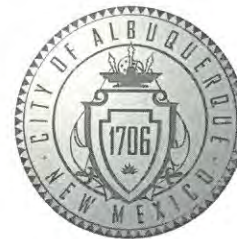


# CITY OF ALBUQUERQUE

Hydrology Section Planning Department  
David S. Campbell, Director



Timothy M. Keller, Mayor

December 14, 2018

Richard Stevenson  
Tierra West, LLC  
5571 Midway Park Place NE  
Albuquerque, NM, 87109

**RE: 7201 Montgomery Blvd NE Church of Christ**  
**Grading Plan Engineer's Stamp Date: 12/13/2018**  
**Hydrology File: F19D003A**

Based upon the information provided in your submittal received 12/13/2018, the Grading and Drainage Plan is approved for Site Plan for Building Permit, SO-19, Building Permit, and Grading Permit. Please be sure to include a copy of the approved G&D Plan in the approved Site plan for Planning and in the plan sets for Building Permit.

1. As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, [ccherne@cabq.gov](mailto:ccherne@cabq.gov), 924-3420) 14 days prior to any earth disturbance.
2. Please provide a Private Facility Drainage Covenant per Chapter 17 of the DPM for BMP pond prior to Certificate of Occupancy. Please submit this on the 4th floor of Plaza de Sol. A \$25 fee will be required.
3. An Engineer's Certification must be submitted to hydrology for approval prior to Certificate of Occupancy.

If you have any questions, please contact me at 924-3986 or e-mail [jhughes@cabq.gov](mailto:jhughes@cabq.gov).

Sincerely,

James D. Hughes, P.E.  
Principal Engineer, Planning Dept.  
Development and Review Services

PO Box 1293

Albuquerque

NM 87103

[www.cabq.gov](http://www.cabq.gov)



# City of Albuquerque

Planning Department  
Development & Building Services Division

## DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Project Title: Montgomery Church Building Permit #: \_\_\_\_\_ Hydrology File #: F190003A  
DRB#: \_\_\_\_\_ EPC#: \_\_\_\_\_ Work Order#: \_\_\_\_\_  
Legal Description: TR A-1 Plat of TR A-1  
City Address: 7201 Montgomery Blvd NE Albuquerque NM 87109

Applicant: Tierra West, LLC Contact: Richard Stevenson  
Address: 5571 Midway Park Place NE Albuquerque NM 87109  
Phone#: 505-858-3100 Fax#: 505-858-1118 E-mail: rstevenson@tierrawestllc.com

Other Contact: \_\_\_\_\_ Contact: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

TYPE OF DEVELOPMENT: \_\_\_\_\_ PLAT (# of lots) \_\_\_\_\_ RESIDENCE ☒ DRB SITE \_\_\_\_\_ ADMIN SITE

IS THIS A RESUBMITTAL? ☒ Yes \_\_\_\_\_ No

DEPARTMENT \_\_\_\_\_ TRANSPORTATION ☒ HYDROLOGY/DRAINAGE

Check all that Apply:

### TYPE OF SUBMITTAL:

- ☐ ENGINEER/ARCHITECT CERTIFICATION
- ☐ PAD CERTIFICATION
- ☐ CONCEPTUAL G & D PLAN
- ☒ GRADING PLAN
- ☒ DRAINAGE REPORT
- ☐ DRAINAGE MASTER PLAN
- ☐ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
- ☐ ELEVATION CERTIFICATE
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ TRAFFIC IMPACT STUDY (TIS)
- ☐ STREET LIGHT LAYOUT
- ☐ OTHER (SPECIFY) \_\_\_\_\_
- ☐ PRE-DESIGN MEETING?

### TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ☒ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ SITE PLAN FOR SUB'D APPROVAL
- ☐ SITE PLAN FOR BLDG. PERMIT APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ SIA/RELEASE OF FINANCIAL GUARANTEE
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ SO-19 APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ GRADING/ PAD CERTIFICATION
- ☐ WORK ORDER APPROVAL
- ☐ CLOMR/LOMR
- ☐ FLOODPLAIN DEVELOPMENT PERMIT
- ☐ OTHER (SPECIFY) \_\_\_\_\_



DATE SUBMITTED: 12/13/2018 By: Richard Stevenson

COA STAFF:

ELECTRONIC SUBMITTAL RECEIVED: \_\_\_\_\_

FEE PAID: \_\_\_\_\_



## DRAINAGE REPORT REV 1



### **Montgomery Church of Christ** 7201 Montgomery Blvd NE, Albuquerque, NM 87109

Prepared for:

Montgomery Blvd. Church of Christ, Inc.  
7201 Montgomery Blvd NE,  
Albuquerque, NM 87109

Prepared by:

Tierra West, LLC  
5571 Midway Park Place NE  
Albuquerque, New Mexico 87109

December, 2018

I certify that this report was prepared under my supervision, and I am a registered Professional Engineer in the State of New Mexico in good standing.



---

Ronald R. Bohannon  
PE # 7868

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**TABLE OF CONTENTS**

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Purpose .....	1
Location and Background .....	2
Flood Plain.....	3
Calculations .....	4
Existing Conditions .....	4
Proposed Conditions.....	5
Stormwater Quality Volume Management.....	7
Summary .....	7

**Appendices**

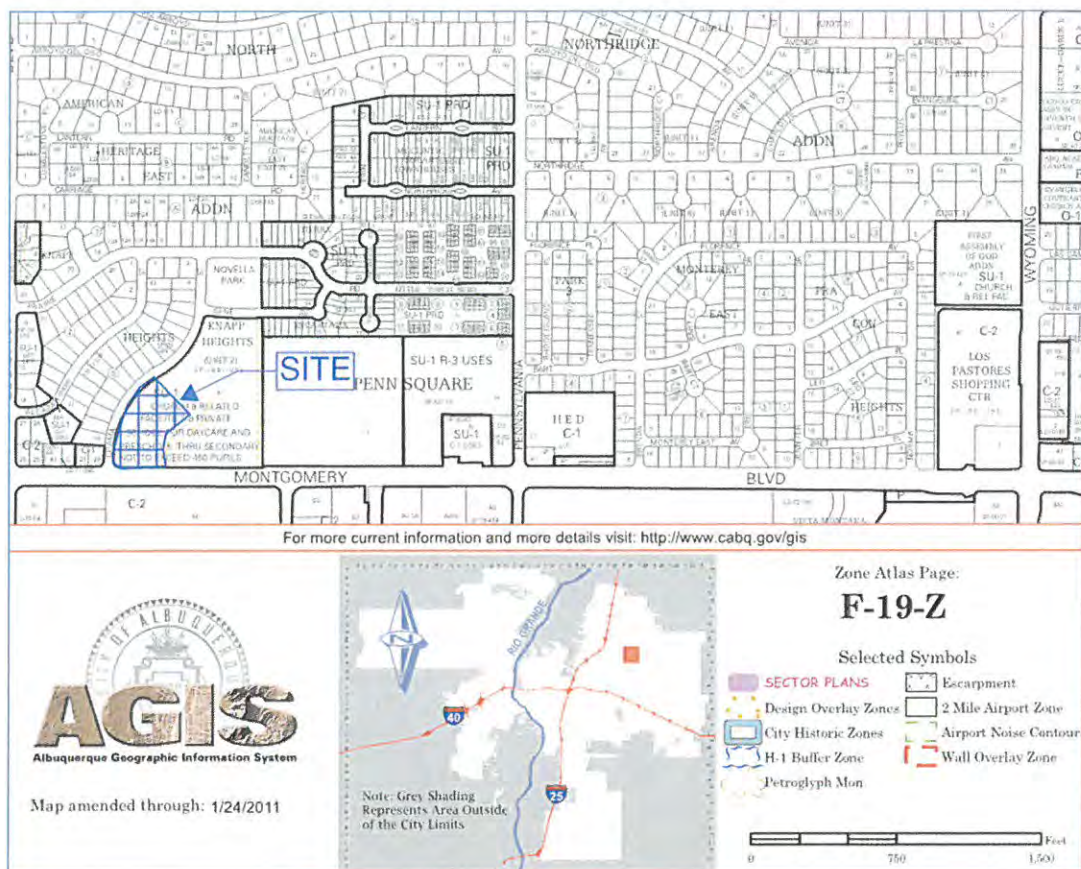
Drainage Basin Maps & Hydrology Tables/Calculations.....	APPENDIX A
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## Purpose

The purpose of this report is to outline the Drainage Plan for the development of the proposed Montgomery Church of Christ and Building Permit Approval for the new facilities, located on the undeveloped lot at the south west corner of Montgomery Blvd. and Chama St. at 7201 Montgomery Blvd NE, Albuquerque, NM 87109. The Church is in the process of subdividing the property and will retain a  $\pm 3.73$  acre tract to develop the new facility. The proposed worship facility will consist of a single-story 23,995 square foot building with 142 parking stalls and just over 12,000 square foot of landscape areas.

This report outlines the developed flows associated in developing a portion of the subdivided lot, approximately  $\pm 2.48$  acres. The balance of the property will remain in its current state with paved parking areas. The project was delegated by the Environmental Planning Commission on April 12, 2018. This report supports the application to the Development Review Board for the signoff of the Site Development Plan for Building Permit.



**Exhibit A – Vicinity Map**



## Location and Background

The subdivided parcel is located at the south west corner of Montgomery Blvd. and Chama St. Recently two residential houses were vacated and demolished on the site. The balance of the site is undeveloped with areas of scrub and small vegetation. The site is bounded to the north by the balance of the subdivided lot; hardscaped parking areas, to the east by Mesilla St., to the south by Montgomery Blvd. and to the west by Chama St.

The existing parcel drainage number is F19D003. The entire church site was previously approved under a Grading and Drainage Plan that was updated on August 3, 1988 and submitted to the City by Jeff Mortensen & Associated, Inc. This was a revision based on the approved Masterplan for the entire site by Murray-McCormick, Inc. in 1975. The entire  $\pm 10.28$  acre site has free discharge to Montgomery Blvd. under a full build out condition. The site under development that is covered by this drainage report is the final undeveloped parcel for the 'Church of Christ' site and consists of  $\pm 2.48$  acres.



**Exhibit B – Site Aerial Image**







## Calculations

The site is located within Precipitation Zone 3, between San Mateo Blvd. and Eubank Blvd. as specified in Chapter 22, Section A.1 of the City of Albuquerque Development Process Manual Volume I – Design Criteria, 2006 Revision (DPM). The principal design storm is the 100-year 6 hour event. No detention basins or retention basins are proposed and therefore longer duration design storms are not considered in the calculations. As stated in the DPM in Chapter 22 Section A.2, the 100-year 6 hour event is 2.60 inches. The appropriate land treatments A through D, as defined in the DPM Chapter 22 Section A.3, will be applied to the various pervious and impervious areas for the proposed re-developed site.

Excess precipitation is the depth of runoff remaining after the initial volume of rainfall retained on the surface and infiltration has been subtracted from the design storm hydrograph. The DPM defines the excess precipitation for the 100-year 6 hour event in Chapter 22 Table A-8 for Zone 2 with the corresponding land treatments.

A weighted excess precipitation rate is used to calculate the volume runoff as defined in the DPM Chapter 22 (a-5, a-6). The calculation requires the sum of excess precipitation multiplied by the corresponding treatment areas divided by the total area, multiplied by the weighted excess precipitation of the watershed area.

To determine the peak discharge for the re-development the corresponding treatment areas are multiplied by the peak rate for each treatment and sum to compute the total flow. The peak rates for the treatment areas are defined in the DPM Chapter 22 Table A-9 for the 100 year event.

As this site is a re-development the storm water quality volume is calculated based on the 0.48 inch storm. To calculate the required storm water quality volume to be captured and retained onsite, the impervious areas are multiplied by 0.26 inches for the 80th percentile storm.

## Existing Conditions

The site generally drains from the northeast to the southwest with sheet flow draining directly into Montgomery Blvd and Charma St. There are no offsite flows that enter the site. The offsite sheet flow generated by the parking lot to the north is directed to Mesilla St. by the existing topography along an access way. At the proposed driveway entrances to the site a water block is established preventing this runoff entering into the undeveloped site.



The peak discharge calculated for the existing undeveloped conditions is 5.35 cfs. The existing hydrology calculations are detailed in the hydrology table in the appendix.



**Exhibit D – Existing Site Conditions**

## **Proposed Conditions**

The proposed additions to the property consist of a new building, paving, and landscaping in its entirety. The landscaping requirements (15% net site minimum) results in a lower discharge than was previously calculated in the 1988 plans, coupled with the first flush volume retention, the proposed drainage flows do not exceed what was previously approved. The site shall continue as previously approved to free discharge for the developed condition as there is no downstream volume constraint within Montgomery Blvd.





**Exhibit E – Drainage Basin Map**

The proposed developed site is divided into four basins B1-B4. There are two BMP surface Stormwater Quality Volume (SWQV) ponds proposed to capture the required volume. The calculated total runoff from the developed site for the 100-year 6 hour event is 11.66 cfs or a volume of 0.442 ac-ft that passes directly into Chama St. 20-feet north of the intersection with Montgomery Blvd. At the point of discharge Chama St. is at a gradient of 3.6% and is a 32-foot wide (face-to-face) roadway with standard curb and gutter and has the capacity to accept the 11.66 cfs discharge from the Church site.

On site the runoff is designed to sheet flow to curb and gutters around the perimeter of the parking areas that will then be directed through the SWQV ponds. The runoff is consolidated in the larger SWQV pond at the south east corner of the site and is then passed through two 24-inch sidewalk culverts into Chama St. This was intentional to circumvent discharging directly



into Montgomery Blvd. as this roadway conveys significant flow during high storm events. The designed sidewalk culvert outlets that discharge the event flow of 11.6 cfs have a total capacity of 13.9 cfs. Roof drains are proposed for the church building that will discharge into the parking lot areas and sheet flow away from the building.

Both SWQV ponds will be xeriscaped to blend with the existing right-of-way landscaping. The water quality pond #1 will retain a volume of 420 cubic feet. Water quality pond #2 will have Class A rip rap slopes and have a capacity of 2,175 cubic feet. The total SWQV onsite is 2,595 which is slightly greater than the required 2,420 cubic feet. The drainage rundowns into the ponds and the sidewalk culverts were sized using both the weir equation and normal depth to ensure there is adequate capacity to pass the design flows into and out of the SWQV ponds. The normal depth calculations to ensure the 6-inch curb and gutter in the parking lot can safely convey and has the capacity for the design storm was confirmed and included in the appendix are the calculations for the proposed site conditions.

## **Stormwater Quality Volume Management**

As this site is a development of an undeveloped site, the water quality volume is calculated based on retaining the 0.44- inch and considering 0.1-inch for infiltration. The formula used to calculate the Stormwater Quality Volume to be retained on site is  $= (.44 - 0.1) * 1/12 * I * 43,560$  where I is the impervious area in acres.

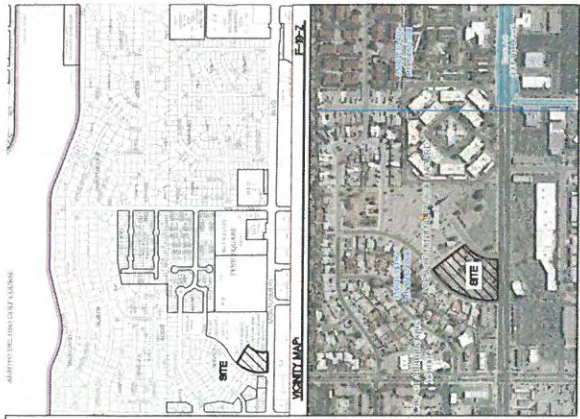
The total impervious area is 1.96 acres and requires a total SWQV retention of 2,420 cubic feet. A combine total of 2,420 cubic feet is provided for SWQV and is detailed on the grading plan. The water quality volume calculations are detailed on the hydrology table in the appendix.

## **Summary**

This report outlines the Drainage Plan and presents the on-site BMP SWQV ponding and drainage improvements needed to safely convey the developed flows for the development of the site into a new Montgomery Church building. The developed discharge passes through the required SWQV ponding before being released into Charma St. and thereafter Montgomery Blvd. The developed site conforms to the previously approved Master Drainage Plan for the parcel submitted to the City in 1975. The drainage plan presented meets the current DPM requirements and includes LID treatments to safely control and pass the site runoff.



ADAPTED FROM USGS 1:25000



FIRM MAP #0000000000 DATED 9/20/2008

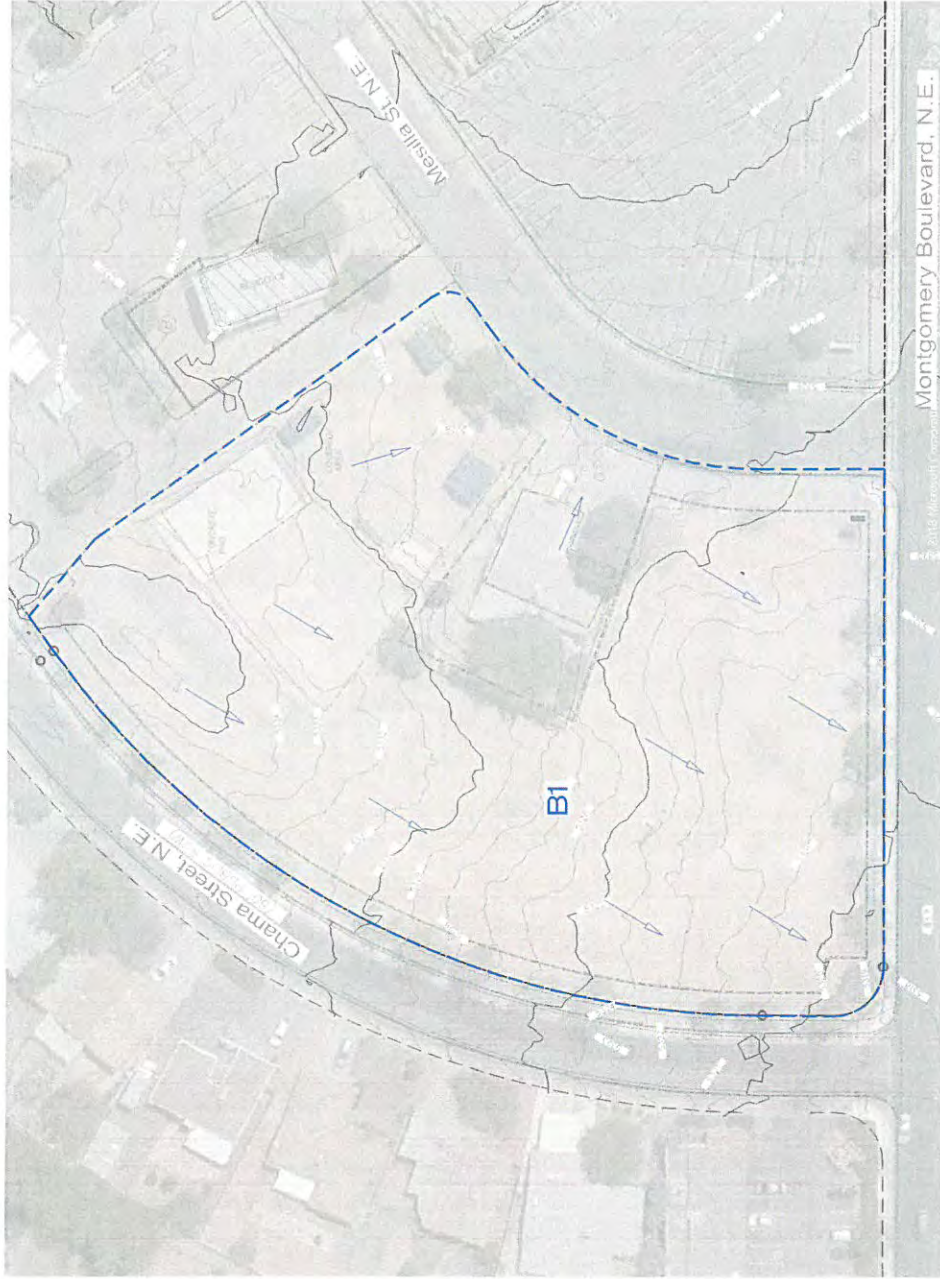
#### LEGAL DESCRIPTION

A-1-B KNAPP HEIGHTS UNIT 2

#### LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- CENTRAL LINE
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- RETAINING WALL
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- DRAINAGE BASIN BOUNDARY
- FLOW DIRECTION

OWNER'S SEAL	DRAWN BY BT
	DATE 12/6/18
	PROJECT 2018037-DRAINAGE HISTORIC
	SHEET # C1
	PROJECT LOCATION 5571 MONTAGUE PLACE NE ALBUQUERQUE, NM 87109 (505) 252-3100 www.terrapin.com
DESIGNED BY P. J. BOWMAN	DATE 12/6/18
PROJECT 2018037-DRAINAGE HISTORIC	SHEET # C1
	PROJECT LOCATION 5571 MONTAGUE PLACE NE ALBUQUERQUE, NM 87109 (505) 252-3100 www.terrapin.com



GRAPHIC SCALE  
SCALE: 1"=30'

Existing Conditions - Free Discharge													
Basin ID	Area (ft <sup>2</sup> )	Area (ac)	Rain Description						15 Year, 5-Hr				
			Treatment A	Treatment B	Treatment C	Treatment D	Weighted E	Flow	Volume	Flow cfs			
1	108,358	2.488	0.0000%	0.0000%	0.423	1.047	0.423	0.124	0.164	5.35	264	0.079	2.07
Total	108,358	2.488	0.0000%	0.0000%	0.423	1.047	0.423	0.124	0.164	5.35	264	0.079	2.07

Peak Discharge (cfs/acre)			
Basin ID	Area (ac)	Peak Discharge (cfs/acre)	Peak Discharge (cfs)
1	2.488	0.124	0.307
Total	2.488	0.124	0.307

Equations:  
Weighted E =  $0.47 \times A \times (1.48 \times 10^{-4} \times C \times P \times A)^{0.78} / (Total Area)$   
Volume = Weighted E \* Total Area  
Flow =  $(Q \times P \times A) / (2.48 \times 10^{-4} \times C \times P \times A)$





# TIERRA WEST, LLC

December 13, 2018

James D. Hughes, P.E.  
Hydrology Planning Department  
PO Box 1293  
Albuquerque, NM 87103

**RE: 7201 MONTGOMERY BLVD NE CHURCH OF CHRIST  
GRADING PLAN ENGINEER'S STAMP DATE: 12/07/2018  
HYDROLOGY FILE: F19D003A**

Dear Mr. Hughes:

Please find the following responses addressing your comments listed below:

1. Add standard SO-19 note available on the hydrology web page.  
**Response:**  
**The standard SO-19 notes were added to the Grading Plan.**
2. There are two sets of contours inside the ponds making the plan hard to read. Please revise so the pond contours are legible.  
**Response:**  
**The pond contours were amended to clearly show the contours.**
3. The drainage rundowns into the ponds and the sidewalk culverts need to be sized using both the weir equation and normal depth, whichever is the more limiting. At 8" depth they have capacity for about 1.25 cfs per foot width. The width of the rundowns and the sidewalk culverts needs to be increased to provide 100 year capacity.  
**Response:**  
**The sidewalk culverts and curb openings were checked for the weir equation and modifications made to increase their capacity as required to convey the design flow. The 2x sidewalk culverts capacity was checked to confirm it can convey the design flow (13.6 cfs>11.6 cfs).**
4. Please provide normal depth calculations for sizing the curb height in the parking lot. Curb heights in the parking lot should be specified on the plan and curb with gutter recommended where the parking lot curb is used to collect and convey the drainage.  
**Response:**  
**The proposed curb and gutter extents is detailed on the site plan. The capacity of the curb and parking lot was checked to ensure it has adequate capacity to convey the design flows. Included in the revised report is the calculations confirming the capacity (18.53 cfs>8.41 cfs).**
5. The water quality precipitation depth in the calculations on the plan (Sheet C-2) needs to match the depth in the report, 0.26" for re-development.  
**Response:**  
**The formula used to calculate the Stormwater Quality Volume to be retained on site is  $= (.44" - 0.1") * 1/12 * I * 43,560$  where I is the impervious area in acres. This is detailed on the Drainage Sheet and in the report under section 'SWQV Management'.**
6. As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required



to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

**Response:**

**An erosion and sediment control plan was submitted to Curtis Cherne for review on 12/7/2018. A NOI will be submitted 14 days prior to any earth disturbance.**

7. Please provide a Private Facility Drainage Covenant per Chapter 17 of the DPM for BMP pond prior to Certificate of Occupancy. Please submit this on the 4<sup>th</sup> floor Plaza de Sol. A @25 fee will be required.

**Response:**

**A Private Facility Drainage Covenant will be submitted and recorded prior to occupancy.**

If you have any questions or need additional information regarding this matter, please do not hesitate to contact me.

Sincerely,



Ronald R. Bohannon, PE

JN: 2016037

RRB/rs/kw

## Curb Opening Capacity

Weir Equation:

$$Q = CLH^{3/2}$$

Q = Flow

C = 2.7 (Per 6-15(A) of proposed DPM)

L = Length of weir

H = Height of Weir

### **2.0' Curb Opening for SWQV Pond #1**

$$Q = 2.7 * 2.0' * 0.5' ^{(3/2)}$$

Q = 1.91 cfs

1.91 cfs > 1.66 cfs (Basin B3)

Opening has capacity

### **8.5' Curb Opening east side of SWQV Pond #2**

$$Q = 2.7 * 8.5' * 0.5' ^{(3/2)}$$

Q = 4.17 cfs

8.11 cfs > 8.1 cfs (Basins B2-B4)

Opening has capacity

### **3.7' Curb Opening north side of SWQV Pond #2**

$$Q = 2.7 * 3.7' * 0.5' ^{(3/2)}$$

Q = 3.51 cfs

3.53 cfs > 3.52 cfs (Basin B1)

Opening has capacity

### **Curb Opening west side of SWQV Pond #2 (outlet)**

$$Q = 2.7 * 12.2' * 0.5' ^{(3/2)}$$

Q = 3.51 cfs

11.65 cfs > 11.6 cfs (Basin B1-B4)

Opening has capacity

## Worksheet for Parking Lot Curb Capacity at 1% Critical Area

### Project Description

Friction Method                      Manning Formula  
Solve For                              Discharge

### Input Data

Channel Slope    0.01000    ft/ft  
Normal Depth    0.50       ft  
Section Definitions

Station (ft)

Elevation (ft)

0+00	0.50
0+00	0.00
0+20	0.60

### Roughness Segment Definitions

Start Station

Ending Station

Roughness Coefficient

(0+00, 0.50)

(0+20, 0.60)

0.013

### Options

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

### Results

Discharge	18.53	ft <sup>3</sup> /s
Elevation Range	0.00 to 0.60	ft
Flow Area	4.17	ft <sup>2</sup>
Wetted Perimeter	17.17	ft
Hydraulic Radius	0.24	ft
Top Width	16.67	ft
Normal Depth	0.50	ft
Critical Depth	0.60	ft
Critical Slope	0.00383	ft/ft
Velocity	4.45	ft/s

## Worksheet for Parking Lot Curb Capacity at 1% Critical Area

### Results

Velocity Head	0.31	ft
Specific Energy	0.81	ft
Froude Number	1.57	
Flow Type	Supercritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.60	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00383	ft/ft

## Cross Section for Parking Lot Curb Capacity at 1% Critical Area

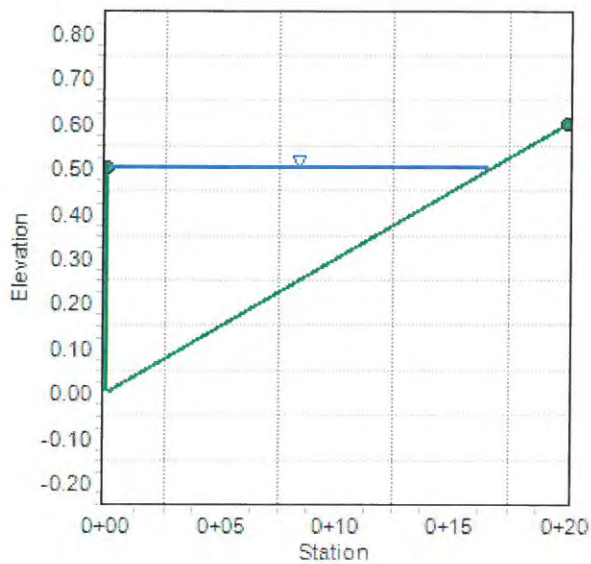
### Project Description

Friction Method                      Manning Formula  
Solve For                              Discharge

### Input Data

Channel Slope                              0.01000    ft/ft  
Normal Depth                              0.50    ft  
Discharge                                  18.53    ft<sup>3</sup>/s

### Cross Section Image





## Worksheet for 2' Concrete Sidewalk Culvert at 2% Slope

### Project Description

Friction Method                      Manning Formula  
Solve For                              Discharge

### Input Data

Channel Slope    0.02000    ft/ft  
Normal Depth    0.50    ft  
Section Definitions

Station (ft)

Elevation (ft)

0+00	0.58
0+00	0.08
0+01	0.00
0+02	0.08
0+02	0.58

### Roughness Segment Definitions

Start Station

Ending Station

Roughness Coefficient

(0+00, 0.58)

(0+02, 0.58)

0.013

### Options

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

### Results

Discharge		6.97    ft <sup>3</sup> /s
Elevation Range	0.00 to 0.58 ft	
Flow Area		0.92    ft <sup>2</sup>
Wetted Perimeter		2.84    ft
Hydraulic Radius		0.32    ft
Top Width		2.00    ft
Normal Depth		0.50    ft
Critical Depth		0.76    ft

## Worksheet for 2' Concrete Sidewalk Culvert at 2% Slope

### Results

Critical Slope	0.00550	ft/ft
Velocity	7.61	ft/s
Velocity Head	0.90	ft
Specific Energy	1.40	ft
Froude Number	1.98	
Flow Type	Supercritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.76	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00550	ft/ft

## Cross Section for 2% Slope

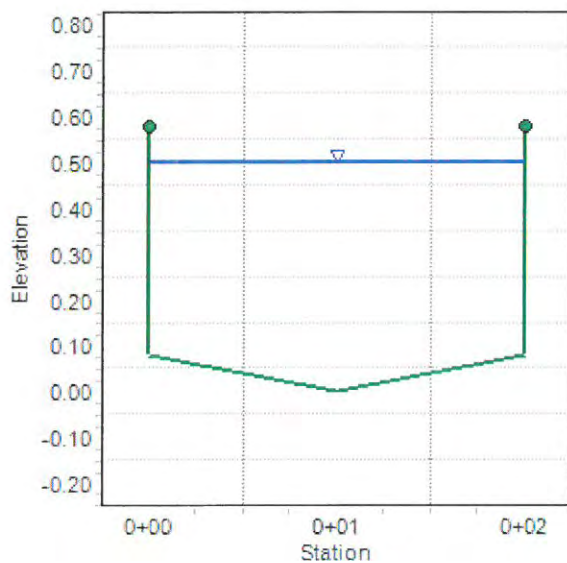
### Project Description

Friction Method	Manning Formula
Solve For	Discharge

### Input Data

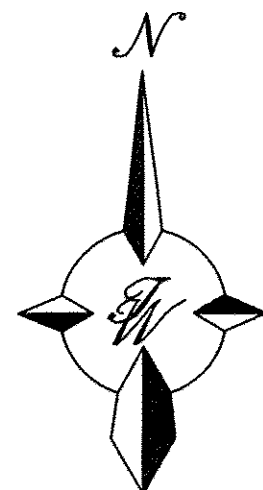
Channel Slope	0.02000	ft/ft
Normal Depth	0.50	ft
Discharge	6.97	ft <sup>3</sup> /s

### Cross Section Image

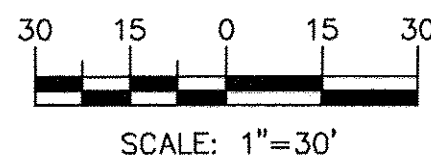




A.G.R.S. MONUMENT "DECKER"  
STANDARD A.G.R.S. BRASS DISC  
(FOUND IN PLACE)  
NEW MEXICO STATE PLANE COORDINATES  
(CENTRAL ZONE-N.A.D. 1983)  
N=1,503,376.247  
E=1,544,026.289  
PUBLISHED EL=5293.812 (NAVD 1988)  
GROUND TO GRID FACTOR=0.999661298  
DELTA ALPHA ANGLE=-0°11'07.87"



GRAPHIC SCALE



Chama Street, N.E.  
(60' PUBLIC ROW)

TRACT A-1  
KNAPP HEIGHTS ADDITION UNIT 2  
(07/25/1988, C37-13)

MONTGOMERY CHURCH  
OF CHRIST TWO-STORY  
23,995 SF

PLAZA

Mesilla St, N.E.

Montgomery Boulevard, N.E.  
(100' PUBLIC ROW)

#### LEGEND

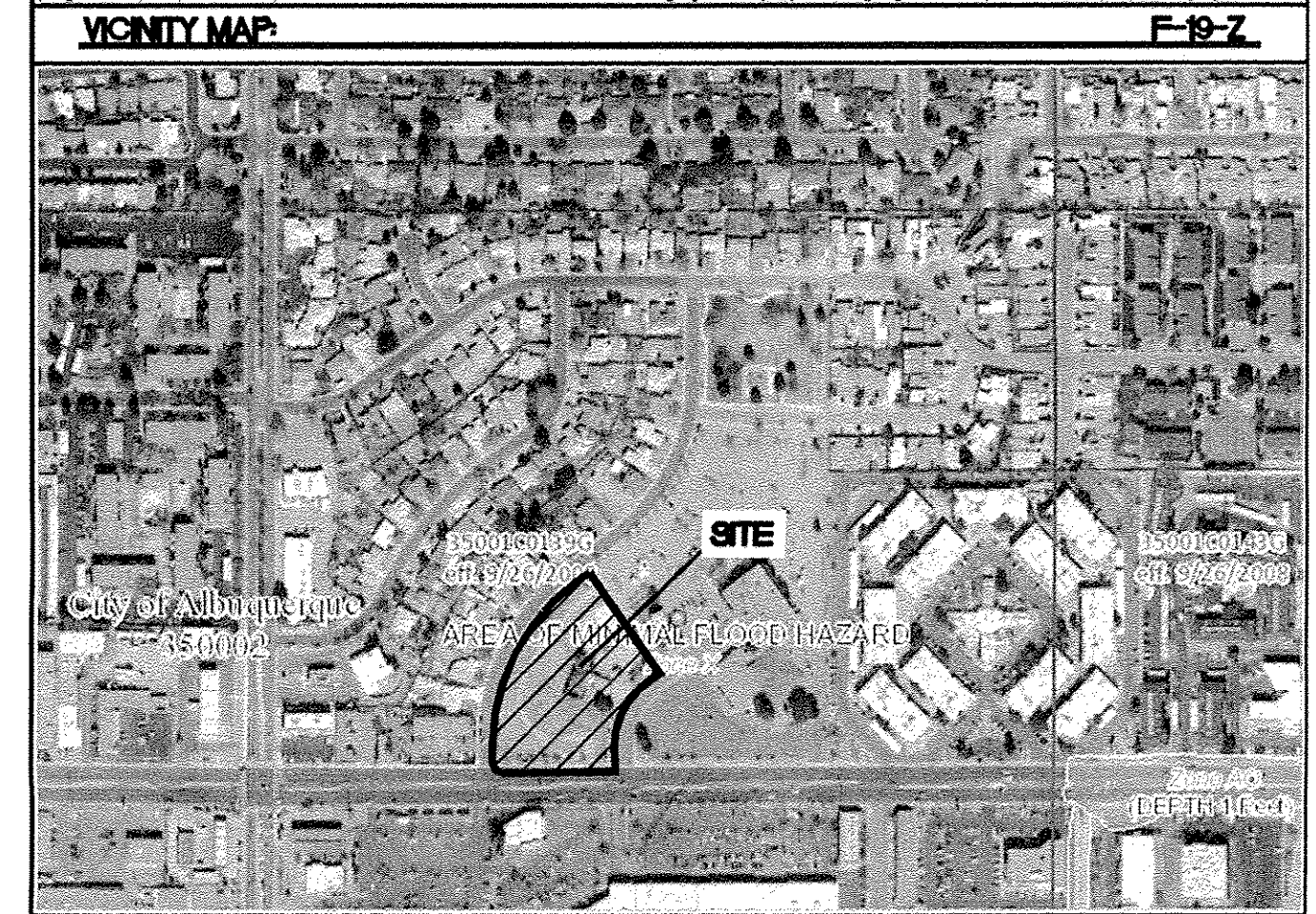
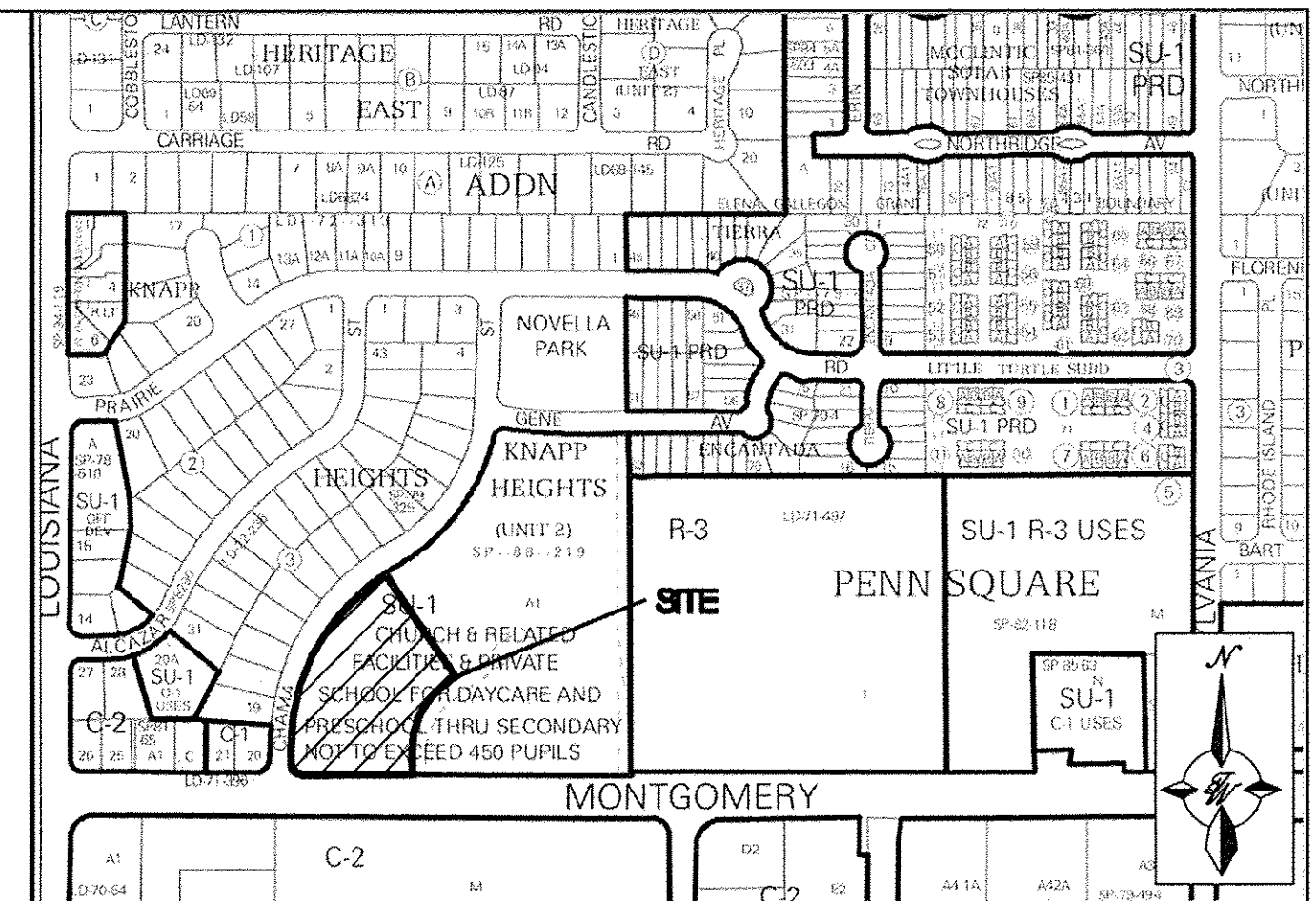
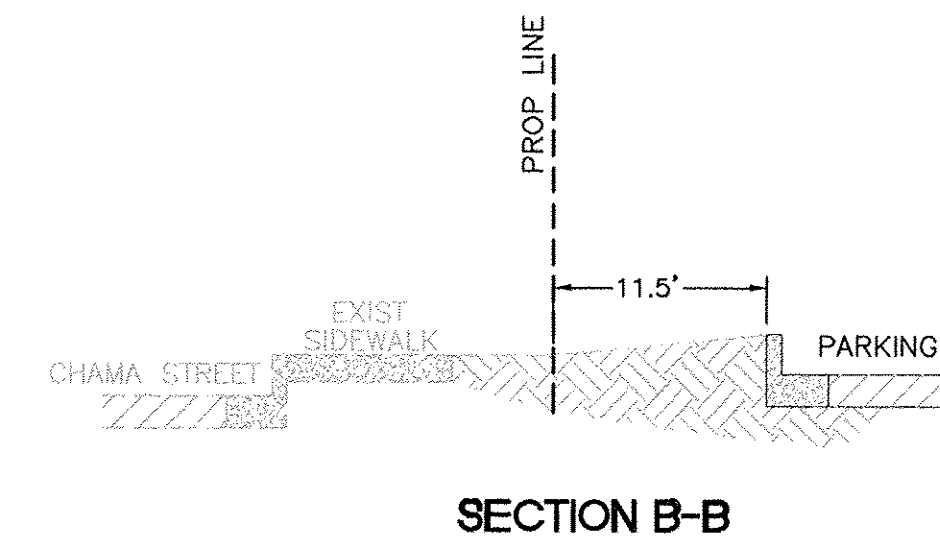
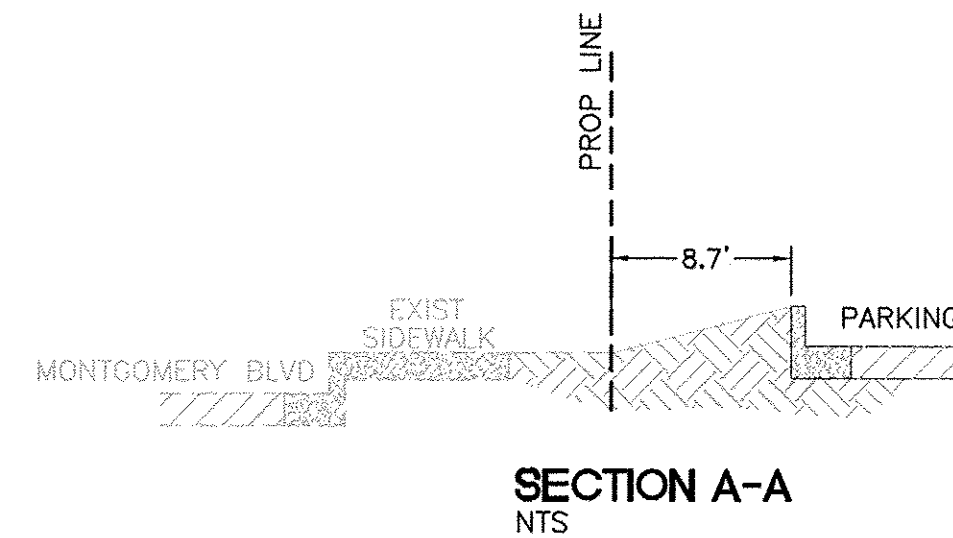
	CURB & GUTTER
	BOUNDARY LINE
	EASEMENT
	CENTERLINE
	RIGHT-OF-WAY
	LIMITS OF CONSTRUCTION
	BUILDING
	SIDEWALK
	RETAINING WALL
	CONTOUR MAJOR
	CONTOUR MINOR
	SPOT ELEVATION
	FLOW ARROW
	EXISTING CURB & GUTTER
	EXISTING BOUNDARY LINE
	EXISTING CONTOUR MAJOR
	EXISTING CONTOUR MINOR
	EXISTING SPOT ELEVATION

#### PRIVATE DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY NOTICE TO CONTRACTOR (SPECIAL ORDER 10 "80-10")

1. AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT-OF-WAY.
2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF ALBUQUERQUE INTERIM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1985.
3. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL, DIAL "811" [OR (505) 260-1990] FOR THE LOCATION OF EXISTING UTILITIES.
4. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONNECTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL
5. NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
6. BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
7. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.
8. WORK ON ARTERIAL STREETS SHALL BE PERFORMED ON A 24-HOUR BASIS.
9. CONTRACTOR MUST CONTACT JASON RODRIGUEZ AT 235-8016 AND CONSTRUCTION COORDINATION AT 924-3416 TO SCHEDULE AN INSPECTION.

#### EROSION CONTROL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.
3. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
4. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL (CITY) ACCEPTANCE OF ANY PROJECT.



#### LEGAL DESCRIPTION

A-1-B KNAPP HEIGHTS UNIT 2

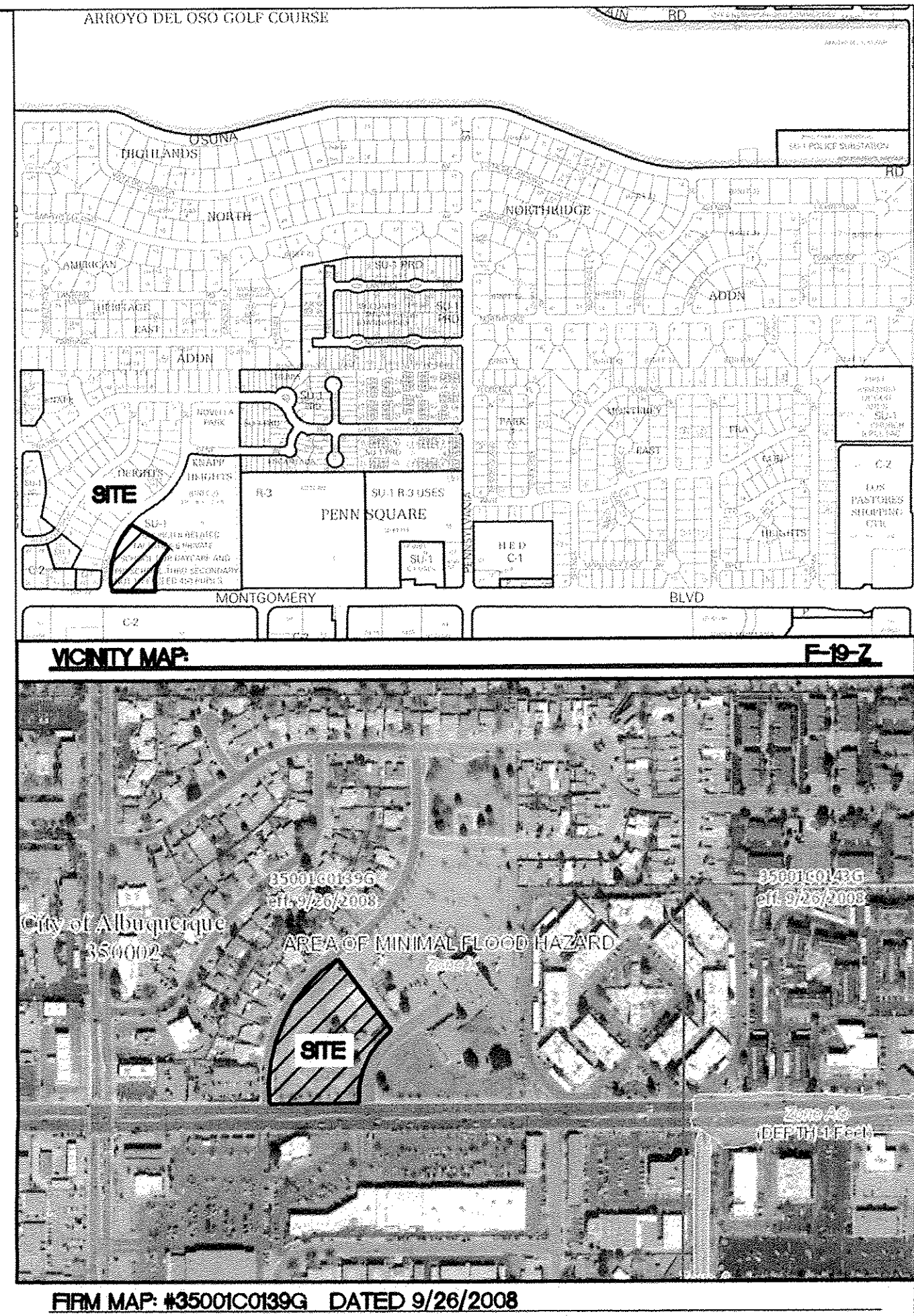
#### CAUTION:

ALL EXISTING UTILITIES SHOWN WERE OBTAINED FROM RESEARCH, AS-BUILTS, SURVEYS OR INFORMATION PROVIDED BY OTHERS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT ALL NECESSARY FIELD INVESTIGATIONS PRIOR TO AND INCLUDING ANY EXCAVATION, TO DETERMINE THE ACTUAL LOCATION OF UTILITIES AND OTHER IMPROVEMENTS. PRIOR TO STARTING THE WORK, ANY CHANGES FROM THIS PLAN SHALL BE COORDINATED WITH AND APPROVED BY THE ENGINEER.

ENGINEER'S SEAL 	MONTGOMERY CHURCH OF CHRIST 7201 MONTGOMERY BLVD. NE	DRAWN BY BF
	GRADING PLAN	DATE 12/11/18
		2016037_GRB
		SHEET # C3
		JOB # 2016037







LEGAL DESCRIPTION:  
A-1-B KNAPP HEIGHTS UNIT 2

- LEGEND
- CURB & GUTTER
  - BOUNDARY LINE
  - EASEMENT
  - CENTERLINE
  - RIGHT-OF-WAY
  - BUILDING
  - SIDEWALK
  - RETAINING WALL
  - EXISTING CURB & GUTTER
  - EXISTING BOUNDARY LINE
  - DRAINAGE BASIN BOUNDARY
  - FLOW DIRECTION

Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr			Water Quality Volume	
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (in)	Volume (ac-ft)	Flow cfs	Weighted E (in)	Volume (ac-ft)	Flow cfs	FF Pond Required CF	FF Pond Provided CF
				%	(acres)	%	(acres)	%	(acres)	%	(acres)								
1	31,711	0.728	0.00114	0%	0.000	0%	0.000	12%	0.087	88%	0.641	2.232	0.135	3.52	1.394	0.085	2.35	790	
2	43,626	1.002	0.00156	0%	0.000	0%	0.000	27%	0.270	73%	0.731	2.071	0.173	4.60	1.262	0.105	3.02	901	
3	15,510	0.356	0.00056	0%	0.000	0%	0.000	22%	0.078	78%	0.278	2.125	0.063	1.66	1.306	0.039	1.10	342	2,175
4	17,511	0.402	0.00063	0%	0.000	0%	0.000	22%	0.088	78%	0.314	2.125	0.071	1.88	1.306	0.044	1.24	387	2,595
Total	108,358	2.488	0.00389		0.000		0.000		0.525		1.963		0.442	11.66		0.272	7.70	2,420	4,770

Equations:

Weighted E =  $E_a \cdot A_a + E_b \cdot A_b + E_c \cdot A_c + E_d \cdot A_d$  / (Total Area)

Volume = Weighted E \* Total Area

Flow =  $Q_a \cdot A_a + Q_b \cdot A_b + Q_c \cdot A_c + Q_d \cdot A_d$

Excess Precipitation, E (in.)			
Zone 3	100-Year	10-Year	
Ea	0.66	0.19	
Eb	0.92	0.36	
Ec	1.29	0.62	
Ed	2.36	1.50	

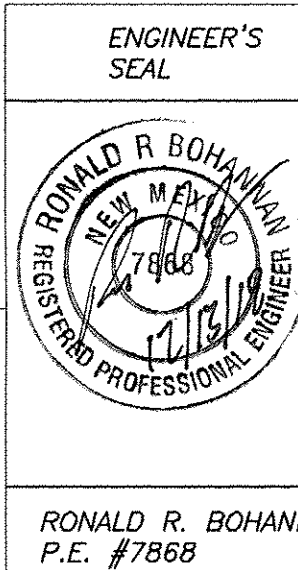
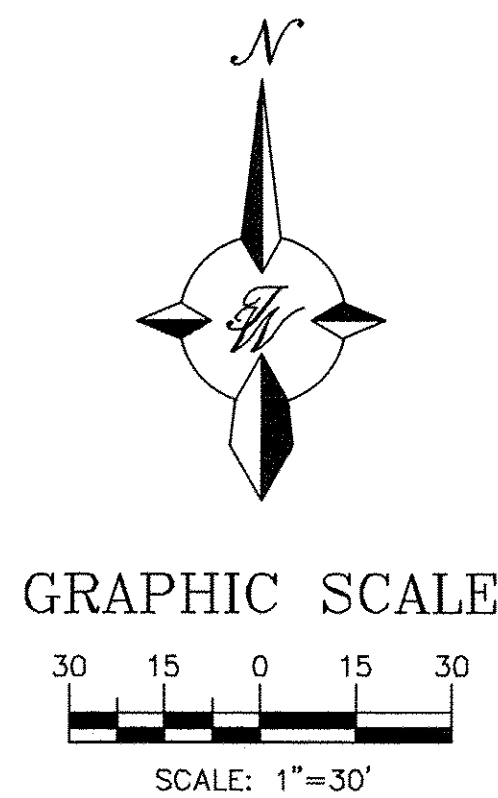
Peak Discharge (cfs/acre)			
Zone 3	100-Year	10-Year	
Qa	1.87	0.58	
Qb	2.6	1.19	
Qc	3.45	2.00	
Qd	5.02	3.39	

Water Quality Volume

Total Impervious Area = 85,509 SF

Retention depth =  $0.44' - 0.1' = 0.34' = 0.0283$  FT

Retention Volume =  $(\text{Area} \times 0.0283) = 2,420$  CF



MONTGOMERY CHURCH OF CHRIST  
7201 MONTGOMERY BLVD. NE  
DEVELOPED DRAINAGE  
PLAN

TERRA WEST, LLC  
5571 MIDWAY PARK PLACE NE  
ALBUQUERQUE, NM 87109  
(505) 858-3100  
www.tierawestllc.com

DRAWN BY  
BF  
DATE  
12/11/18  
2016037—DRAINAGE  
DEVELOPED  
SHEET #  
C4  
JOB #  
2016037