildings, asphalt parking lots and concrete sidewalks. A large courtyard was constructed at the interior of the buildings. The courtyard has several small depressions that are used for both water harvesting and to collect the water so that

storm drainage discharge pipes can release the excess runoff away from the courtyard area.

The buildings have metal (standing seam metal roofs) with a ridge line located in the middle (sending 1/2 of the water into the courtyard and the other 1/2 away from the building to the perimeter.

The peak runoff that is generated by the 100 year 6 hour storm for Basin #2 the courtyard area is 2.70 cfs. There are three (3) discharge pipes that drain the water toward the west under the proposed building. Each of these pipes are 12" diameter with a capacity of 3.7 cfs. The factor of safety for these pipes is 3.4.

Runoff from the storm drainage pipes was diverted south around the existing portables and eventually west into the access road and parking lot. The final outfall for the storm runoff is into Comanche Road NE merged with the water within the concrete lined drainage channel to the north of the project site.

The entire site drainage basin combined in the existing configuration generates a peak discharge of 14.24 cfs. The ponding volume inside the courtyard is 1220 cf.

VI. DRAINAGE MANAGEMENT PLAN

The Basin #3 portion of the Phase II site generally slopes from east to west with excess runoff being directed into the access drive and parking lot for the Senior Citizens Center. This excess runoff joins the water that is flowing in the concrete lined drainage channel and eventually back into Comanche Road NE.

The existing Phase II portion of the site, Basin #3, has all been disturbed by human activity and generates a peak runoff rate of 3.83 cfs in the current conditions.

The proposed building and associated parking, and sidewalks will increase the peak runoff to 4.42 cfs. The site was previously submitted with Phase II and was permitted free discharge into the concrete drainage channel. The proposed layout now incorporates a retention area for the first flush.

Roof runoff will be collected in gutters and downspouts to an underground collection and conveyance system that directs the runoff into the retention pond at the North West corner of the site.

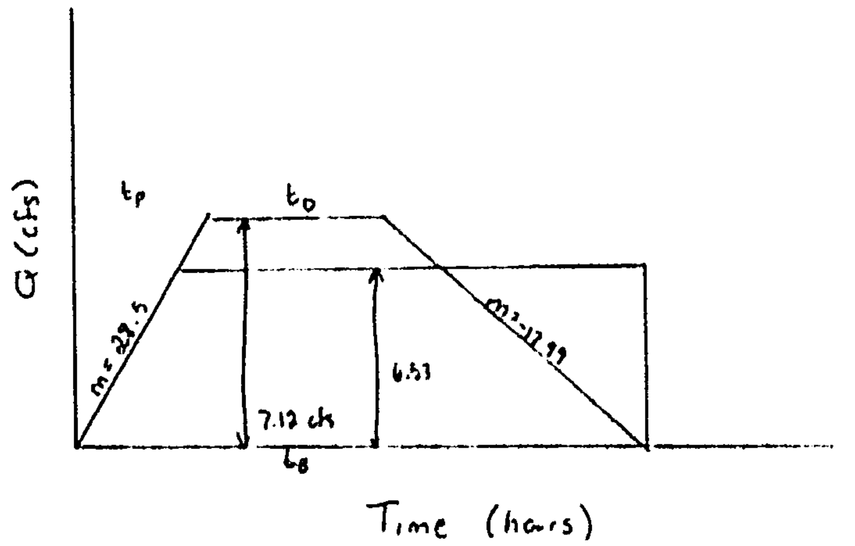
The peak incoming flow rate into the first flush pond is 7.12 cfs (combining the courtyard runoff from Phase I(Basin #2) with the roof runoff from Phase II (Basin #3). The peak flow rate from the pond is 6.53 cfs, with the intent to only collect the first flush volume without detaining the larger storm events. The first flush volume that is needed for Phase II is 616 cf. The pond located in the northwest corner has a capacity of 671 cf.

Drainage Basins #1 and #2 will not be affected by this site improvement.

VII. CONCLUSION

The project site was previously developed as ball fields and portable building campus for APS. The proposed Phase II building construction will have a small increase (0.59 cfs) in the peak discharge. The site will still drain to Comanche Road NE as it has historically. There should be minimal impact to downstream users. The site also contains a first flush ponding area that is sized for the Phase II development.

4/21/2016



Excess Precipitation (Zone 3)

$$E = \frac{0 + .92(.12) + 1.29(1.11) + 2.36(.48)}{.12 + 1.11 + .48}$$

$$= 1.564$$

Time to Peak (7.12 cfs)

$$t_p = .7 t_c + \frac{(1.6 - \frac{A_p}{A_T})}{12}$$

$$= .7(.2\text{ hr}) + \frac{(1.6 - \frac{.48}{1.7})}{12}$$

= .2498 hours

= 899.28 secs

Time of Base (7.12 cfs)

$$t_B = \frac{2.107 * E * A_T}{Q_p} - .25\left(\frac{A_D}{A_T}\right)$$

$$= \frac{2.107 * (1.564)^2 (1.7)}{7.12} - .0706$$

= .7162 hrs

= 2,578 secs

Time of Duration (7.12 cfs)

$$t_D = .25\left(\frac{A_p}{A_T}\right)$$

$$= .25\left(\frac{.48}{1.7}\right)$$

= .0706 hrs

= 254.16 secs

Slope

$$\frac{R_{ise}}{R_{un}} = \frac{7.12}{2498} = 28.50$$

Time to Peak (6.53 cfs)

$$\frac{6.53 \text{ cfs}}{28.5} = .229 \text{ hours}$$

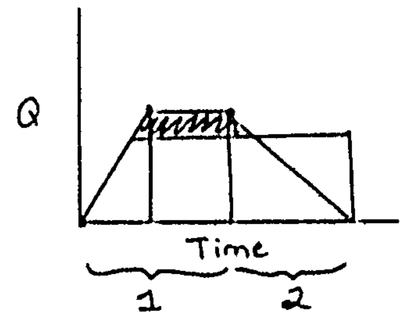
= 824.84 secs

Time of Duration (6.53 cfs)

$$(T_{P7.12} + T_{D7.12}) - T_{P6.53}$$

$$T_{D6.53} = 899.28 + 254.16 - 824.84$$

= 328.6 secs



1) $\frac{1}{2}(t_{p_{7.12}} * 7.12\text{ cfs}) + (t_{D_{7.12}} * 7.12\text{ cfs})$

$\frac{1}{2}(899.28 * 7.12) + (254.16 * 7.12)$

$= 5,011.06$ cf

Area under the graph for 7.12 cfs $T_P + T_D$ combined.

$\frac{1}{2}(t_{p6.53} * 6.53\text{ cfs}) + (t_{D6.53} * 6.53\text{ cfs})$

$\frac{1}{2}(824.84 * 6.53) + (328.6 * 6.53)$

$= 4,838.84$ cf

Area under graph for 6.53 cfs $T_P + T_D$ combined

$V_{diff_1} = 5,011.06 - 4,838.84$

$= 172.22$ cubic feet

---

2) $t_B - t_P - t_D$ = Back of graph

$2.578 - 899.28 - 254.16 = .3957$ hrs

$.3957 - .3629 = .0328 = 118.08$ secs

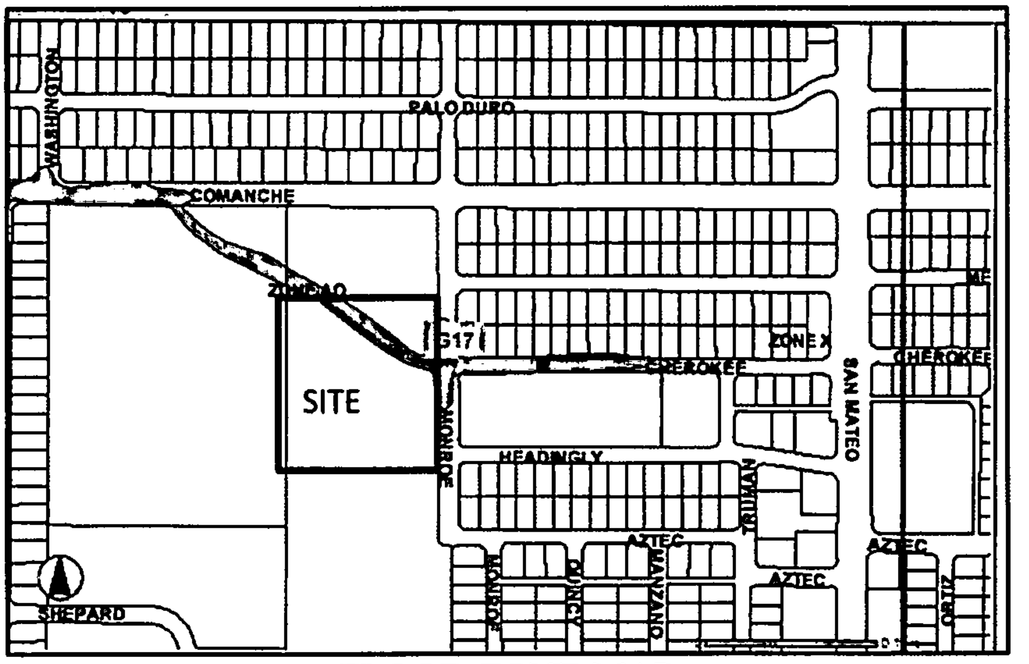
$\frac{1}{2}[1180.8 * (7.12 - 6.53)] = 34.83$ cf

Slope $\therefore \frac{7.12}{.3957} = -17.99$

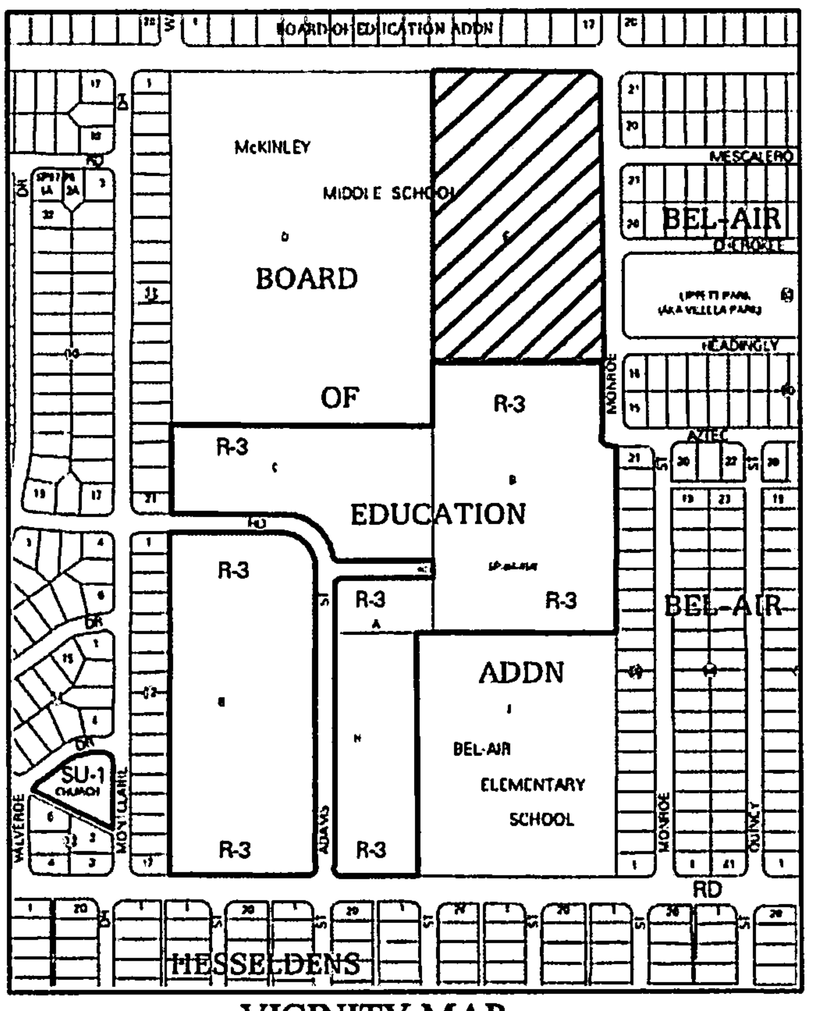
so $\frac{6.53}{-17.99} = .3629$ hours

Total Volume Difference 7.12 + 6.53

$$\begin{array}{r} 172.22 \text{ cf} \\ 34.83 \text{ cf} \\ \hline \boxed{207.05} \text{ cubic feet} \end{array}$$



FLOOD ZONE MAP



VICINITY MAP

Drainage Summary

Project:	APS DESERT WILLOW
Project Numbe:	3043
Date:	06/15/16
By:	Dave A

Site Location

Precipitaion Zone 3 Per Table A-1 COA DPM Section 22.2

Existing summary

Basin Name	Ex 1	Ex 2	Ex #3
Area (sf)	83411	25907	48298
Area (acres)	1.91	0.59	1.11
%A Land treatment			
%B Land treatment	15	20	0
%C Land treatment	40	0	100
%D Land treatment	45	80	0
Soil Treatment (acres)			
Area "A"	0.00	0.00	0.00
Area "B"	0.29	0.12	0.00
Area "C"	0.77	0.00	1.11
Area "D"	0.86	0.48	0.00
Excess Runoff (acre-feet)			
100yr. 6hr.	0.2738	0.1027	0.1192
10yr. 6hr.	0.1559	0.0630	0.0573
2yr. 6hr.	0.0781	0.0359	0.0185
100yr. 24hr.	0.3097	0.1225	0.1192
Peak Discharge (cfs)			
100 yr.	7.71	2.70	3.83
10yr.	4.79	1.75	2.22
2yr.	2.42	1.00	0.86

Proposed summary

Basin Name	Pro 1	Pro 1A	Pro 3
Area (sf)	83411	25907	48298
Area (acres)	1.91	0.59	1.11
%A Land treatment			
%B Land treatment	15	20	20
%C Land treatment	40	0	35
%D Land treatment	45	80	45
Soil Treatment (acres)			
Area "A"	0.00	0.00	0.00
Area "B"	0.29	0.12	0.22
Area "C"	0.77	0.00	0.39
Area "D"	0.86	0.48	0.50
Excess Runoff (acre-feet)			
100yr. 6hr.	0.2738	0.1027	0.1568
10yr. 6hr.	0.1559	0.0630	0.0891
2yr. 6hr.	0.0781	0.0359	0.0446
100yr. 24hr.	0.3097	0.1225	0.1776
Peak Discharge (cfs)			
100 yr.	7.71	2.70	4.42
10yr.	4.79	1.75	2.73
2yr.	2.42	1.00	1.37

THE DESIGN GROUP

PROJECT APS DESERT WILLOW
PROJECT NO. 3022
DATE 06/15/16
BY Dave A

DPM Section 22.2 - Hydrology

Part A-Watersheds less than 40 acres.
January, 1993

INSTRUCTIONS

* Spread sheet requires three input areas (dark cells):
  - Location
  - >A.1 Precipitation Zone
  - >A.3 Land Treaments
* Values from the tables are automatically placed using "if" statements.
* Table values should be checked for correctness for each use.

SUMMARY

Location	**Pro 1**		
Precipitation Zone		3	
Land Area		1.91	acres
Excess Precipitation Volume			
	>>> 100-year 6-hour (design)	**0.27**	**acre-ft.**
	10-year 6-hour	0.16	acre-ft.
	2-year 6-hour	0.08	acre-ft.
	100-year 24-hour	0.31	acre-ft.
Peak Discharge Rates (DPM)			
	>>> Q100 (design)	**7.71**	**cfs**
	Q10	4.79	cfs
	Q2	2.42	cfs
Peak Discharge Rates (DPM-Rational Method)			
	>>> Q100 (design)	**7.69**	**cfs**
	Q10	4.81	cfs
	Q2	2.41	cfs

CALCULATIONS FOLLOW

INPUT AND CALCULATIONS

LOCATION	Pro 1		
>A.1 PRECIPITATION ZONE (from Table A-1)	3		
>A.2 DEPTHS			
(from Table A-2)			
100-YEAR STORM (P60)		2.14	inches
100-YEAR STORM (P360)		2.60	inches
100-YEAR STORM (P1440)		3.10	inches
10-YEAR (P360) (Calculated: P360*RPF10)		1.73	inches
2-YEAR (P360) (Calculated: P360*RPF2)		1.13	inches
>A.3 LAND TREATMENTS (AI)			
Treatment A		0.00	acres
Treatment B		0.29	acres
Treatment C		0.77	acres
Treatment D		0.86	acres
Total Area		1.91	acres
>A.4 ABSTRACTIONS	See A.5		

CALCULATIONS FOLLOW

INPUT AND CALCULATIONS (CON'T)

>A.5 EXCESS PRECIPITATION 6 HOUR AND 24 HOUR (Ei) from Table A-8		
100-year 6-hour		
Treatment A	0.66	inches
Treatment B	0.92	inches
Treatment C	1.29	inches
Treatment D	2.36	inches
WEIGHTED E (Sum Ei*Ai/A)	1.72	inches
VOLUME V100:6h (E*A)	0.27	acre-ft.
	11,927.77	ft^3
10-year 6-hour		
Treatment A	0.19	inches
Treatment B	0.36	inches
Treatment C	0.62	inches
Treatment D	1.50	inches
WEIGHTED E (Sum Ei*Ai/A)	0.98	inches
VOLUME V10:6h (E*A)	0.16	acre-ft.
	6,791.05	ft^3
2-year 6-hour		
Treatment A	0.00	inches
Treatment B	0.06	inches
Treatment C	0.20	inches
Treatment D	0.89	inches
WEIGHTED E (Sum Ei*Ai/A)	0.49	inches
VOLUME V2:6h (E*A)	0.08	acre-ft.
	3,402.47	ft^3
100-year 24-hour		
VOLUME V100:24h (V100-6h+Ad*P1440-P360)/12)	0.31	acre-ft.
	13,491.73	ft^3

CALCULATIONS FOLLOW

INPUT AND CALCULATIONS (CON'T)

>A.6 PEAK DISCHARGE RATE FOR SMALL WATERSHEDS (Qi) from Table A-9		
100-year		
Treatment A	1.87	cfs/acre
Treatment B	2.60	cfs/acre
Treatment C	3.45	cfs/acre
Treatment D	5.02	cfs/acre
Q100 (Sum Qi*Ai)	7.71	cfs
10-year		
Treatment A	0.58	cfs/acre
Treatment B	1.19	cfs/acre
Treatment C	2.00	cfs/acre
Treatment D	3.39	cfs/acre
Q10 (Sum Qi*Ai)	4.79	cfs
2-year		
Treatment A	0.00	cfs/acre
Treatment B	0.21	cfs/acre
Treatment C	0.78	cfs/acre
Treatment D	2.04	cfs/acre
Q2 (Sum Qi*Ai)	2.42	cfs

CALCULATIONS FOLLOW

RATIONAL METHOD

PEAK INTENSITY (in/hr at tc=0.2 hour)
from Table A-10

Peak Intensity (I) 100-year	5.38
Peak Intensity (I) 10-year	3.65
Peak Intensity (I) 2-year	2.21

RATIONAL METHOD COEFFICIENT, C
from Table A-11

100-year

Treatment A	0.35	cfs/acre
Treatment B	0.48	cfs/acre
Treatment C	0.64	cfs/acre
Treatment D	0.93	cfs/acre
Q100 (Sum Qi*I*Ai)	7.69	cfs

10-year

Treatment A	0.16	cfs/acre
Treatment B	0.33	cfs/acre
Treatment C	0.55	cfs/acre
Treatment D	0.93	cfs/acre
Q10 (Sum Qi*I*Ai)	4.81	cfs

2-year

Treatment A	0.00	cfs/acre
Treatment B	0.10	cfs/acre
Treatment C	0.35	cfs/acre
Treatment D	0.92	cfs/acre
Q2 (Sum Qi*I*Ai)	2.41	cfs

Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Dec 28 2016

<Name>

Rectangular Weir

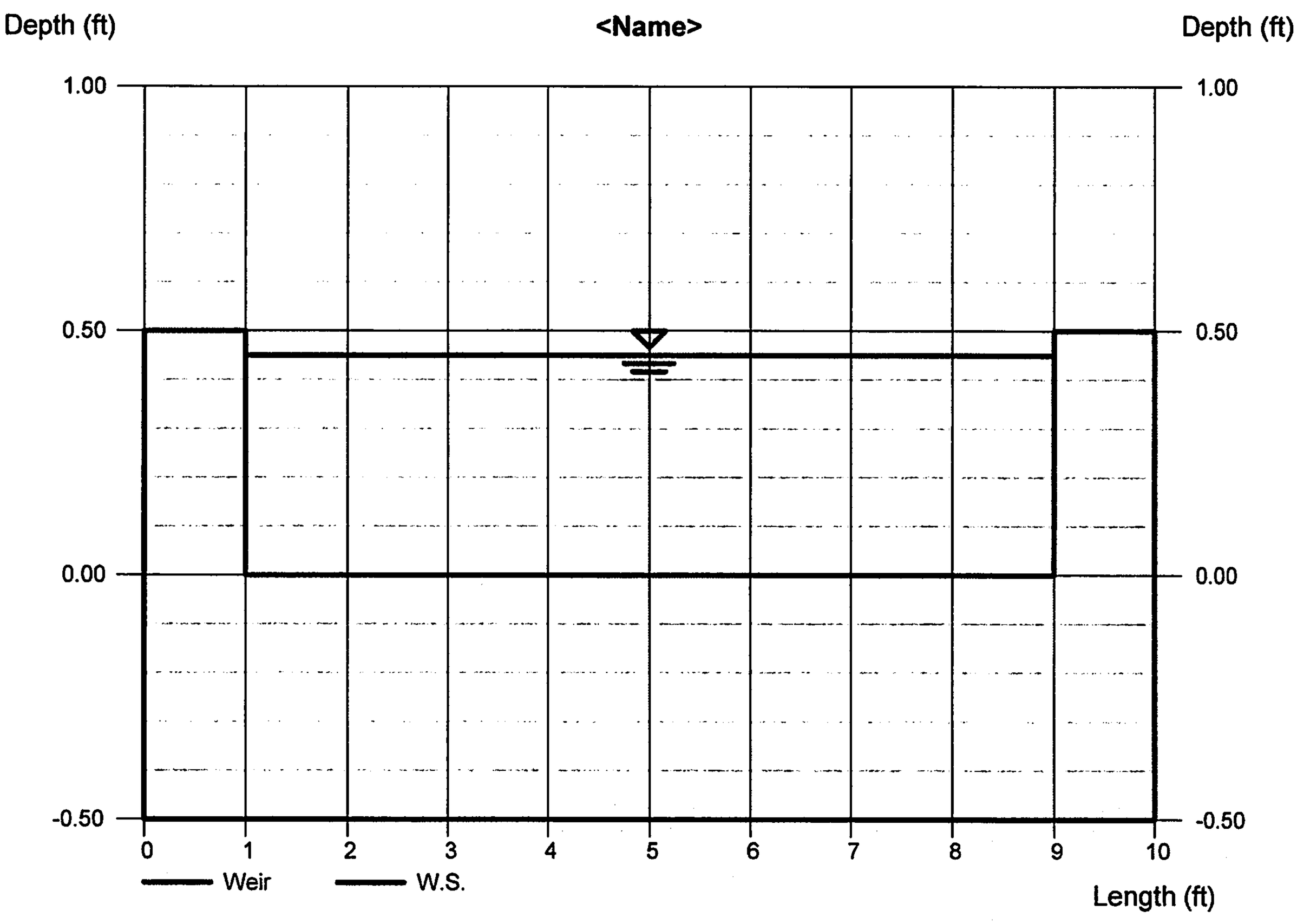
Crest	= Broad
Bottom Length (ft)	= 8.00
Total Depth (ft)	= 0.50

Calculations

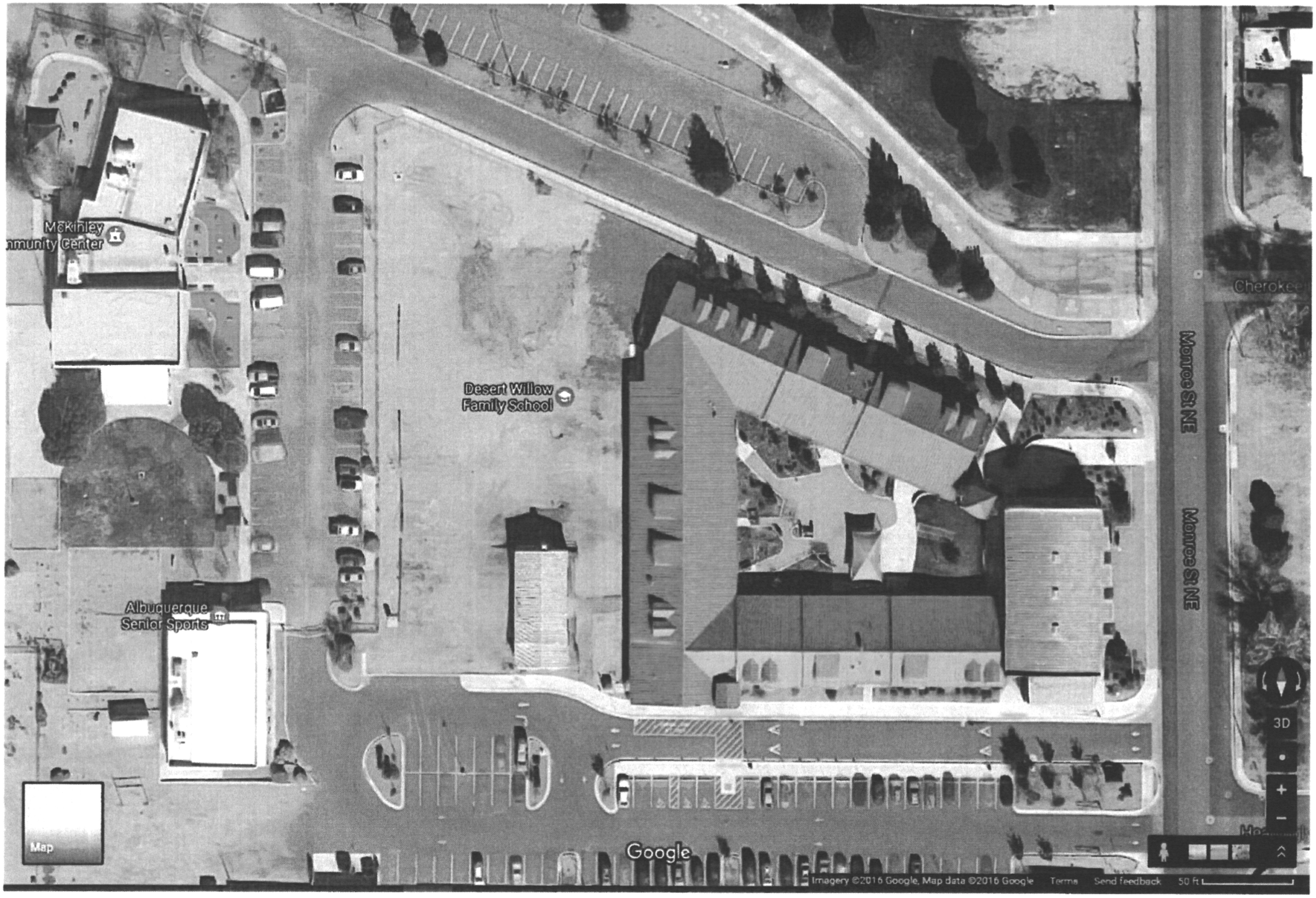
Weir Coeff. Cw	= 2.60
Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 0.45
Q (cfs)	= 6.279
Area (sqft)	= 3.60
Velocity (ft/s)	= 1.74
Top Width (ft)	= 8.00



Depth	Q	Area	Veloc	TopWidth	Energy
(ft)	(cfs)	(sqft)	(ft/s)	(ft)	(ft)
0.05	0.233	0.40	0.58	8.00	0.06
0.10	0.658	0.80	0.82	8.00	0.11
0.15	1.208	1.20	1.01	8.00	0.17
0.20	1.860	1.60	1.16	8.00	0.22
0.25	2.600	2.00	1.30	8.00	0.28
0.30	3.418	2.40	1.42	8.00	0.33
0.35	4.307	2.80	1.54	8.00	0.39
0.40	5.262	3.20	1.64	8.00	0.44
0.45	6.279	3.60	1.74	8.00	0.50
0.50	7.354	4.00	1.84	8.00	0.55



Desert Willow Existing Conditions Aerial