

# CITY OF ALBUQUERQUE

Planning Department  
Brennon Williams, Director



Mayor Timothy M. Keller

July 6, 2021

Ronald Bohannon, P.E.  
Tierra West, LLC  
5571 Midway Park Place NE  
Albuquerque, NM, 87109

**RE: Wintergreen Apartments  
10800 Golf Course Rd NW  
Grading & Drainage Plan and Drainage Report  
Engineer's Stamp Date: 06/08/21  
Hydrology File: A12D008D**

Dear Mr. Bohannon:

PO Box 1293

Based upon the information provided in your submittal received 06/10/2021, the Grading & Drainage Plan and Drainage Report **are not** approved for Building Permit. The following comments need to be addressed for approval of the above referenced project:

Albuquerque

NM 87103

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

1. Since this project is adjacent to, or drains into an Albuquerque Metropolitan Arroyo and Flood Control Authority (AMAFCA) facility, approval by AMAFCA will be need prior to Hydrology approval. Please contact Nicole Friedt P.E, CFM ([nfriedt@amafca.org](mailto:nfriedt@amafca.org) or 505-884-2215).
2. Please remove "Issued for Permit – Not for Construction" on all the Sheets C1 – C7. Hydrology can only approve plans that are for construction for Building Permit.
3. Sheet C3-C5. Please either add a note, "all spot elevations next to curbs is flowline elevation" or add "FL" behind those spot elevations that are next to the curbs.
4. Sheet C5. Per our phone conversation on July 6, 2021, AMACA is requiring the removal and replacement of the existing concrete channel at the southeast corner of the site. Please show all elevations need to construct this. This information may be shown as a blowup area on Sheet C7 next to the cross-section detail of the channel.
5. Sheet C7. The Vehicle Gate Detail and Carport Detail are from another project. The Carport Detail has a structural engineer's stamp and date on it. Therefore, these details were payed under that project and the company and engineer needs to provide updated details for this project. Please check with the architect about this since these are not standard details.

# CITY OF ALBUQUERQUE

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*Mayor Timothy M. Keller*

6. Please reference City of Albuquerque standard detail No. 2236 – Sidewalk Culvert with Steel Plate Top at the sidewalk culvert.
7. 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 (Doug Hughes, PE, [jhughes@cabq.gov](mailto:jhughes@cabq.gov), 924-3420) 14 days prior to any earth disturbance.
8. Also as a reminder, please provide the recorded Drainage Covenant to Hydrology prior to Permanent Certificate of Occupancy. The Drainage Covenant for the proposed Stormwater Quality Pond and retention ponds must meet Chapter Article 6-15(C) of the DPM. Drop off the original executed drainage covenant, the exhibit, and the \$ 25.00 recording fee check made payable to Bernalillo County at the 4th floor of Plaza de Sol.
9. Standard review fee of \$150 will be required at the time of resubmittal.

PO Box 1293

If you have any questions, please contact me at 924-3995 or [rbrissette@cabq.gov](mailto:rbrissette@cabq.gov).

Albuquerque

Sincerely,

*Renée C. Brissette*

NM 87103

Renée C. Brissette, P.E. CFM  
Senior Engineer, Hydrology  
Planning Department

[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:** Wintergreen Apartments **Building Permit #:** \_\_\_\_\_ **Hydrology File #:** \_\_\_\_\_  
**DRB#:** \_\_\_\_\_ **EPC#:** \_\_\_\_\_ **Work Order#:** \_\_\_\_\_  
**Legal Description:** TR E-1 Plat of TRS D-1, E-1 AMAFCA Black Arroyo Channel ROW Paradise Heights Unit 1  
**City Address:** Golf Course RD NW Albuquerque, NM 87114

**Applicant:** Tierra West, LLC **Contact:** Luis Noriega  
**Address:** 5571 Midway Park PI NE Albuquerque NM 87109  
**Phone#:** 505-858-3100 **Fax#:** 505-858-1118 **E-mail:** lnoriega@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:** 6/9/2021 **By:** Luis Noriega

COA STAFF:

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

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

# DRAINAGE REPORT FOR

## WINTERGREEN APARTMENTS

TRACT E-1 PARADISE HEIGHTS, UNIT 1  
ALBUQUERQUE, NM

Prepared by:



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

June, 2021

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.



A handwritten signature in black ink, appearing to read "Ron R. Bohannon".

Ronald R. Bohannon  
PE # 7868



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### **Appendices**

Drainage Basin Maps, Hydrology Tables/Calculations and Inlet Capacity Charts.....	APPENDIX A
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Property Plat detailing cross drainage.....	APPENDIX C

### **Map Pocket**

Grading and Drainage Plan

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## **Purpose**

The purpose of this report is to outline the Drainage Plan intent and present a solution for the development of the vacant tract E-1 of Paradise Heights, Unit 1 Albuquerque, New Mexico. The developed site is a proposed four 52 unit apartment complex and associated clubhouse and site amenities.

This report outlines the developed flows associated in developing the  $\pm 8.7$  acre site and describes the on-site surface improvements needed to safely convey the developed flows. The drainage analysis improvements also considers the vacant site to the north, a  $\pm 7.6$  acre parcel Tract D-1, whose runoff passes through the subject property.

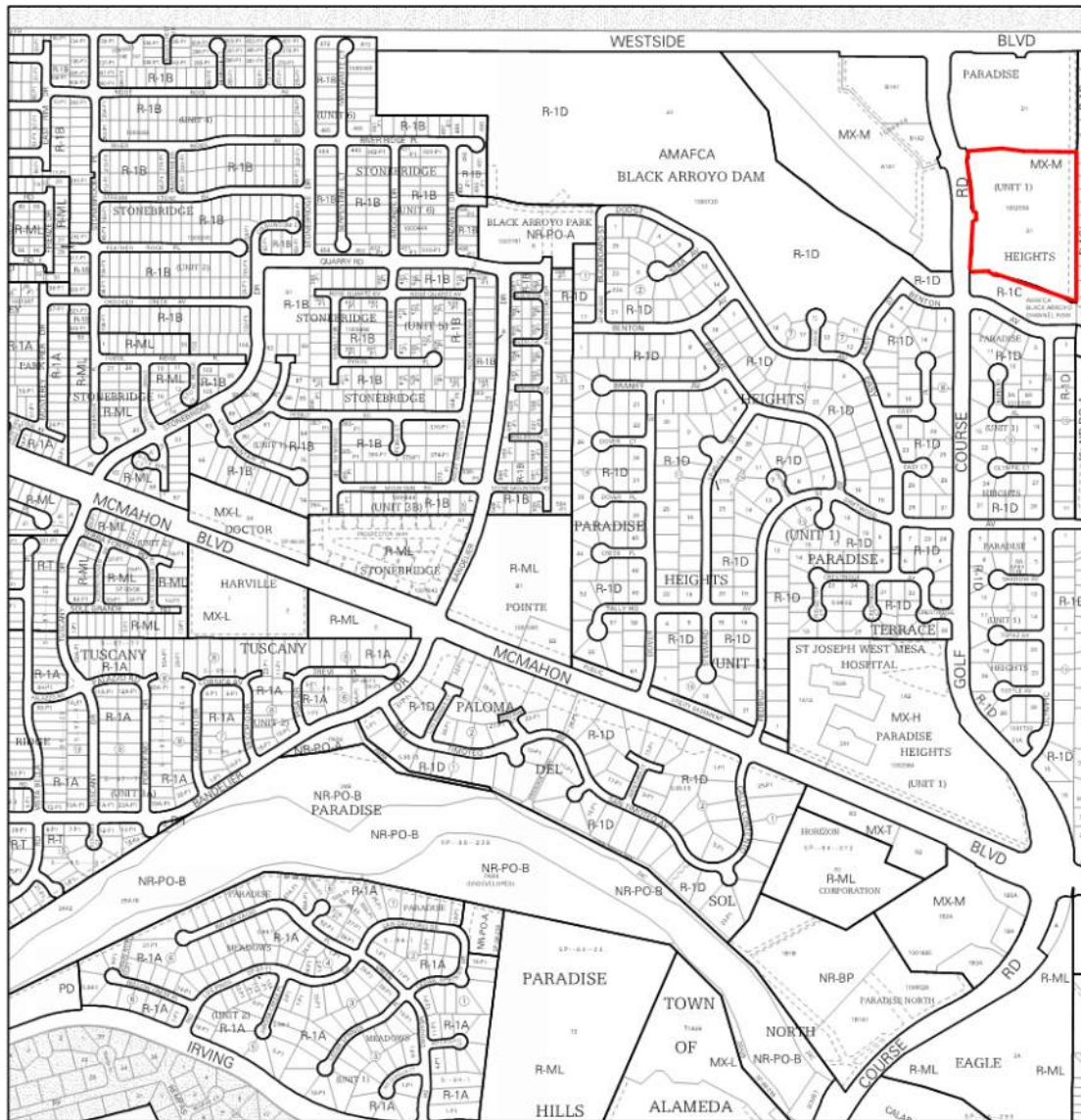
In 2008 a platting action was completed for the property and a conceptual grading and drainage plan with engineers stamp date 10-1-08 was approved by COA Hydrology with the plat subsequently approved by DRB and recorded on 6/2/2009. Included in the appendix is the hydrology approval letter and current plat.

## **Location and Background**

The site is located on the north east corner of Golf Course Rd and the AMAFCA Black Arroyo Channel. The address of both undeveloped parcels is 10800 Golf Course Rd NW, Albuquerque, NM, 87114. The proposed development will occur across the entire vacant tract E-1, legally described as TRACT E-1, AMAFCA BLACK ARROYO CHANNEL ROW, PARADISE HEIGHTS, UNIT 1, BERNALILLO COUNTY, NEW MEXICO. As mentioned the existing parcel is undeveloped with areas of scrub, small vegetation and some minor disturbance by dumping of soils.

The site is bordered to the north by Tract D-1, also undeveloped, by Golf Course Rd to the west and Black Arroyo Channel to the south. Single Family residential dwellings border the site to the east.

## Exhibit A – Vicinity Map

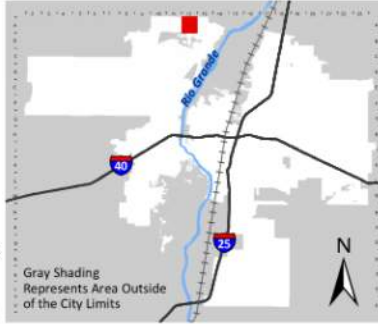


For more details about the Integrated Development Ordinance visit: <http://www.cabq.gov/planning/codes-policies-regulations/integrated-development-ordinance>

### IDO Zone Atlas May 2018



IDO Zoning information as of May 17, 2018  
The Zone Districts and Overlay Zones  
are established by the  
Integrated Development Ordinance (IDO).



Zone Atlas Page:  
**A-12-Z**

- Easement
- Escarpment
- Petroglyph National Monument
- Areas Outside of City Limits
- Airport Protection Overlay (APO) Zone
- Character Protection Overlay (CPO) Zone
- Historic Protection Overlay (HPO) Zone
- View Protection Overlay (VPO) Zone

0 250 500 1,000 Feet



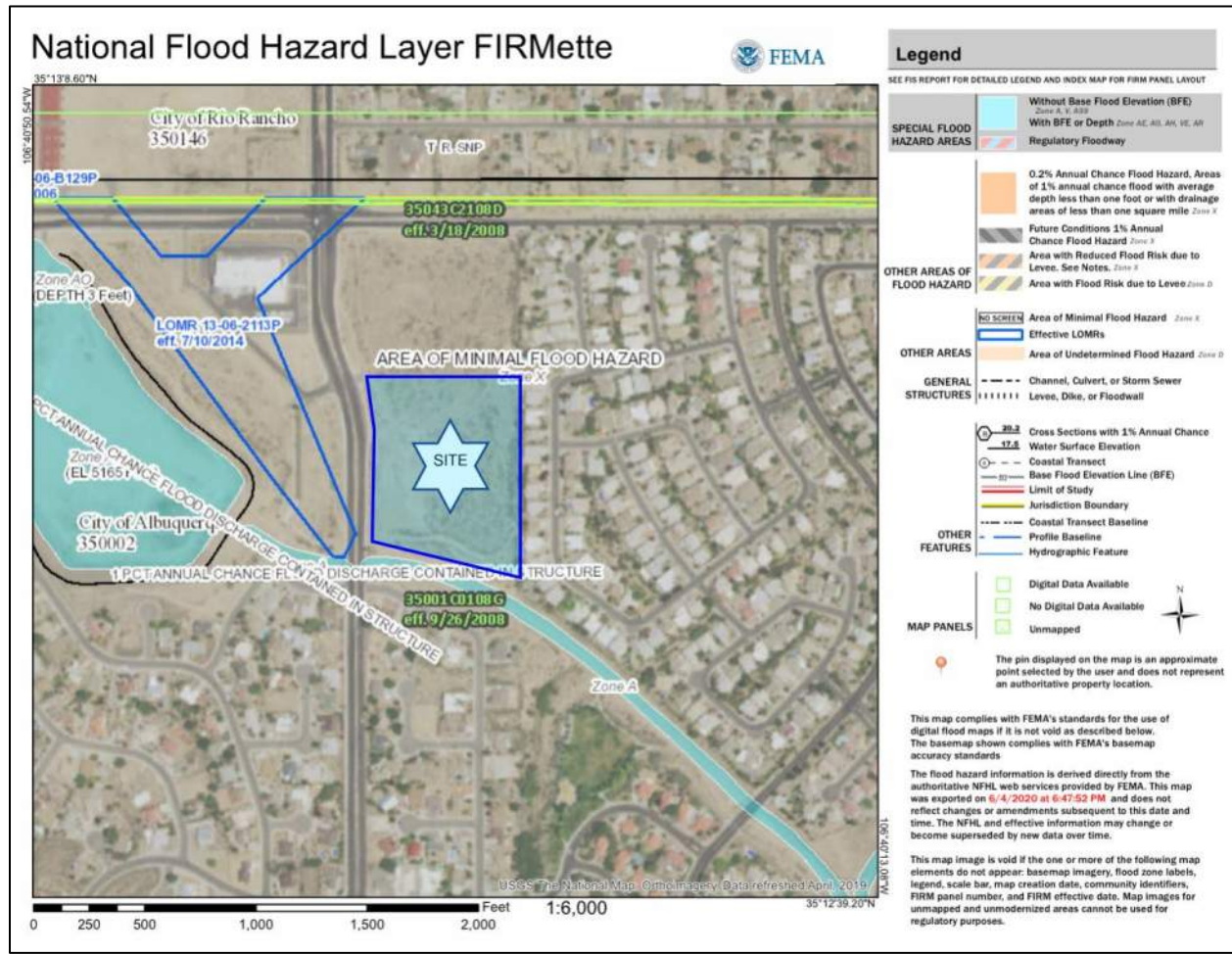


### **Exhibit B – Site Aerial Image**

#### **Flood Plain**

The floodplain information is published for the site by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Bernalillo County, New Mexico and Incorporated Areas. The subject site is detailed on Community Panel Number 35001C0108G dated August 26, 2008 and is shown below.

The subject site is located within Flood Zone X, which is defined as, “Areas determined to be outside the 0.2% annual chance floodplain”. The site does not lie within a Flood Hazard Area as shown on the FEMA map requiring no further flood-proofing or other flood mitigation.



## **Exhibit C – FIRM Map**

## Calculations

The proposed site is divided into appropriate drainage basins related to existing topography and existing drainage conveyance plans. The onsite project area includes 16.59 acres of developable acreage, including private vehicle driveway accesses, open areas for landscaping and buffer zones, and asphalt parking areas. At this site there are no offsite flows which contribute to the sites drainage as both Tracts D-1 and E-1 are considered in this analysis.

The site is located within Precipitation Zone 1, west of the Rio Grande, as specified in Chapter 6, Article 2 of the City of Albuquerque Development Process Manual 20202 Revision (DPM). The principal design storm is the 100-year, 6 hour event.

The appropriate land treatments A through D, as defined in the DPM Chapter 6 Article 2, will be applied to the various pervious and impervious areas for the proposed 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 6 Table 6.2.13 for Zone 1 with the corresponding land treatments.

A weighted excess precipitation rate is used to calculate the volume runoff as defined in the DPM Chapter 6 (Equation 6.1). 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 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 6 Table 6.2.14 for the 100-year event.

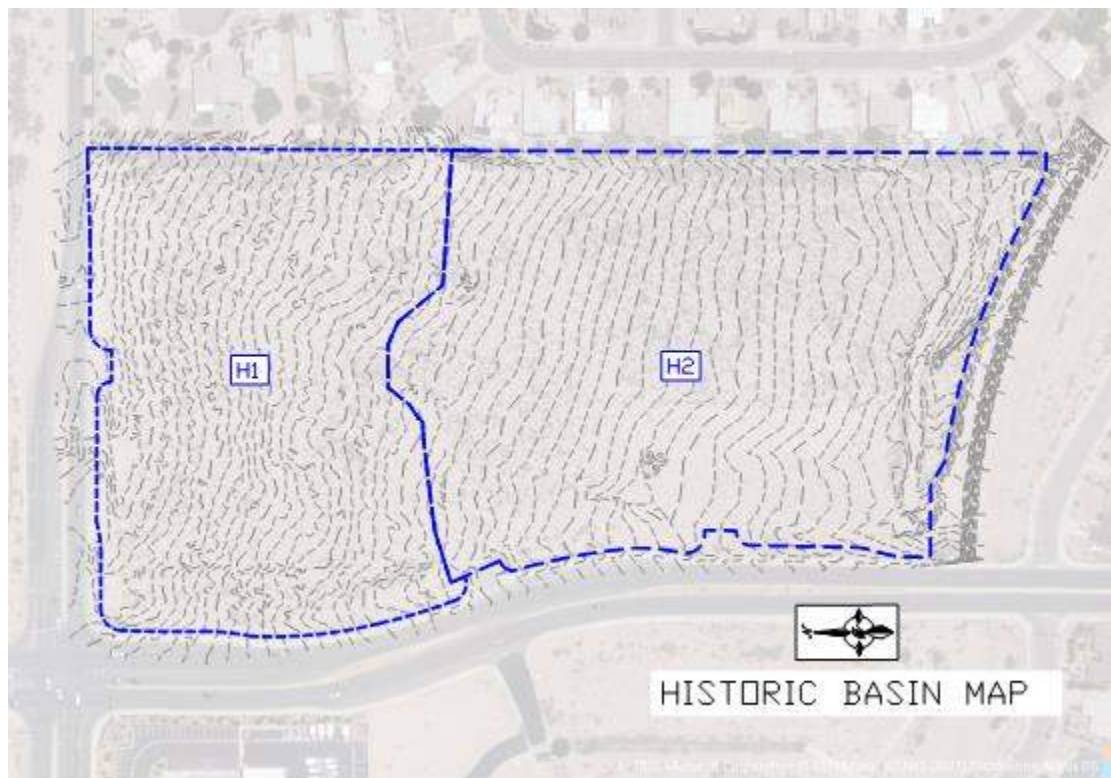
New development sites are required to capture and infiltrate the "stormwater quality volume" from the 90th percentile storm. The methodology used in the EPA report "estimating predevelopment hydrology in the middle Rio Grande watershed" April 2014, yields a runoff value of 0.42 inches for the 90th percentile storm. Therefore the required stormwater quality volume to be captured and infiltrated is the product of the impervious area multiplied by 0.42 inches for new development sites.



## Subdivision Existing Conditions

The subdivision does not fall within any previous master drainage management plans on file with the City. Currently the subdivision lies in an undeveloped condition with vegetation typical of the west mesa. The subdivision slopes consistently from the northeast to the southwest with the flows predominately overland with a moderately defined drainage course along the east side of Golf Course Rd. and along the east side of the subdivision adjacent to the residential dwellings. The sheet flow consolidates and is directed to an existing concrete rundown at the southeast corner of the subdivision. The subdivision is allocated as treatment A. No offsite flows enter the subdivision parcels of Tract D-1 and E-1. Offsite flows are contained in the surrounding roadway and directed to curb inlets along Golf Course Rd. before discharging to the Black Arroyo channel at the overpass.

The site is divided into two drainage basins as shown in Exhibit D. Basin H1 covers the undisturbed northern Tract D-1 and basin H2 reflects the disturbed southern Tract E-1. The runoff and volume calculations for the existing condition, based on the drainage criteria detailed in the DPM are included in appendix A.



**Exhibit D – Existing Drainage Basin Map**

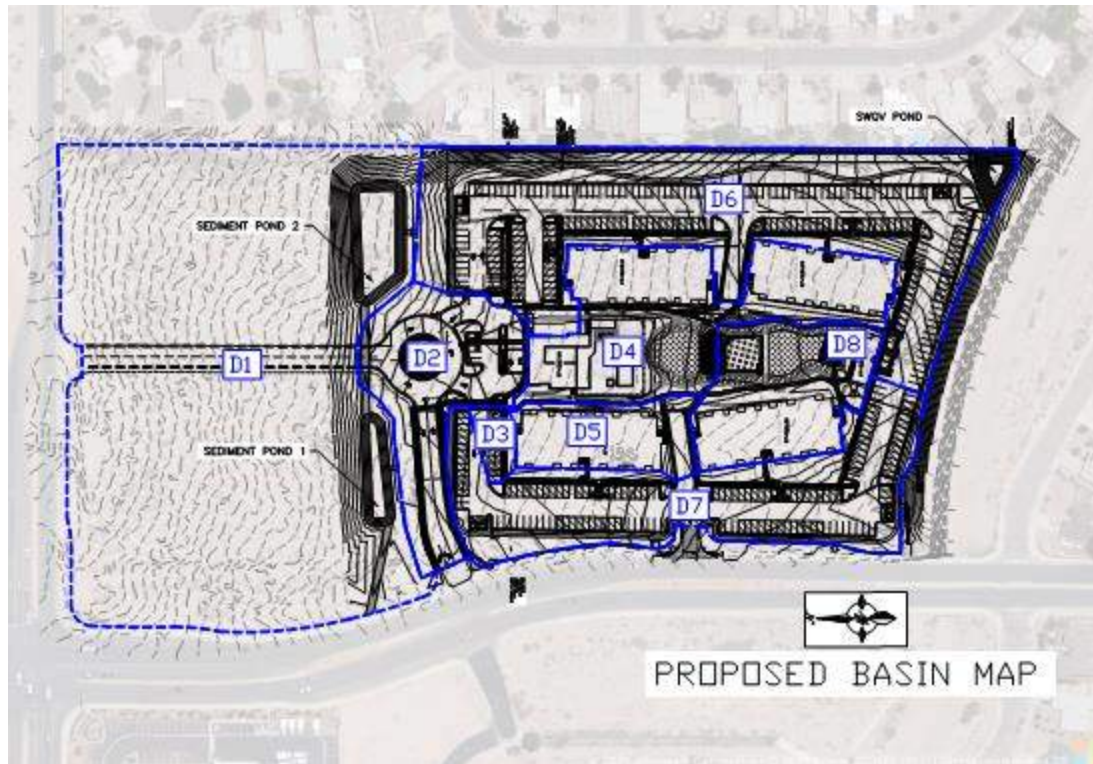
## Proposed Conditions

The developed site, including consideration for Tract D-1 in its future developed state, was analyzed to determine the total subdivision runoff and the required drainage improvements necessary to safely convey stormwater runoff.

As detailed on the subdivision plat, there is an existing 30-foot public water and sanitary sewer easement extending along the entire eastern boundary of the site. A blanket cross access and drainage easement is in place between Tracts D-1 and E-1, with the maintenance of the easement the responsibility of the underlying owner/s.

There is an existing concrete flume rundown connecting to AMAFCAs Black Arroyo channel exists at the south east corner and is in acceptable condition to support the developed flows. The onsite stormwater shall be collected by a combination of curb inlets and area drains, and shall discharge to the SWQV pond at the south east corner of the site. The capacity charts of the inlets are included in the appendix. A new concrete flume shall be installed and connected to the existing rundown. The dimensions of the rundown shall match the existing flume, and be 10-ft wide with 2.5-ft high 3H:1V slope side walls. This channel adequately handles the design flows and the capacity calculations are included in the appendix.

The site was divided into eight drainage basins to determine the developed flows and to size the storm drain pipes and inlets accordingly. Included in the appendix is the drainage basin calculations for the runoff associated with each basin and the total developed flow discharged from the site. As there is no downstream capacity constraint the developed flows are discharged into the Black Arroyo channel. Flows from the undeveloped Tract D-1 shall be retained on site via two temporary sediment ponds.



### **Exhibit E – Drainage Basin Map**

#### **Stormwater Quality Volume Management**

As this site is a new development, the water quality volume is calculated based on the 0.42 inch storm. The methodology used in the EPA Report, Estimating Predevelopment Hydrology in the Middle Rio Grande Watershed, New Mexico, TetraTech, April 2014, EPA Publication Number 832-R-14-007, yields a runoff value of 0.42 inches for the 90th percentile storm. Therefore to calculate the Stormwater Quality Volume the impervious area is multiplied by 0.42 inches. The formula used is  $SWQV = I * 43,560 * 0.42 * (1/12)$  where I is the impervious area in acres.

The impervious areas and SWQV ponding required for Tract E-1 is detailed on the design calculations in the appendix of the report and the required volume to be retained onsite is provided for Tract E-1. For Tract D-1, appropriate onsite SWQV ponding must be provided within Tract D-1 at time of development.

## **AMAFCA – Black Arroyo Channel**

Approval is being sought from AMAFCA to connect to the concrete lined Black Arroyo channel to the south of the property. An existing concrete rundown was previously built as is in acceptable condition to provide a rundown for stormwater and a connection directly to the arroyo. Photographs of the flume are included in the appendix. The channel flume has a 10-foot wide bottom with 2.5-ft side walls and has excess capacity to discharge the developed flows of both Tract D-1 and E-1. Included in the appendix are the discharge calculations for the existing flume at maximum capacity.

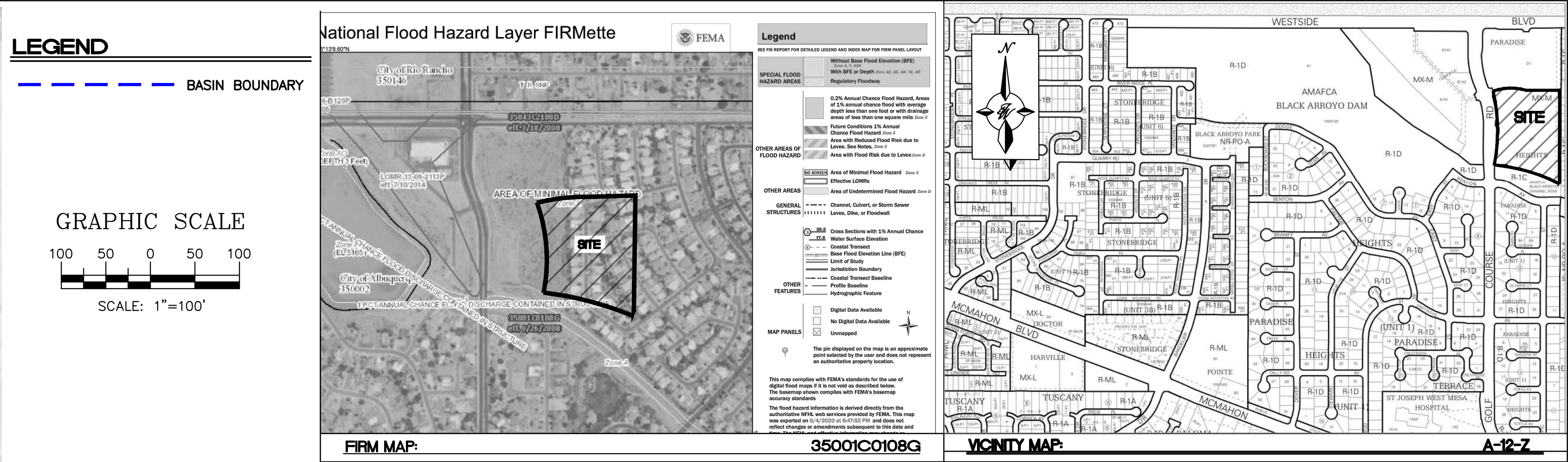
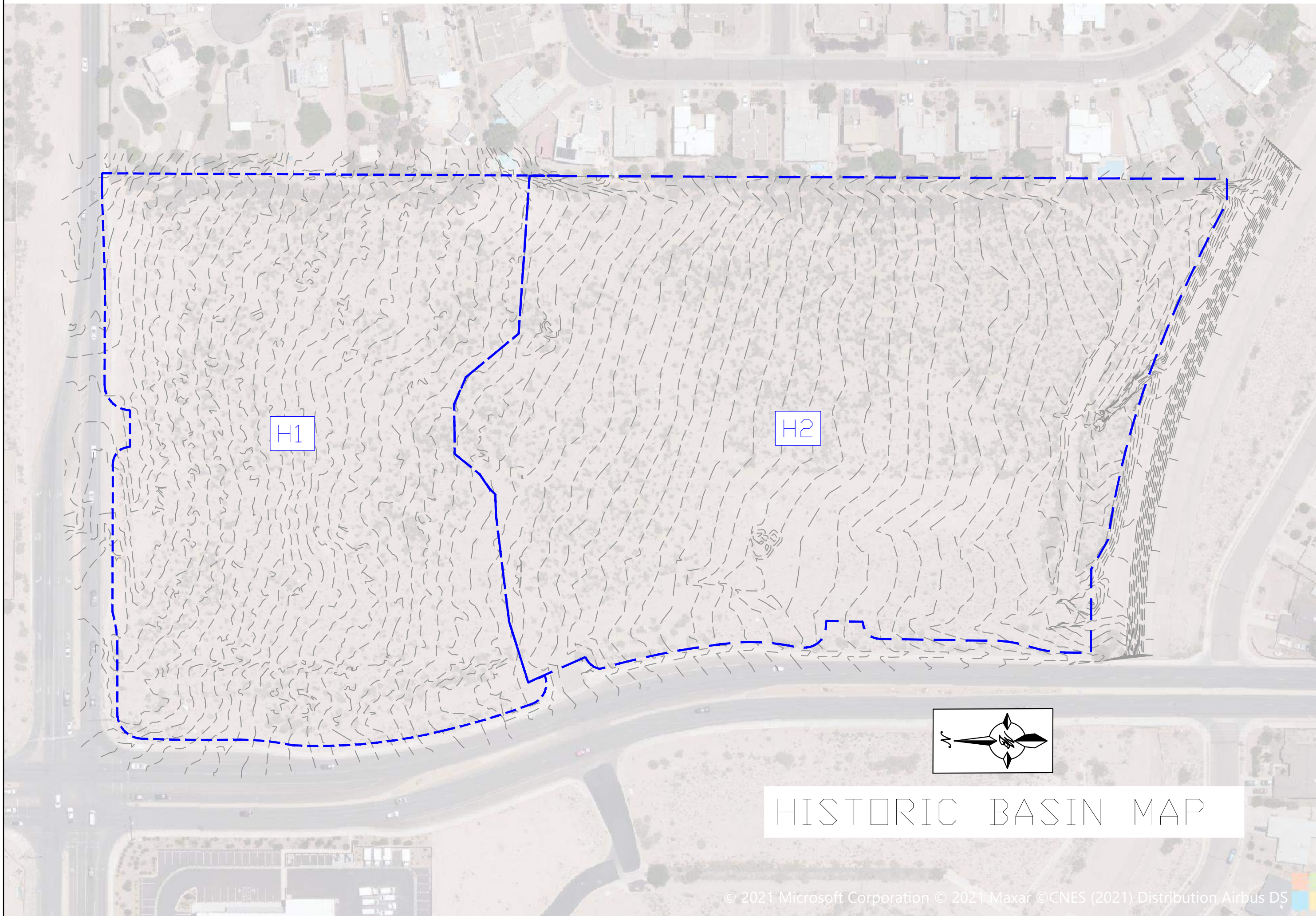
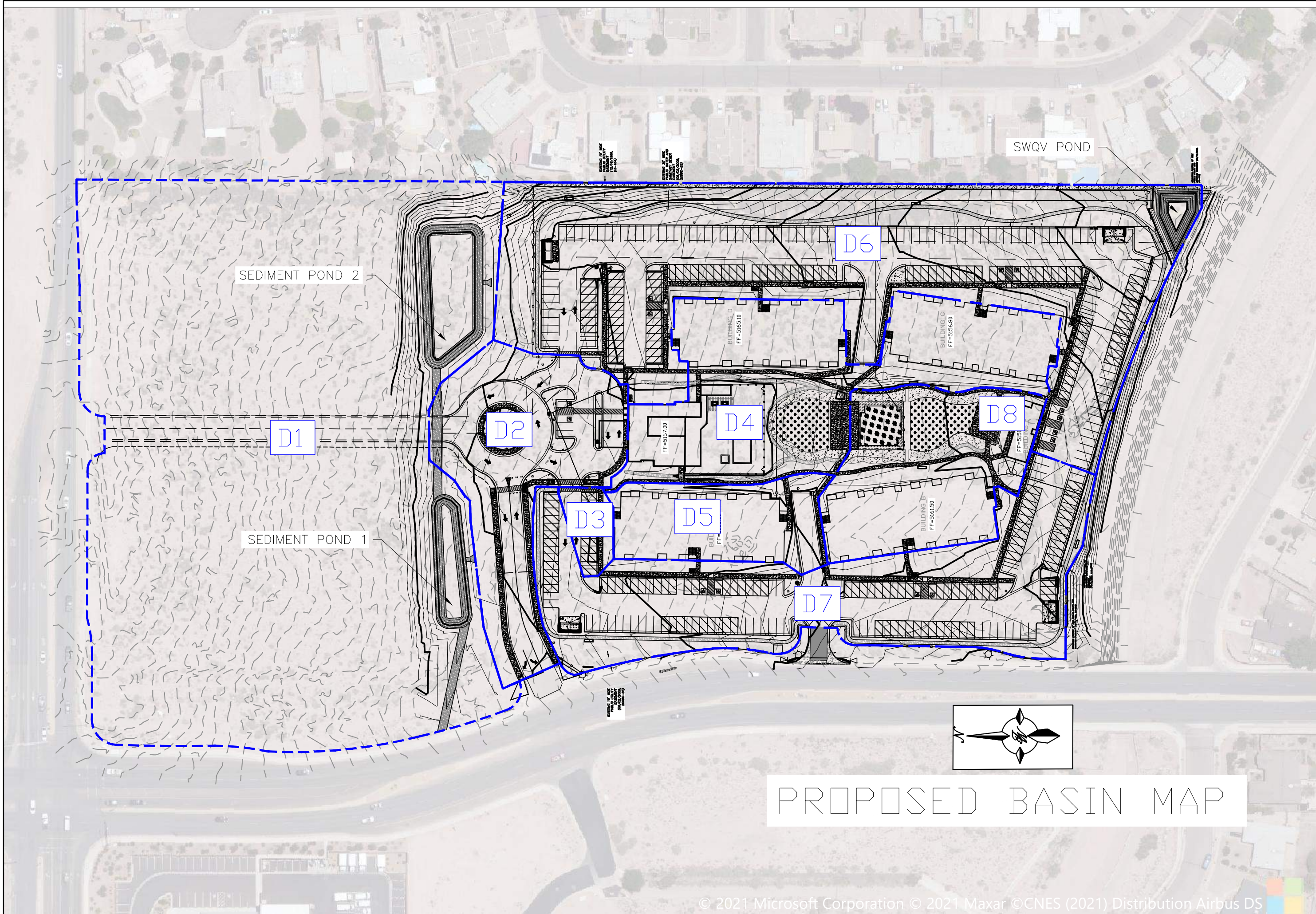
## **Summary**

This report outlines the conceptual Drainage Plan and presents the on-site BMP SWQV ponding and drainage improvements needed to safely convey the developed flows for both tracts D-1 and E-1. Tract D-1 will be developed some time in the future therefore temporary sedimentation ponds will be constructed to manage the historic flows prior to entering into the developed tract E-1. When Tract D-1 is developed in the future onsite SWQV ponding must be provided within Tract D-1 to meet EPA requirements. The required SWQV ponding for Tract E-1 is achieved with a suitable size pond located at the southeast corner of Tract E-1.

Developed stormwater runoff shall be collected through combination of curb inlets and area drains, and discharged to the SWQV pond at the southeast corner of the site, before passing directly into the Black Arroyo Channel through a concrete rundown.

## APPENDIX A





Existing Conditions												100-Year, 6-Hr			10-Year, 6-Hr			
Basin ID	Tract	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
					%	(acres)	%	(acres)	%	(acres)	%	(acres)						
H1	D-1	303,908	6.98	0.01090	100%	6.977	0%	0.000	0%	0.000	0%	0.000	0.440	0.256	9.00	0.080	0.047	1.67
H2	E-1	418,804	9.61	0.01502	100%	9.614	0%	0.000	0%	0.000	0%	0.000	0.440	0.353	12.40	0.080	0.064	2.31
Total		722,712	16.59	0.02592		16.591		0.000		0.000		0.000		0.608	21.40		0.111	3.98

Proposed Conditions												100-Year, 6-Hr			10-Year, 6-Hr			
Basin ID	Tract	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
					%	(acres)	%	(acres)	%	(acres)	%	(acres)						
D1	D-1	303,908	6.98	0.01090	0%	0.000	0%	0.000	15%	1.047	85%	5.930	1.823	1.060	28.92	1.120	0.651	18.70
D2	E-1	49,255	1.13	0.00177	0%	0.000	5%	0.057	25%	0.283	70%	0.792	1.660	0.156	4.39	0.989	0.093	2.75
D3	E-1	4,963	0.11	0.00018	0%	0.000	0%	0.000	10%	0.011	90%	0.103	1.872	0.018	0.48	1.160	0.011	0.31
D4	E-1	69,351	1.59	0.00249	0%	0.000	5%	0.080	15%	0.239	80%	1.274	1.758	0.233	6.41	1.069	0.142	4.10
D5	E-1	23,420	0.54	0.00084	0%	0.000	5%	0.027	10%	0.054	85%	0.457	1.807	0.081	2.21	1.109	0.050	1.42
D6	E-1	149,183	3.42	0.00535	0%	0.000	10%	0.342	20%	0.685	70%	2.397	1.644	0.469	13.14	0.978	0.279	8.21
D7	E-1	81,673	1.87	0.00293	0%	0.000	5%	0.094	10%	0.187	85%	1.594	1.807	0.282	7.69	1.109	0.173	4.96
D8	E-1	40,959	0.94	0.00147	0%	0.000	10%	0.094	20%	0.188	70%	0.658	1.644	0.129	3.61	0.978	0.077	2.25
Total		722,712	16.59	0.02592		0.000		0.693		2.694		13.204		2.429	66.841		1.476	42.701

Basin ID	SWQV	
	Required (cf)	Provided (cf)
D1	-	0
D2	1,207	0
D3	156	0
D4	1,942	0
D5	697	0
D6	3,655	11,305
D7	2,287	0
D8	1,003	0
Total	10,947	11,305

**Equations:**  
Weighted E = Ea\*Aa + Eb\*Ab + Ec\*Ac + Ed  
Volume = Weighted E \* Total Area  
Flow = Qa\*Aa + Qb\*Ab + Qc\*Ac + Qd\*Ad

SWQV Pond Volume Calculation	
Area at Mid Depth	1,615 Sq. Ft.
Depth of Pond	7 Ft.
Total Volume	11,305 Cubic Ft.


Sediment Pond 1 Volume Calculation	
Area at Mid Depth	3,800 Sq. Ft.
Depth of Pond	4 Ft.
Volume	15,200 Cubic Ft.
Sediment Pond 2 Volume Calculation	
Area at Mid Depth	8,616 Sq. Ft.
Depth of Pond	4 Ft.
Volume	34,464 Cubic Ft.
Total Volume	49,664 Cubic Ft.

Excess Precipitation, E (in.)		
Zone 1	100-Year	10-Year
Ea	0.44	0.08
Eb	0.67	0.22
Ec	0.99	0.44
Ed	1.97	1.24

Peak Discharge (cfs/acre)		
Zone 1	100-Year	10-Year
Qa	1.29	0.24
Qb	2.03	0.76
Qc	2.87	1.49
Qd	4.37	2.89

**Stormwater Quality Volume**  
Total Impervious Area =  
Retainage depth = 0.42" Per DPM Pg. 272  
Retention Volume =

ΣArea in "Treatment D"  
0.035  
=0.035 x area  
foot  
CF

"ISSUED FOR PERMIT - NOT FOR CONSTRUCTION"		
ENGINEER'S SEAL	WINTERGREEN LUXURY APARTMENTS	DRAWN BY BF
	10820 GOLF COURSE RD. NW	DATE 5/19/2021
	GRADING AND DRAINAGE BASIN MAP	2020013_BASINS
	 <b>TIERRA WEST, LLC</b> 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com	SHEET # <b>C1</b>
RONALD R. BOHANNAN P.E. #7868		JOB # 2020013





**DPM Weighted E Method**  
Precipitation Zone 1  
Wintergreen Apartments Golf Course Rd  
TWLLC Date

6/8/2021

**Existing Conditions**

Basin Descriptions													100-Year, 6-Hr			10-Year, 6-Hr		
Basin ID	Tract	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
					%	(acres)	%	(acres)	%	(acres)	%	(acres)						
H1	D-1	303,908	6.98	0.01090	100%	6.977	0%	0.000	0%	0.000	0%	0.000	0.440	0.256	9.00	0.080	0.047	1.67
H2	E-1	418,804	9.61	0.01502	100%	9.614	0%	0.000	0%	0.000	0%	0.000	0.440	0.353	12.40	0.080	0.064	2.31
Total		722,712	16.59	0.02592		16.591		0.000		0.000		0.000		0.608	21.40		0.111	3.98

**Proposed Conditions**

Basin Descriptions													100-Year, 6-Hr			10-Year, 6-Hr			SWQV	
Basin ID	Tract	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	Vol Required (cf)	Provided (cf)
					%	(acres)	%	(acres)	%	(acres)	%	(acres)								
D1	D-1	303,908	6.98	0.01090	0%	0.000	0%	0.000	15%	1.047	85%	5.930	1.823	1.060	28.92	1.120	0.651	18.70	-	0
D2	E-1	49,255	1.13	0.00177	0%	0.000	5%	0.057	25%	0.283	70%	0.792	1.660	0.156	4.39	0.989	0.093	2.75	1,207	0
D3	E-1	4,963	0.11	0.00018	0%	0.000	0%	0.000	10%	0.011	90%	0.103	1.872	0.018	0.48	1.160	0.011	0.31	156	0
D4	E-1	69,351	1.59	0.00249	0%	0.000	5%	0.080	15%	0.239	80%	1.274	1.758	0.233	6.41	1.069	0.142	4.10	1,942	0
D5	E-1	23,420	0.54	0.00084	0%	0.000	5%	0.027	10%	0.054	85%	0.457	1.807	0.081	2.21	1.109	0.050	1.42	697	0
D6	E-1	149,183	3.42	0.00535	0%	0.000	10%	0.342	20%	0.685	70%	2.397	1.644	0.469	13.14	0.978	0.279	8.21	3,655	11,305
D7	E-1	81,673	1.87	0.00293	0%	0.000	5%	0.094	15%	0.281	80%	1.500	1.758	0.275	7.55	1.069	0.167	4.83	2,287	0
D8	E-1	40,959	0.94	0.00147	0%	0.000	10%	0.094	20%	0.188	70%	0.658	1.644	0.129	3.61	0.978	0.077	2.25	1,003	0
Total		722,712	16.59	0.02592		0.000		0.693		2.787		13.110		2.421	37.781		1.470	42.569	10,947	11,305

**Equations:**

Weighted E = Ea\*Aa + Eb\*Ab + Ec\*Ac + Ed\*Ad / (Total Area)

Volume = Weighted E \* Total Area

Flow = Qa\*Aa + Qb\*Ab + Qc\*Ac + Qd\*Ad

Excess Precipitation, E (in.)		
Zone 1	100-Year	10-Year
Ea	0.44	0.08
Eb	0.67	0.22
Ec	0.99	0.44
Ed	1.97	1.24

Peak Discharge (cfs/acre)		
Zone 1	100-Year	10-Year
Qa	1.29	0.24
Qb	2.03	0.76
Qc	2.87	1.49
Qd	4.37	2.89

SWQV Pond Volume Calculation	
Area at Mid Depth	1,615 Sq. Ft.
Depth of Pond	7 Ft.
Total Volume	11,305 Cubic Ft.

**Stormwater Quality Volume**

Total Impervious Area =

Retainage depth = 0.42" Per DPM Pg. 272

Retention Volume =

ΣArea in "Treatment D"

0.035

foot

=0.035 x area

CF

Sediment Pond 1 Volume Calculation		
Area at Mid D	3,800	Sq. Ft.
Depth of Pond	4	Ft.
Volume	15,200	Cubic Ft.

Sediment Pond 2 Volume Calculation		
Area at Mid D	8,616	Sq. Ft.
Depth of Pond	4	Ft.
Volume	34,464	Cubic Ft.
Total Volume	49,664	Cubic Ft.

Pipe Capacity Tables

Pipe ID	D	Slope	Area	R	Q 100	Q Provided
	(in)	(%)	(ft^2)		(cfs)	(cfs)
1	18	1.00	1.77	0.375	0.48	10.53
2	18	2.00	1.77	0.375	2.68	14.90
3	18	1.90	1.77	0.375	4.87	14.52
4	18	1.90	1.77	0.375	5.64	14.52
5	18	2.00	1.77	0.375	1.81	14.90
6	18	1.90	1.77	0.375	7.45	14.52
7	18	1.90	1.77	0.375	2.09	14.52
8	18	2.00	1.77	0.375	1.25	14.90
9	18	1.00	1.77	0.375	0.40	10.53
10	18	2.00	1.77	0.375	9.54	14.90
11	18	1.00	1.77	0.375	0.63	10.53
12	18	2.00	1.77	0.375	11.02	14.90
13	18	2.00	1.77	0.375	12.57	14.90
14	24	2.00	3.14	0.500	12.57	32.08
15	18	1.00	1.77	0.375	7.69	10.53
16	18	1.00	1.77	0.375	2.94	10.53
17	18	1.00	1.77	0.375	0.63	10.53
18	24	2.00	3.14	0.500	10.63	32.08
19	24	2.00	3.14	0.500	12.18	32.08
20	24	2.00	3.14	0.500	25.32	32.08
Total					37.89	

Manning's Equation:

$$Q = 1.49/n * A * R^{(2/3)} * S^{(1/2)}$$

A = Area

R = D/4

S = Slope

n = 0.013





# Nyloplast®

Tomorrow's Storm Drainage  
Structures Today.

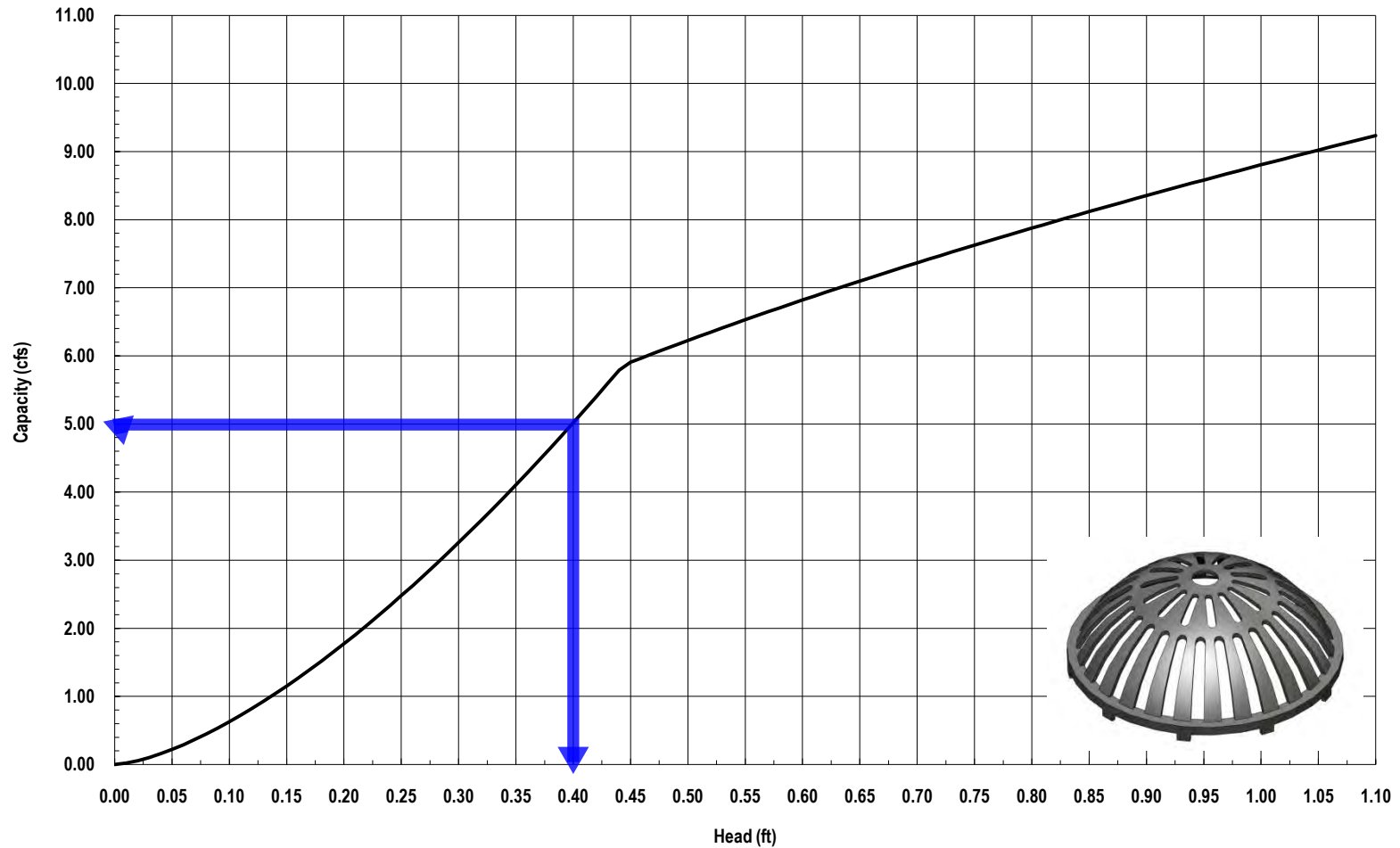
## Nyloplast Grate Inlet Capacity Charts

These charts are based on equations from the USDOT/FAA Advisory Circular pertaining to Surface Drainage Design, AC No: AC150/5320-5C and the USDOT/FHWA Urban Drainage Design Manual, Hydraulic Engineering Circular No. 22, Third Edition, Publication No. FHWA-NHI-10-009. Certain assumptions have been made, and no two installations will necessarily perform the same way. Safety factors should change with site conditions and is left to the discretion of the design engineer.



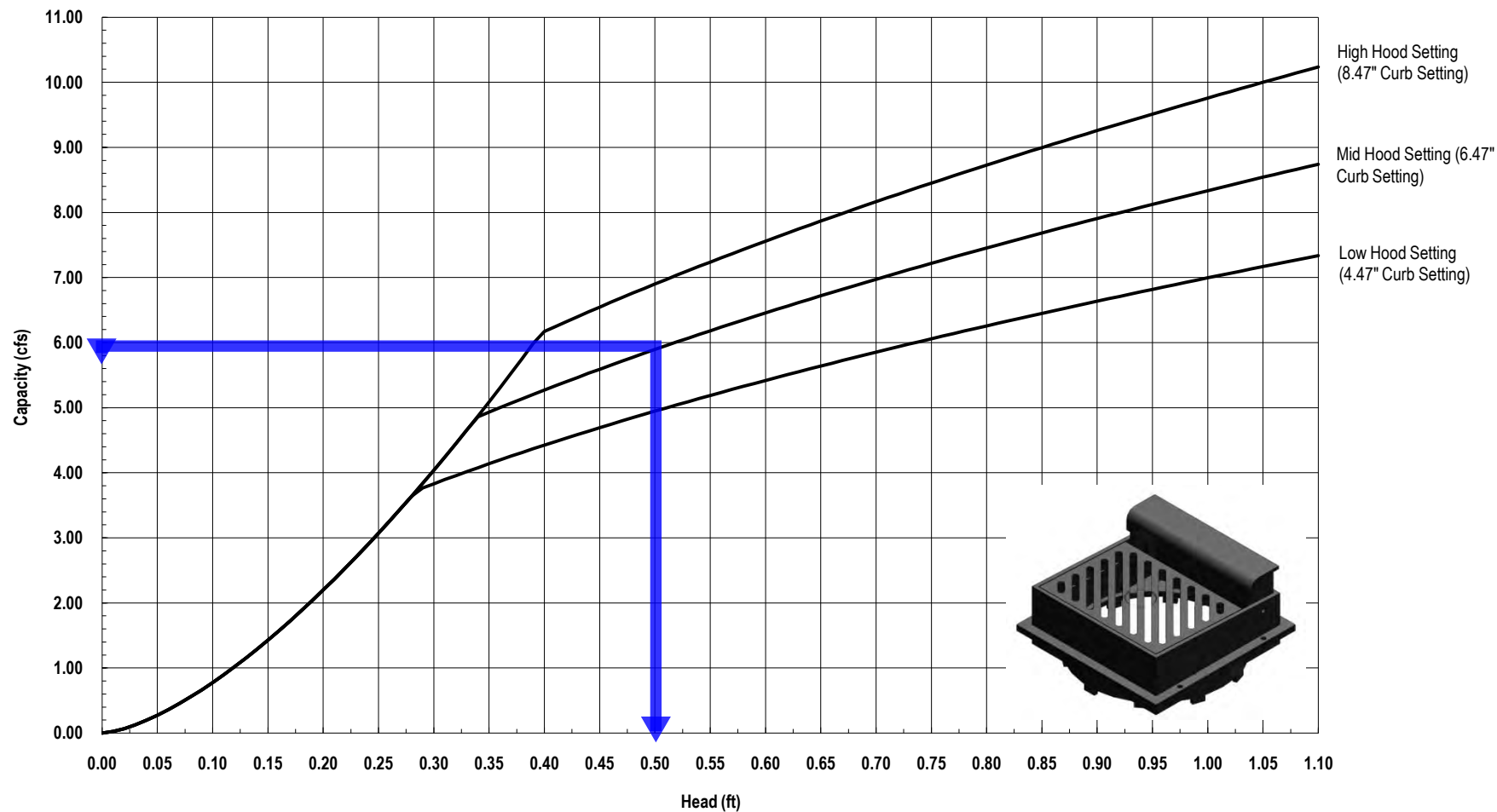
3130 Verona Avenue • Buford, Georgia 30518 • (866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490

Nyloplast 24" Dome Grate Inlet Capacity Chart



3130 Verona Avenue • Buford, GA 30518  
(866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490  
© Nyloplast Inlet Capacity Charts June 2012

Nyloplast 2' x 2' Curb Inlet Diagonal Grate Inlet Capacity Chart



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 © Nyloplast Inlet Capacity Charts June 2012

## APPENDIX B

## Worksheet for Existing Concrete Flume connecting to Black Arroyo

### Project Description

Friction Method	Manning Formula
Solve For	Discharge

### Input Data

Roughness Coefficient	0.016	
Channel Slope	0.02000	ft/ft
Normal Depth	2.50	ft
Left Side Slope	0.33	ft/ft (H:V)
Right Side Slope	0.33	ft/ft (H:V)
Bottom Width	10.00	ft

### Results

Discharge	520.64	ft <sup>3</sup> /s
Flow Area	27.06	ft <sup>2</sup>
Wetted Perimeter	15.27	ft
Hydraulic Radius	1.77	ft
Top Width	11.65	ft
Critical Depth	4.18	ft
Critical Slope	0.00403	ft/ft
Velocity	19.24	ft/s
Velocity Head	5.75	ft
Specific Energy	8.25	ft
Froude Number	2.23	
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	2.50	ft
Critical Depth	4.18	ft
Channel Slope	0.02000	ft/ft

## Cross Section for Trapezoidal Channel - 1

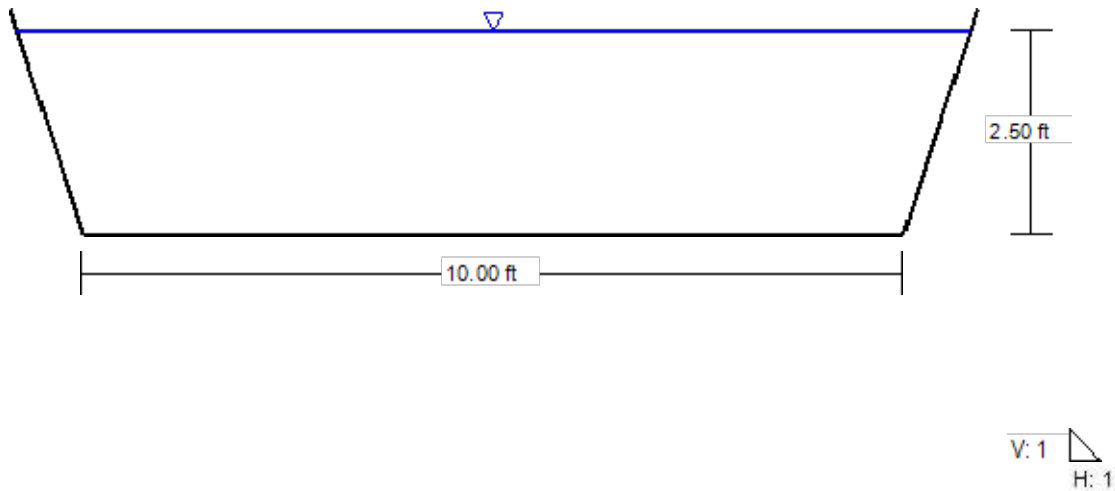
### Project Description

Friction Method	Manning Formula
Solve For	Discharge

### Input Data

Roughness Coefficient	0.016	
Channel Slope	0.02000	ft/ft
Normal Depth	2.50	ft
Left Side Slope	0.33	ft/ft (H:V)
Right Side Slope	0.33	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	520.64	ft <sup>3</sup> /s

### Cross Section Image



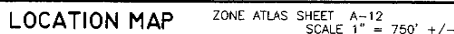


EXISTING CONCRETE FLUME CHANNEL AT SOUTH WEST CORNER OF THE PROPERTY CONNECTING TO THE AMAFCA BLACK ARROYO CHANNEL



**APPENDIX C**



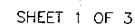


<i>David [Signature]</i>	5/22/09
QWEST COMMUNICATIONS	DATE
<i>Armando [Signature]</i>	5/29/09
PWM ELECTRIC SERVICES	DATE
<i>Quilici [Signature]</i>	5/27/2009
NEW MEXICO GAS CO.	DATE
<i>Robert [Signature]</i>	5-29-09
COMCAST CABLE	DATE

1. PUBLIC SERVICE COMPANY OF NEW MEXICO ELECTRIC SERVICES FOR THE INSTALLATION, MAINTENANCE AND SERVICE OF OVERHEAD AND UNDERGROUND ELECTRICAL LINES, TRANSFORMERS, POLES AND ANY OTHER EQUIPMENT, FIXTURES, STRUCTURES AND RELATED FACILITIES REASONABLY NECESSARY TO PROVIDE ELECTRICAL SERVICE.
2. ~~PUBLIC SERVICE COMPANY OF NEW MEXICO GAS SERVICE~~ <sup>CO.</sup> FOR THE INSTALLATION, MAINTENANCE AND SERVICE OF NATURAL GAS LINES, VALVES AND OTHER EQUIPMENT AND FACILITIES REASONABLY NECESSARY TO PROVIDE NATURAL GAS SERVICE.
3. QWEST COMMUNICATIONS FOR THE INSTALLATION, MAINTENANCE AND SERVICE OF ALL BURIED AND AERIAL COMMUNICATION LINES AND OTHER RELATED EQUIPMENT AND FACILITIES REASONABLY NECESSARY TO PROVIDE COMMUNICATION SERVICES, INCLUDING BUT NOT LIMITED TO ABOVE GROUND PEDESTALS AND CLOSURES.
4. COMCAST CABLE FOR THE INSTALLATION, MAINTENANCE AND SERVICE OF SUCH LINES, CABLE AND OTHER EQUIPMENT AND FACILITIES REASONABLY NECESSARY TO PROVIDE CABLE TV SERVICE.

INCLUDES THE RIGHT TO BUILD, REBUILD, CONSTRUCT, RECONSTRUCT, LOCATE, RELOCATE, CHANGE, REMOVE, MODIFY, REPAIR, OPERATE AND MAINTAIN FACILITIES FOR THE PURPOSES DESCRIBED ABOVE, TOGETHER WITH FREE ACCESS TO, TO AND OVER SAID EASEMENTS, INCLUDING SUFFICIENT WORKING AREA SPACE FOR ELECTRIC TRANSFORMERS, WITH THE RIGHT TO TRIM AND REMOVE TREES, SHRUBS AND BUSHES, AND TO REMOVE AND REPLACE ANY SUCH TREES, SHRUBS AND BUSHES, EITHER ABOVE (GROUND OR SUBSURFACE), HOT TUB, CONCRETE OR WOOD DECKING OR OTHER STRUCTURE SHALL BE ERECTED OR CONSTRUCTED ON SAID EASEMENTS, NOR SHALL ANY WELL BE DRILLED OR OPERATED THEREON. PROPERTY OWNERS SHALL BE SOLELY RESPONSIBLE FOR CORRECTING ANY VIOLATION OF THIS EASEMENT. THIS EASEMENT SHALL NOT BE APPLIED TO ANY DRIVEWAY, DECKING, OR ANY STRUCTURES ADJACENT TO OR WITHIN OR NEAR EASEMENT SHOWN ON THIS PLAT.

BELIEF. *[Signature]* 03/05/09  
JEAN J. BORDENAVE, NMPE&IS NO 9150



A TRACT OF LAND SITUATED IN PROJECTED SECTION 1, T11N, R2E, N.M.P.M., TOWN OF ALAMEDA GRANT, CITY OF ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO; SAID TRACT BEING THE SAME AS TRACTS D AND E, AND BLOCK 19, AS SHOWN ON THE PLAT OF "PARADISE HEIGHTS UNIT 1" AS MODIFIED BY THE PLAT OF "REALIGNMENT OF GOLF COURSE ROAD" AND A WARRANTY DEED FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, NEW MEXICO ON DEC. 13, 1968 IN BK. 63, PAGE 154 AND ON JULY 26, 1974 IN BK. 65, PAGE 61 AND ON FEB. 27, 1975 IN BK. 67, PAGE 107; SAID TRACT BEING DESCRIBED USING NEW MEXICO STATE PLANE BEARINGS (CENTRAL ZONE) AND HORIZONTAL GROUND DISTANCES AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF THE TRACT HEREIN DESCRIBED, FROM WHENCE THE ACS MONUMENT ACS 8-A11 BEARS N88°25'44"W A DISTANCE OF 6504.75 FEET, SAID POINT BEING ON THE SOUTHERLY RIGHT-OF-WAY OF WESTSIDE BLVD; THENCE DEPARTING THE SOUTHERLY RIGHT-OF-WAY OF WESTSIDE BLVD.

S00°17'07"W, 1430.00 FEET TO A POINT ON THE NORTHERLY RIGHT-OF-WAY OF BENTON AVE.; THENCE

N89°42'15"W, 170.20 FEET ALONG THE NORTHERLY RIGHT-OF-WAY OF BENTON AVE. TO A POINT; THENCE

NORTHWESTERLY, 81.40 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 158.45 FEET AND A LONG CHORD BEARING N74°59'10"W A DISTANCE OF 80.51 FEET TO A POINT; THENCE,

N60°18'05"W, 200.82 FEET TO A POINT; THENCE

NORTHWESTERLY, 114.29 FEET ALONG THE ARC OF A CURVE LEFT, HAVING A RADIUS OF 222.45 FEET AND A LONG CHORD BEARING N74°59'10"W A DISTANCE OF 113.03 FEET TO A POINT; THENCE,

NORTHWESTERLY, 39.27 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 25.00 FEET AND A LONG CHORD BEARING N44°41'54"W A DISTANCE OF 35.36 FEET TO A POINT AND TRANSITIONING FROM THE NORTHERLY RIGHT-OF-WAY OF BENTON AVE TO THE EASTERLY RIGHT-OF-WAY OF GOLF COURSE RD.; THENCE,

N00°18'26"E 104.10 FEET ALONG THE EASTERLY RIGHT-OF-WAY OF GOLF COURSE RD. TO A POINT; THENCE,

N00°17'23"E, 487.42 FEET ALONG THE VACATED EASTERLY RIGHT-OF-WAY OF GOLF COURSE RD. TO A POINT ON THE NEW RIGHT-OF-WAY OF GOLF COURSE RD.; THENCE,

NORTHWESTERLY, 91.76 FEET ALONG THE ARC OF A CURVE LEFT, HAVING A RADIUS OF 857.00 FEET AND A LONG CHORD BEARING N13°22'53"W A DISTANCE OF 91.72 FEET TO A POINT; THENCE,

NORTHEASTERLY, 22.64 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 23.50 FEET AND A LONG CHORD BEARING N43°04'17"E A DISTANCE OF 21.77 FEET TO A POINT; THENCE,

N19°20'02"W, 53.83 FEET TO A POINT; THENCE

N70°59'58"W, 5.12 FEET TO A POINT; THENCE,

NORTHWESTERLY, 38.68 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 25.00 FEET AND A LONG CHORD BEARING N65°00'35"W A DISTANCE OF 34.94 FEET TO A POINT; THENCE,

NORTHWESTERLY, 250.27 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 825.00 FEET AND A LONG CHORD BEARING N11°59'41"W A DISTANCE OF 249.31 FEET TO A POINT; THENCE,

NORTHEASTERLY, 37.24 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 140.00 FEET AND A LONG CHORD BEARING N04°19'02"E A DISTANCE OF 37.13 FEET TO A POINT; THENCE,

NORTHEASTERLY, 63.05 FEET ALONG THE ARC OF A CURVE LEFT, HAVING A RADIUS OF 310.00 FEET AND A LONG CHORD BEARING N06°06'42"E A DISTANCE OF 62.94 FEET TO A POINT: THENCE.

N00°17'07"E, 90.00 FEET TO A POINT: THENCE

N03°30'00"E. 26.03 FEET TO A POINT. THENCE

NORTHEASTERLY, 18.00 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 30.00 FEET AND A LONG CHORD BEARING N20°41'13"E A DISTANCE OF 17.73 FEET TO A POINT ON THE VACATED EASTERLY RIGHT-OF-WAY OF GOLF COURSE RD.; THENCE,

NORTHEASTERLY, 25.19 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 25.00 FEET AND A LONG CHORD BEARING N61°18'21"E A DISTANCE OF 24.14 FEET TO A POINT AND TRANSITIONING FROM THE VACATED EASTERLY RIGHT-OF-WAY OF GOLF COURSE RD. TO THE SOUTHERLY RIGHT-OF-WAY OF WESTSIDE BLVD.; THENCE,

S89°49'36"E, 79.24 FEET TO A POINT; THENCE,

S89°49'36"E, 295.05 FEET ALONG THE VACATED RIGHT-OF-WAY OF WESTSIDE BLVD. TO A POINT ON THE NEW RIGHT-OF-WAY OF WESTSIDE BLVD.; THENCE,

NORTHEASTERLY, 15.67 FEET ALONG THE ARC OF A CURVE RIGHT, HAVING A RADIUS OF 30.00 FEET AND A LONG CHORD BEARING N75°12'36"E A DISTANCE OF 15.49 FEET TO A POINT; THENCE,

S89°49'36"E. 122.51 FEET TO A POINT; THENCE

S88°04'18"E, 109.08 FEET TO A POINT; THENCE

S89°49'36"E, 13.20 FEET TO A POINT; SAID POINT BEING THE POINT OF BEGINNING

SAID TRACT CONTAINS 18.6713 ACRES MORE OR LESS.

New Mexico Gas Company, Inc., a Delaware corporation, does hereby release, waive, quitclaim and discharge its right, title and interest in the easement(s) (granted by prior plat, replat or document) shown to be vacated on this plat.

NEW MEXICO GAS COMPANY

By \_\_\_\_\_

STATE OF NEW MEXICO      SS  
COUNTY OF BERNALILLO

This instrument was acknowledged before me on 27<sup>th</sup> of May, 20 09

My Commission Expires: March 24, 2013

 **OFFICIAL SEAL**  
**Amanda Carlyle**  
NOTARY PUBLIC  
STATE OF NEW MEXICO  
My Commission Expires: March 28, 2025

Erinanda Cardillo  
Notary Public

1. MILES OF FULL WIDTH PRIVATE STREETS CREATED BY THIS  
PLAT = 0.0000 MILES.

2. TOTAL NUMBER OF TRACTS CREATED - 3

3. BASIS OF POSITION AND BEARINGS

ACS 8-A11 (NAD 1983 & NAD83 1988)

NORTHING = 1534934.957  
EASTING = 1507071.174  
ELEVATION = 0.000

DELTA ALPHA = -0°15'26.89"  
GROUND TO GRID  
FACTOR = 0.999671590

ACS 9-A11 (NAD 1983 & NAD83 1988)

NORTHING = 1533206.142  
EASTING = 1506571.019  
ELEVATION = 5301.647

DELTA ALPHA = -0°15'30.20"  
GROUND TO GRID  
FACTOR = 0.999670857

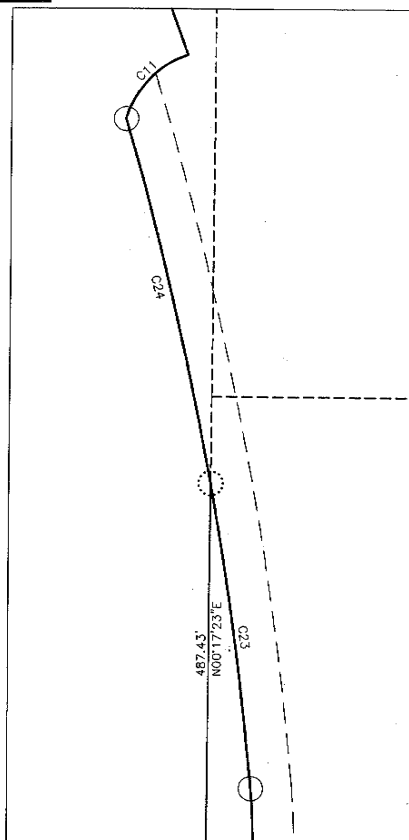
GRID BEARING FROM ACS 8-A11 TO 9-A11 IS S16°08'08"W

4. ALL DISTANCES SHOWN ARE HORIZONTAL GROUND DISTANCES.

5. ALL BOUNDARY CORNERS, LOT CORNERS AND ANGLE POINTS ARE  
MONUMENTED WITH A 5/8" REBAR AND YELLOW PLASTIC CAP  
STAMPED "BORNEAVE, LS 5110" NOT SHOWN OTHERWISE.

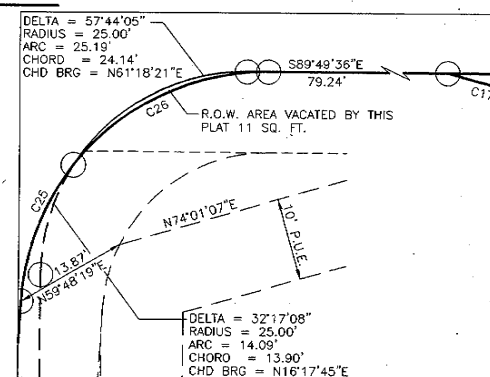
CURRENT ZONING OF TRACTS D & E IS C-2 AND OF LOTS 1 THRU 7 IS R-1.

**INSET I** SCALE 1" = 20'



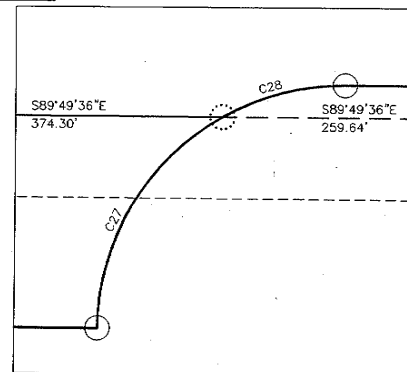
DOC# 2009061460

INSET 2 SCALE 1" = 10'



NOTE: SEE SHEET 3 FOR CURVE DATA NOT SHOWN ON THIS SHEET

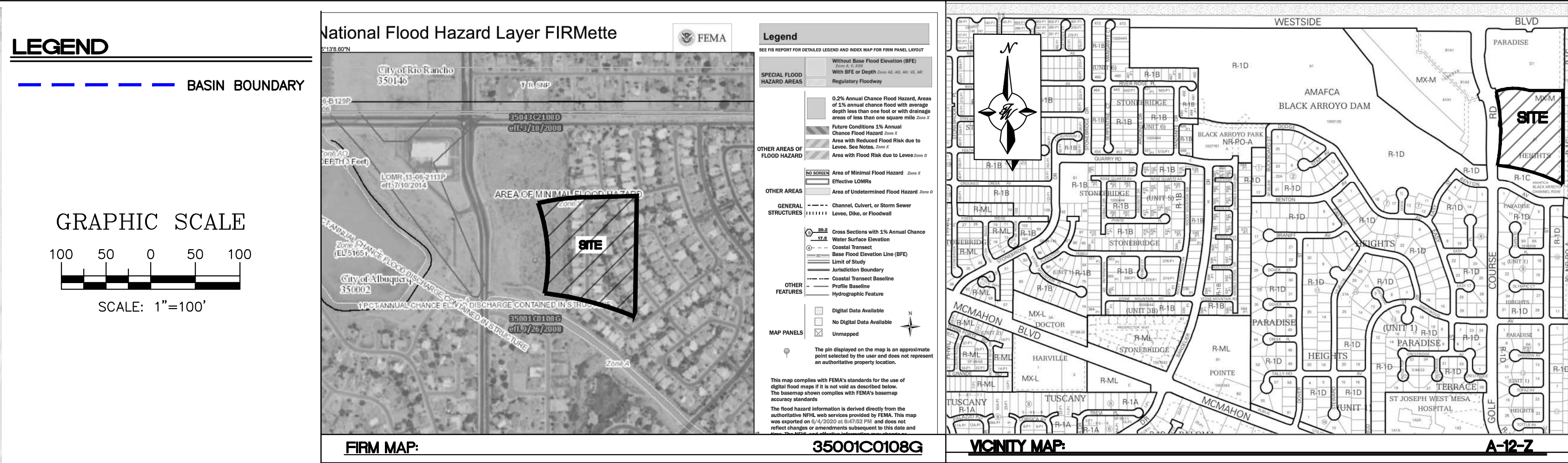
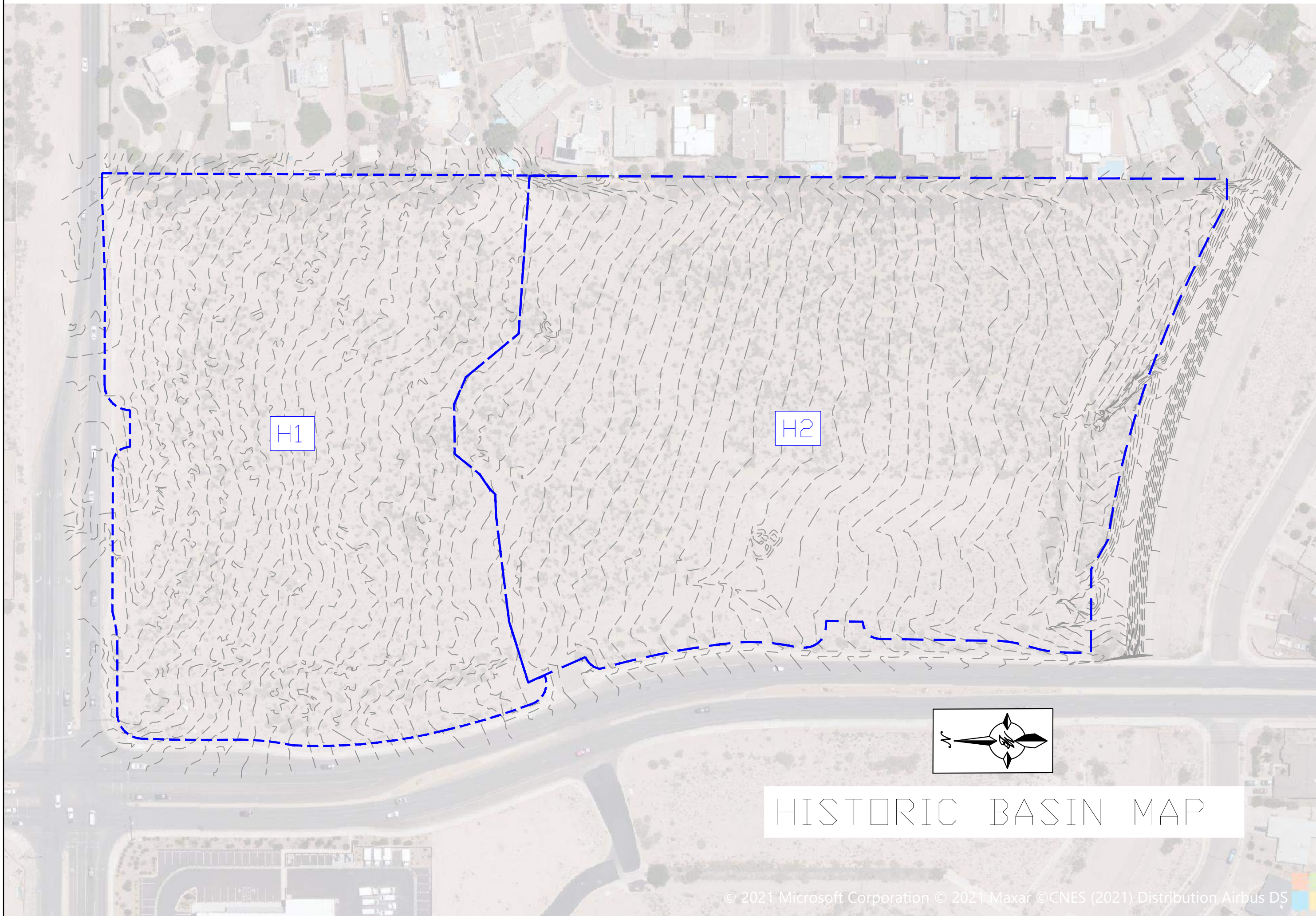
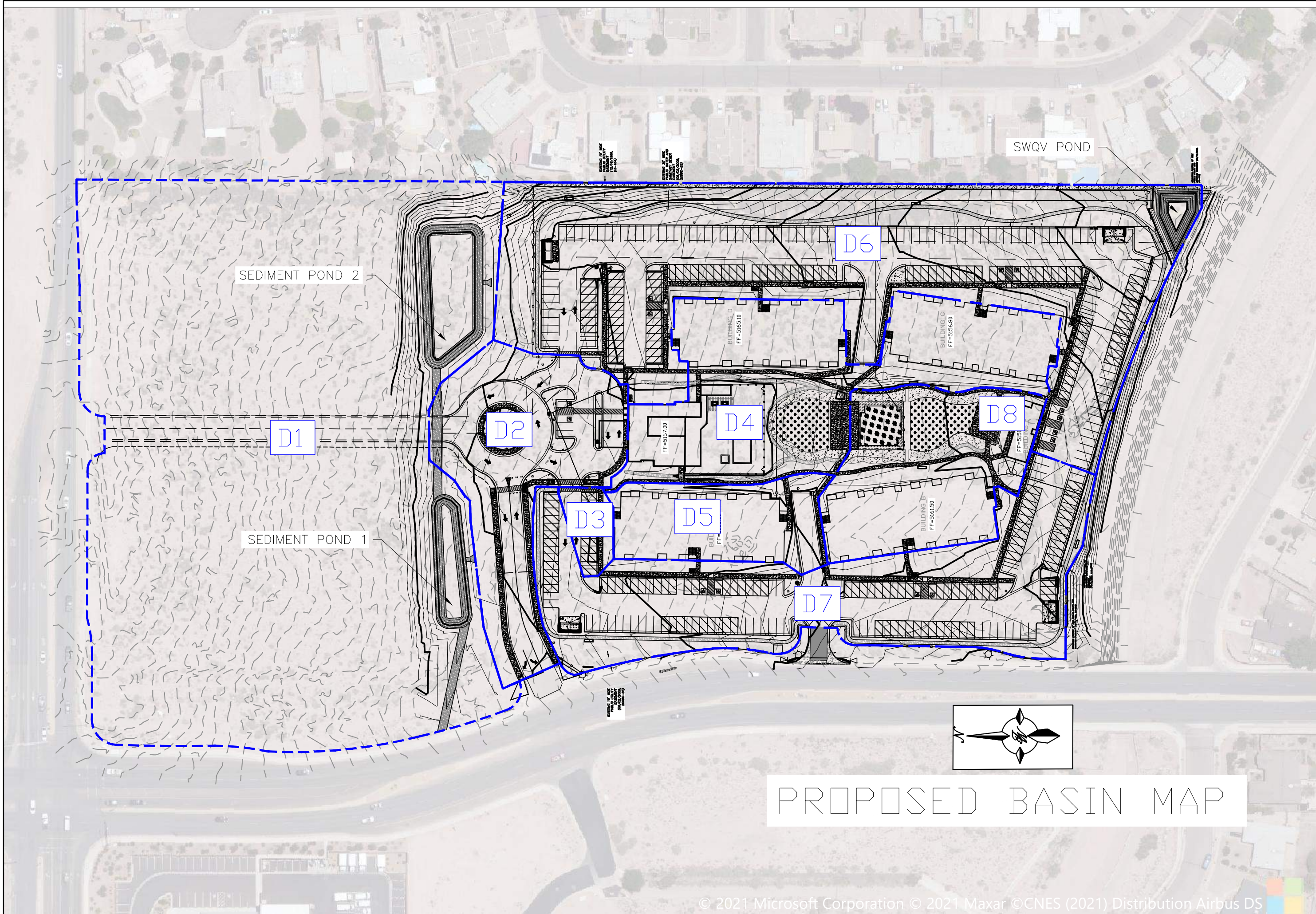
**INSET 3** SCALE 1" = 10'



**B BORDENAVE DESIGNS**  
P.O. BOX 91194, ALBUQUERQUE, NM 87199  
(505)823-1344 FAX (505)821-9105







Existing Conditions												100-Year, 6-Hr			10-Year, 6-Hr			
Basin ID	Tract	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
					%	(acres)	%	(acres)	%	(acres)	%	(acres)						
H1	D-1	303,908	6.98	0.01090	100%	6.977	0%	0.000	0%	0.000	0%	0.000	0.440	0.256	9.00	0.080	0.047	1.67
H2	E-1	418,804	9.61	0.01502	100%	9.614	0%	0.000	0%	0.000	0%	0.000	0.440	0.353	12.40	0.080	0.064	2.31
Total		722,712	16.59	0.02592		16.591		0.000		0.000		0.000		0.608	21.40		0.111	3.98

Proposed Conditions												100-Year, 6-Hr			10-Year, 6-Hr			
Basin ID	Tract	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
					%	(acres)	%	(acres)	%	(acres)	%	(acres)						
D1	D-1	303,908	6.98	0.01090	0%	0.000	0%	0.000	15%	1.047	85%	5.930	1.823	1.060	28.92	1.120	0.651	18.70
D2	E-1	49,255	1.13	0.00177	0%	0.000	5%	0.057	25%	0.283	70%	0.792	1.660	0.156	4.39	0.989	0.093	2.75
D3	E-1	4,963	0.11	0.00018	0%	0.000	0%	0.000	10%	0.011	90%	0.103	1.872	0.018	0.48	1.160	0.011	0.31
D4	E-1	69,351	1.59	0.00249	0%	0.000	5%	0.080	15%	0.239	80%	1.274	1.758	0.233	6.41	1.069	0.142	4.10
D5	E-1	23,420	0.54	0.00084	0%	0.000	5%	0.027	10%	0.054	85%	0.457	1.807	0.081	2.21	1.109	0.050	1.42
D6	E-1	149,183	3.42	0.00535	0%	0.000	10%	0.342	20%	0.685	70%	2.397	1.644	0.469	13.14	0.978	0.279	8.21
D7	E-1	81,673	1.87	0.00293	0%	0.000	5%	0.094	10%	0.187	85%	1.594	1.807	0.282	7.69	1.109	0.173	4.96
D8	E-1	40,959	0.94	0.00147	0%	0.000	10%	0.094	20%	0.188	70%	0.658	1.644	0.129	3.61	0.978	0.077	2.25
Total		722,712	16.59	0.02592		0.000		0.693		2.694		13.204		2.429	66.841		1.476	42.701

Basin ID	SWQV	
	Required (cf)	Provided (cf)
D1	-	0
D2	1,207	0
D3	156	0
D4	1,942	0
D5	697	0
D6	3,655	11,305
D7	2,287	0
D8	1,003	0
Total	10,947	11,305

**Equations:**  
Weighted E = Ea\*Aa + Eb\*Ab + Ec\*Ac + Ed  
Volume = Weighted E \* Total Area  
Flow = Qa\*Aa + Qb\*Ab + Qc\*Ac + Qd\*Ad

SWQV Pond Volume Calculation	
Area at Mid Depth	1,615 Sq. Ft.
Depth of Pond	7 Ft.
Total Volume	11,305 Cubic Ft.

Sediment Pond 1 Volume Calculation	
Area at Mid Depth	3,800 Sq. Ft.
Depth of Pond	4 Ft.
Volume	15,200 Cubic Ft.
Sediment Pond 2 Volume Calculation	
Area at Mid Depth	8,616 Sq. Ft.
Depth of Pond	4 Ft.
Volume	34,464 Cubic Ft.
Total Volume	49,664 Cubic Ft.

Excess Precipitation, E (in.)		
Zone 1	100-Year	10-Year
Ea	0.44	0.08
Eb	0.67	0.22
Ec	0.99	0.44
Ed	1.97	1.24

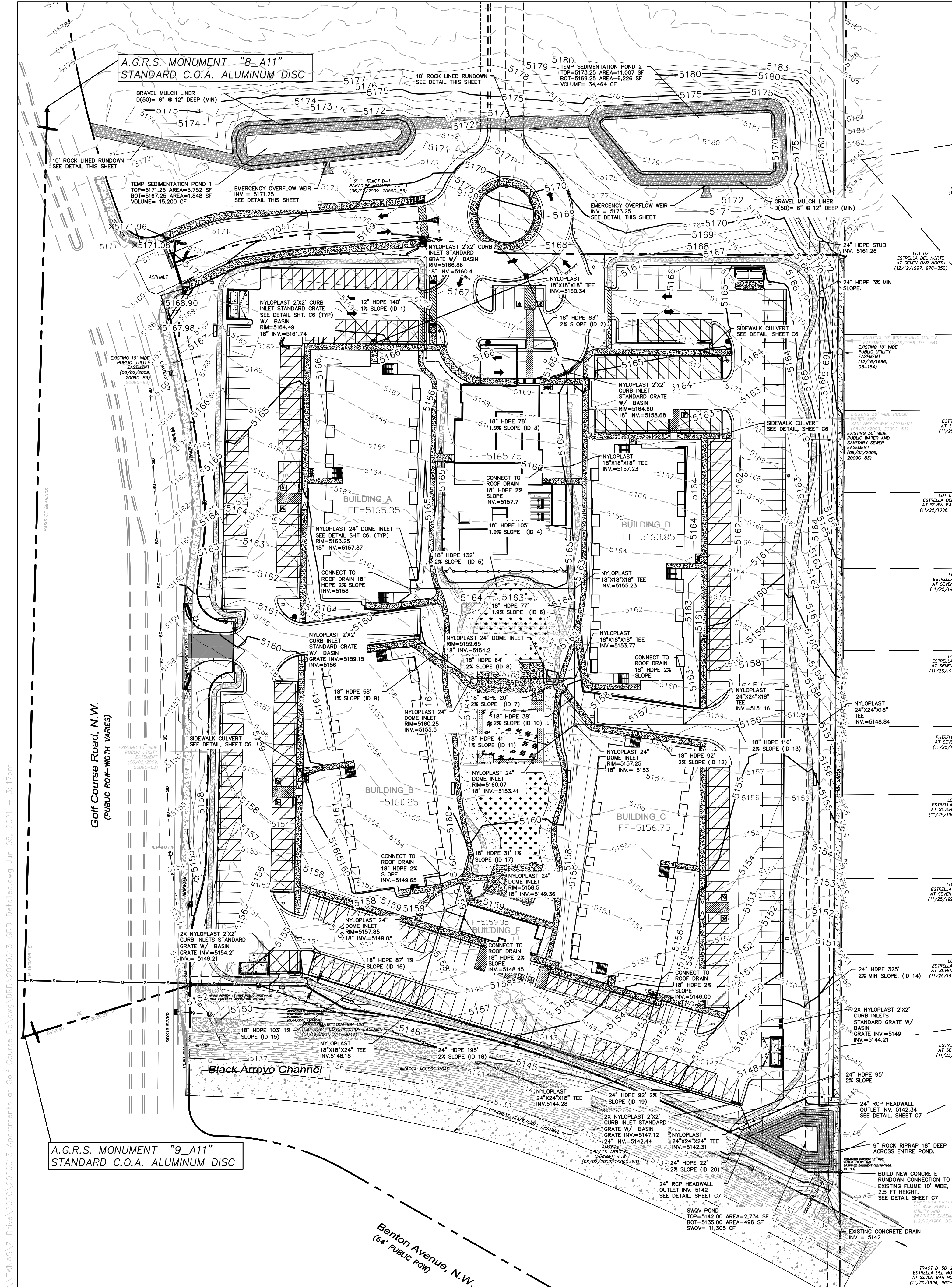
Peak Discharge (cfs/acre)		
Zone 1	100-Year	10-Year
Qa	1.29	0.24
Qb	2.03	0.76
Qc	2.87	1.49
Qd	4.37	2.89

**Stormwater Quality Volume**  
Total Impervious Area =  
Retainage depth = 0.42" Per DPM Pg. 272  
Retention Volume =

ΣArea in "Treatment D"  
0.035  
=0.035 x area  
foot  
CF

"ISSUED FOR PERMIT - NOT FOR CONSTRUCTION"		
ENGINEER'S SEAL  RONALD R. BOHANNAN P.E. #7868	WINTERGREEN LUXURY APARTMENTS 10820 GOLF COURSE RD. NW <b>GRADING AND DRAINAGE BASIN MAP</b>	DRAWN BY BF DATE 5/19/2021 2020013_BASINS
	 TIERRA WEST, LLC 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com	SHEET # <b>C1</b> JOB # 2020013



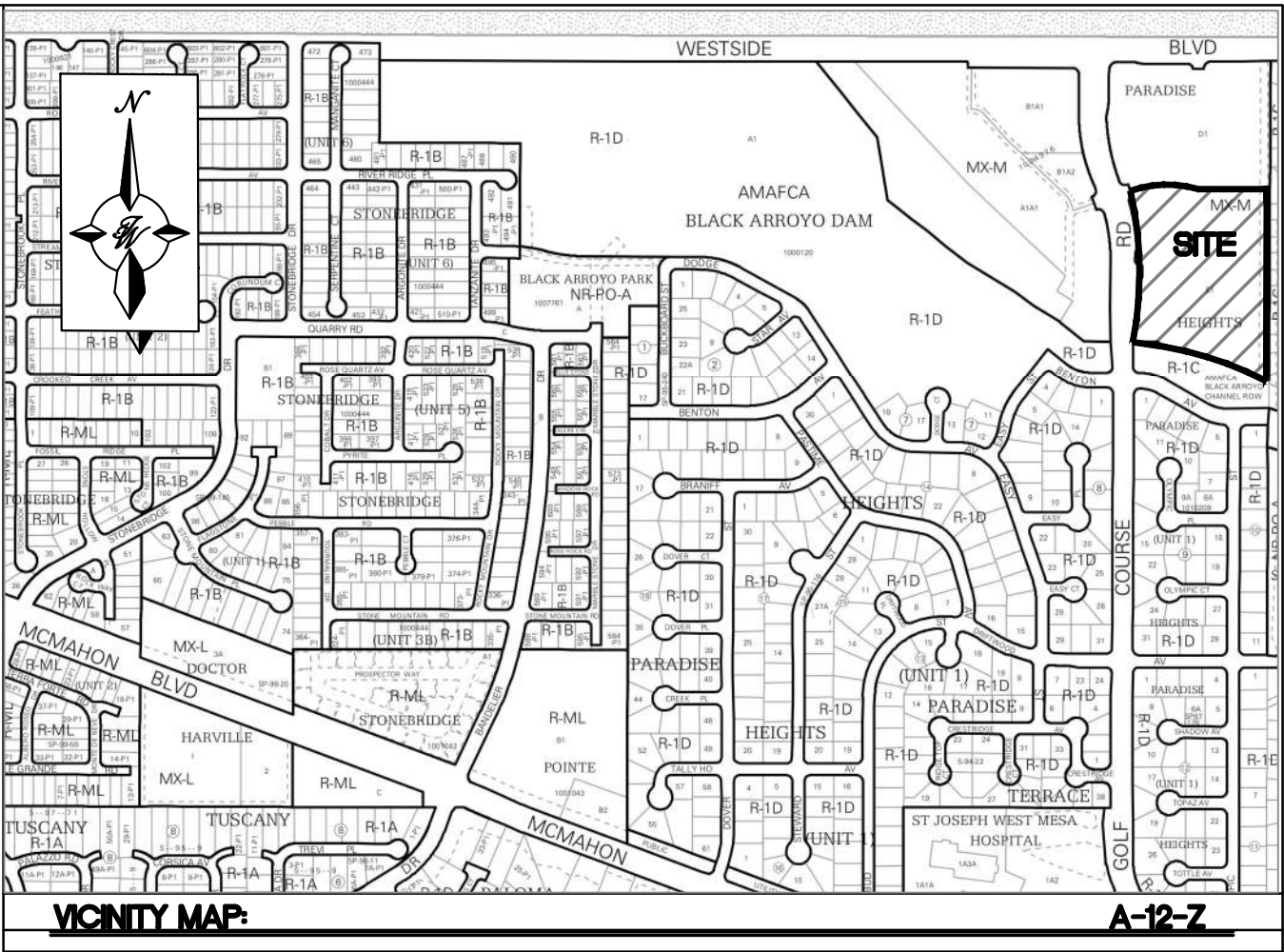


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- 5. BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
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LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- CENTERLINE
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- SCREEN WALL
- 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



Manning's Equation:

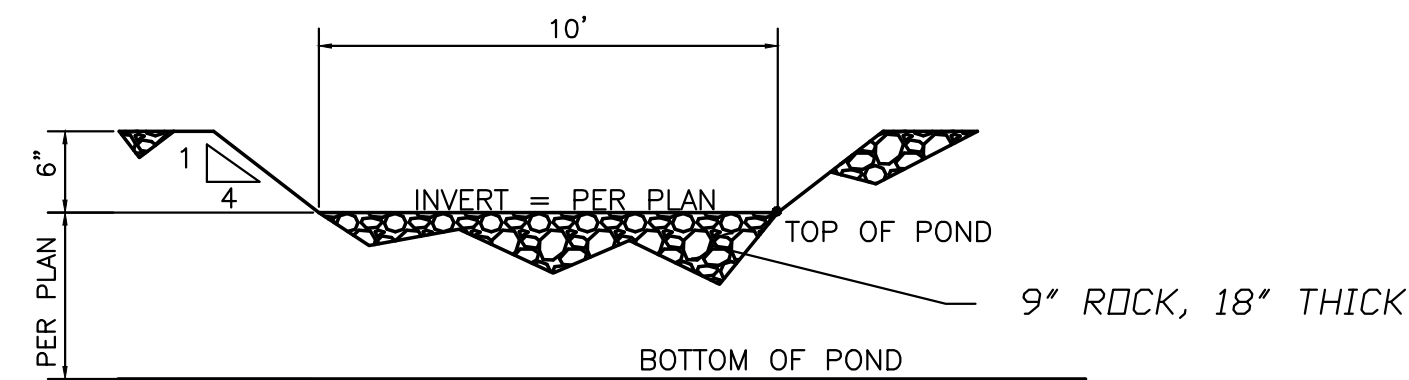
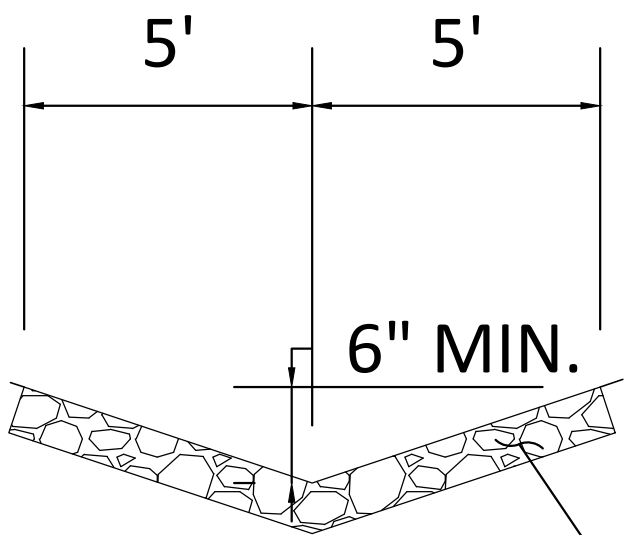
$Q = 1.49/n * A * R^{(2/3)} * S^{(1/2)}$   
A = Area  
R = D/4  
S = Slope  
n = 0.013

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
NORTH-LOT-GRADING	1.000	1.200	68695.18 Sq. Ft.	11766.73 Cu. Yd.	35.55 Cu. Yd.	11731.19 Cu. Yd.<Cut>
SITE-GRADING	1.000	1.200	426784.96 Sq. Ft.	23455.33 Cu. Yd.	33244.76 Cu. Yd.	9789.43 Cu. Yd.<Fill>
Totals			495480.14 Sq. Ft.	35222.06 Cu. Yd.	33280.30 Cu. Yd.	1941.76 Cu. Yd.<Cut>

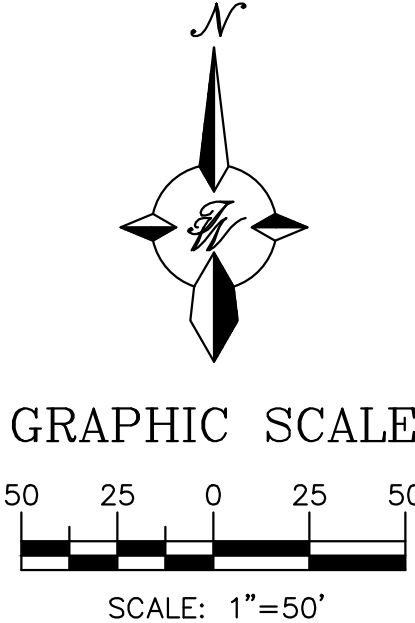
Pipe Capacity Tables

Pipe ID	D (in)	Slope (%)	Area (ft^2)	R	Q 100 (cfs)	Q Provided (cfs)
1	18	1.00	1.77	0.375	0.48	10.53
2	18	2.00	1.77	0.375	2.68	14.90
3	18	1.90	1.77	0.375	4.87	14.52
4	18	1.90	1.77	0.375	5.64	14.52
5	18	2.00	1.77	0.375	1.81	14.90
6	18	1.90	1.77	0.375	7.45	14.52
7	18	1.90	1.77	0.375	2.09	14.52
8	18	2.00	1.77	0.375	1.25	14.90
9	18	1.00	1.77	0.375	0.40	10.53
10	18	2.00	1.77	0.375	9.54	14.90
11	18	1.00	1.77	0.375	0.63	10.53
12	18	2.00	1.77	0.375	11.02	14.90
13	18	2.00	1.77	0.375	12.57	14.90
14	24	2.00	3.14	0.500	12.57	32.08
15	18	1.00	1.77	0.375	7.69	10.53
16	18	1.00	1.77	0.375	2.94	10.53
17	18	1.00	1.77	0.375	0.63	10.53
18	24	2.00	3.14	0.500	10.63	32.08
19	24	2.00	3.14	0.500	12.18	32.08
20	24	2.00	3.14	0.500	25.32	32.08
Total					37.89	



EMERGENCY SPILLWAY DETAIL

ROCK LINED SWALE



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"ISSUED FOR PERMIT - NOT FOR CONSTRUCTION"

ENGINEER'S SEAL  
RONALD R. BOHANNAN  
NEW MEXICO  
7868  
06/08/2021  
RONALD R. BOHANNAN  
P.E. #7868

WINTERGREEN LUXURY APARTMENTS  
10820 GOLF COURSE RD. NW

**GRADING & DRAINAGE PLAN**

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

DRAWN BY  
BF

DATE  
5/19/2021

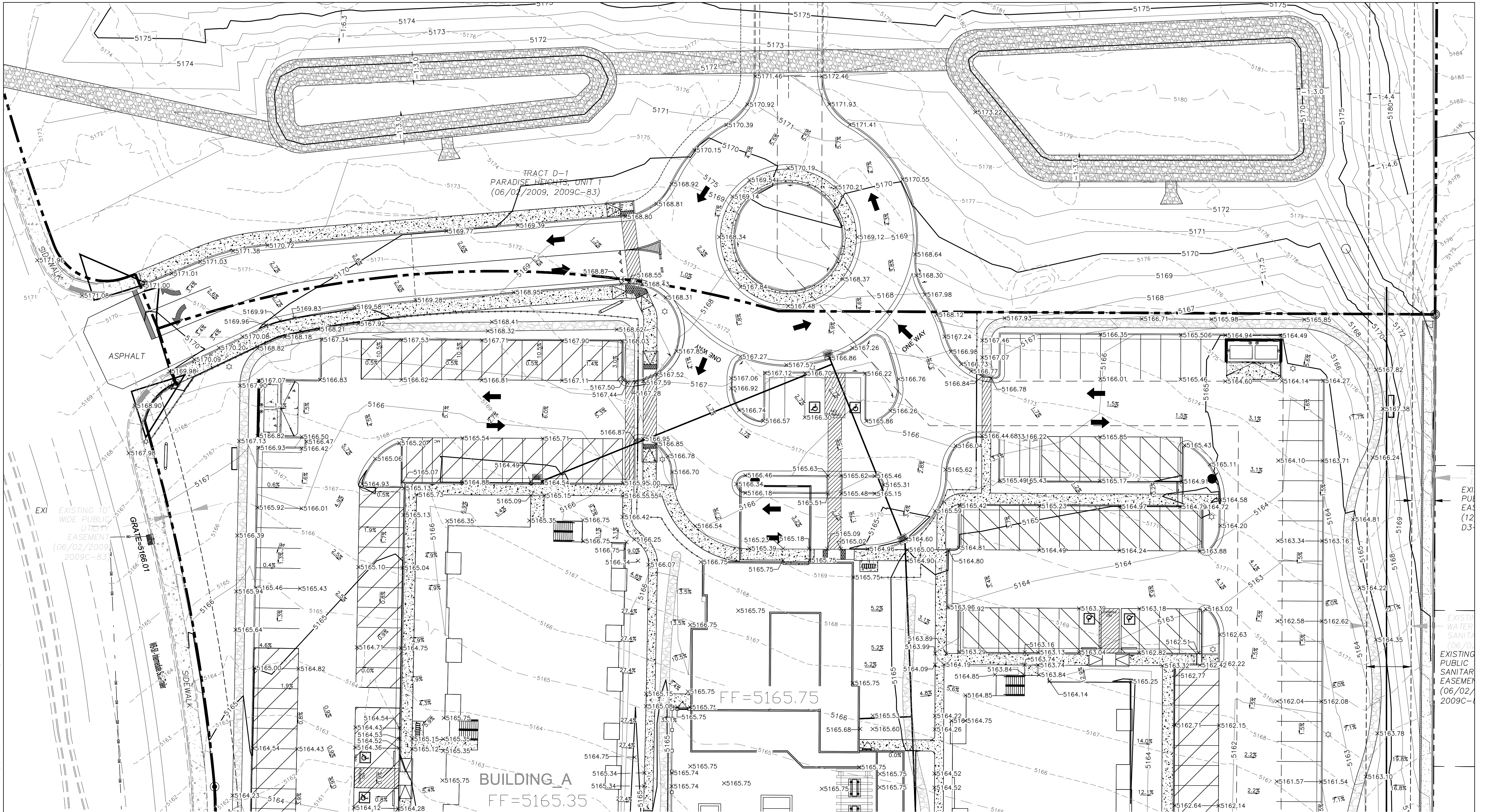
2020013\_GRB\_DETILED

SHEET #  
**C2**

JOB #  
2020013



\\TINAS\Z\_Drive\2020\2020013\_GRB\_Detailed.dwg Jun 08, 2021 - 3:47pm

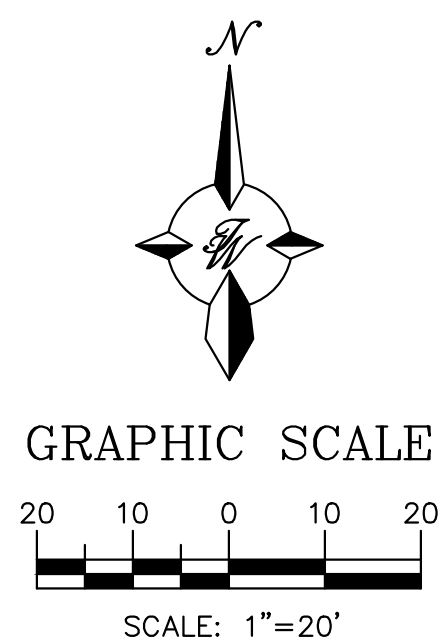


LEGEND			
	CURB & GUTTER		CONTOUR MAJOR
	BOUNDARY LINE		CONTOUR MINOR
	EASEMENT		SPOT ELEVATION
	CENTERLINE		FLOW ARROW
	RIGHT-OF-WAY		EXISTING CURB & GUTTER
	BUILDING		EXISTING BOUNDARY LINE
	SIDEWALK		EXISTING CONTOUR MAJOR
	SCREEN WALL		EXISTING CONTOUR MINOR
	RETAINING WALL		EXISTING SPOT ELEVATION

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	WINTERGREEN LUXURY APARTMENTS 10820 GOLF COURSE RD. NW	DRAWN BY BF
	<b>NORTH GRADING PLAN</b>	DATE 5/19/2021
 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com		2020013_GRB_DETAILED
SHEET # <b>C3</b>		JOB # 2020013





#### LEGEND

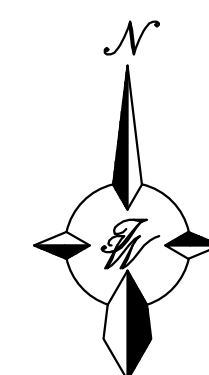
	CURB & GUTTER		5010	CONTOUR MAJOR
	BOUNDARY LINE		5011	CONTOUR MINOR
	EASEMENT		5048.25	SPOT ELEVATION
	CENTERLINE			FLOW ARROW
	RIGHT-OF-WAY			EXISTING CURB & GUTTER
	BUILDING			EXISTING BOUNDARY LINE
	SIDEWALK		5010	EXISTING CONTOUR MAJOR
	SCREEN WALL		5011	EXISTING CONTOUR MINOR
	RETAINING WALL		5048.25	EXISTING SPOT ELEVATION

#### NOTICE TO CONTRACTORS

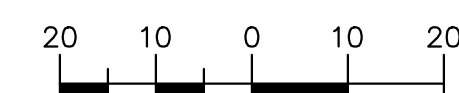
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GRAPHIC SCALE



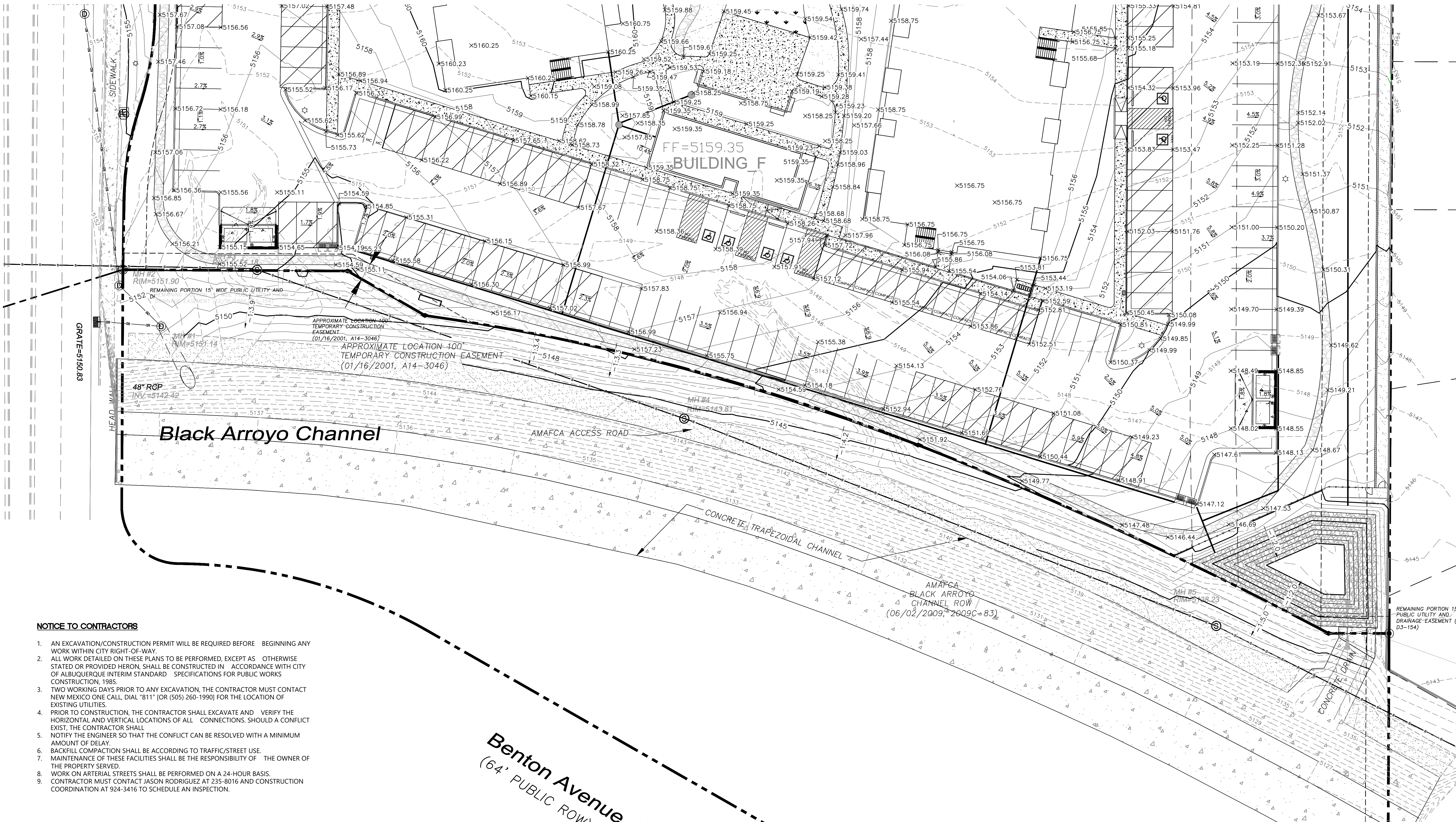
SCALE: 1"=20'

#### "ISSUED FOR PERMIT - NOT FOR CONSTRUCTION"

		ENGINEER'S SEAL	WINTERGREEN LUXURY APARTMENTS	DRAWN BY BF
 06/08/21			10820 GOLF COURSE RD. NW	DATE 5/19/2021
		CENTER GRADING PLAN		2020013_GRB_DETAILED
RONALD R. BOHANNAN P.E. #7868		 <i>TIERRA WEST, LLC</i> 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com		SHEET # <b>C4</b>
				JOB # 2020013



\\TINAS\Z\_Drive\2020\2020013\_Apartments at Golf Course Rd.dwg [R03] 2020013\_GRB\_Detailed.dwg Jun 08, 2021 - 4:56pm



NOTICE TO CONTRACTORS

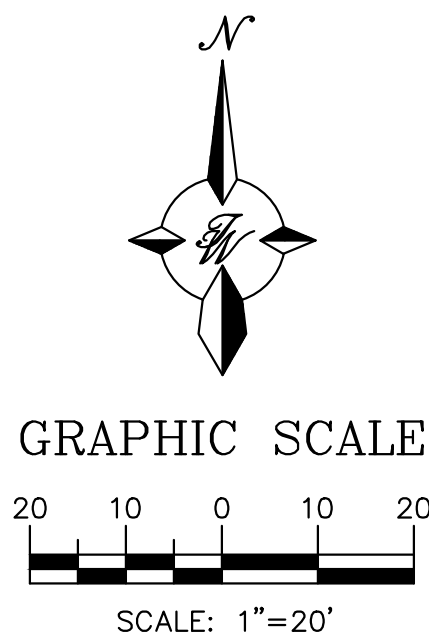
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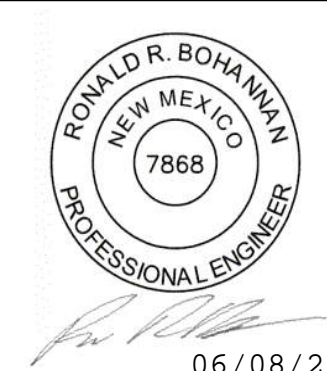

LEGEND

	CURB & GUTTER		CONTOUR MAJOR
	BOUNDARY LINE		CONTOUR MINOR
	EASEMENT		SPOT ELEVATION
	CENTERLINE		FLOW ARROW
	RIGHT-OF-WAY		EXISTING CURB & GUTTER
	BUILDING		EXISTING BOUNDARY LINE
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	SCREEN WALL		EXISTING CONTOUR MINOR
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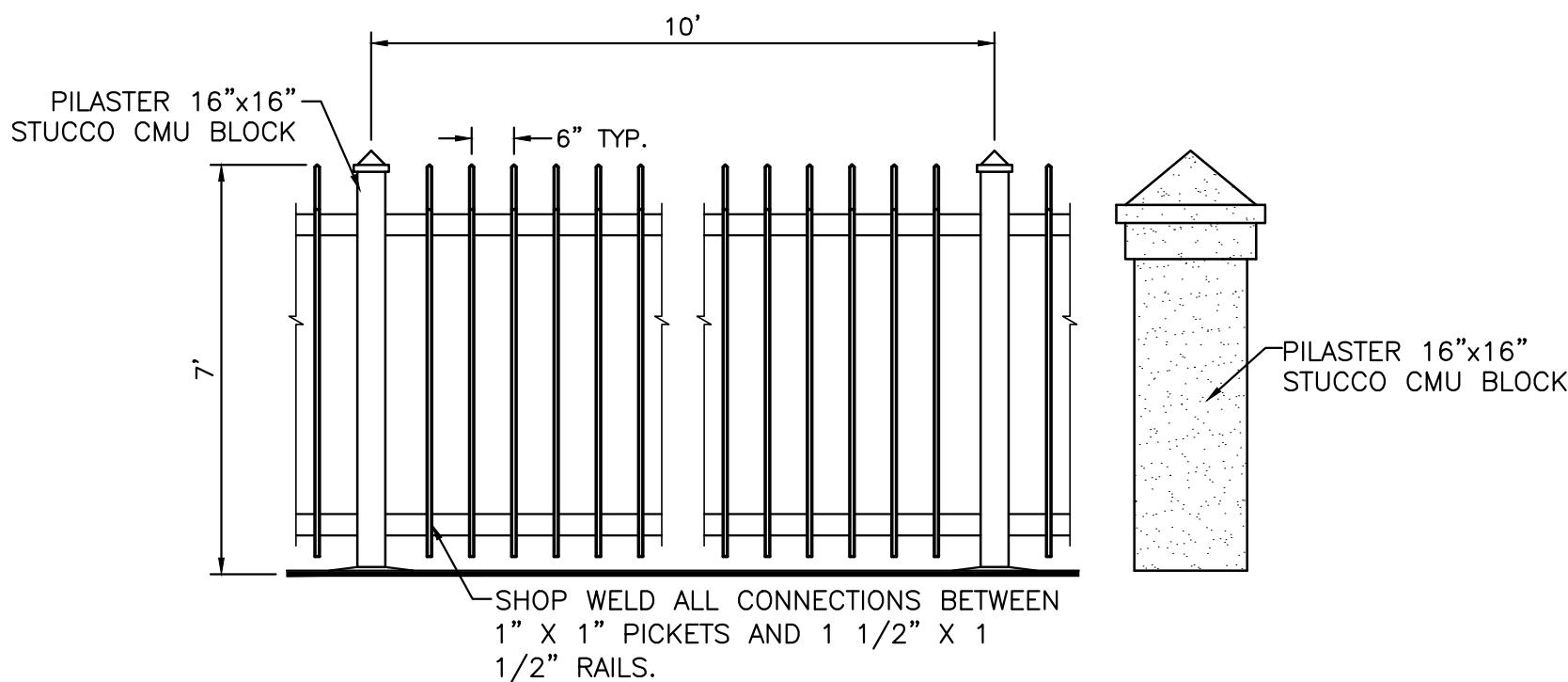
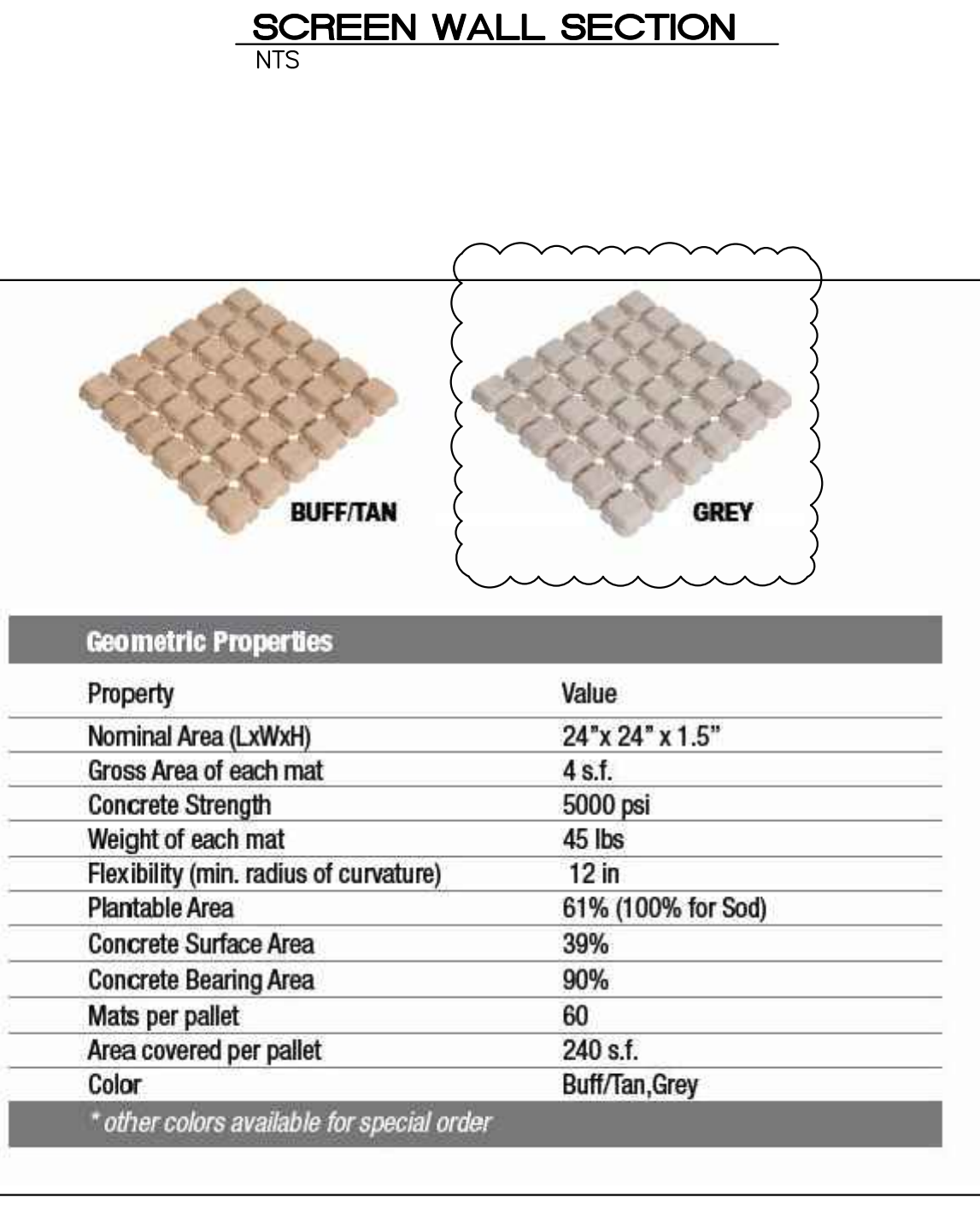
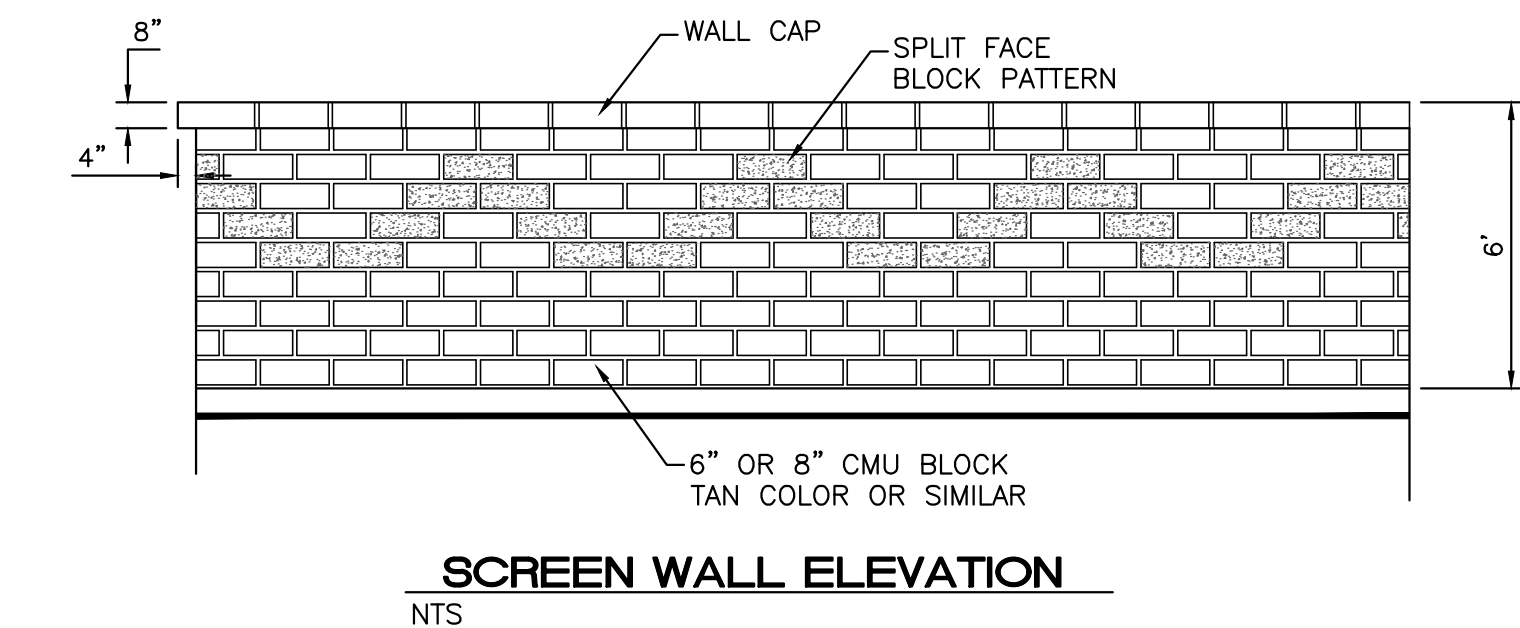
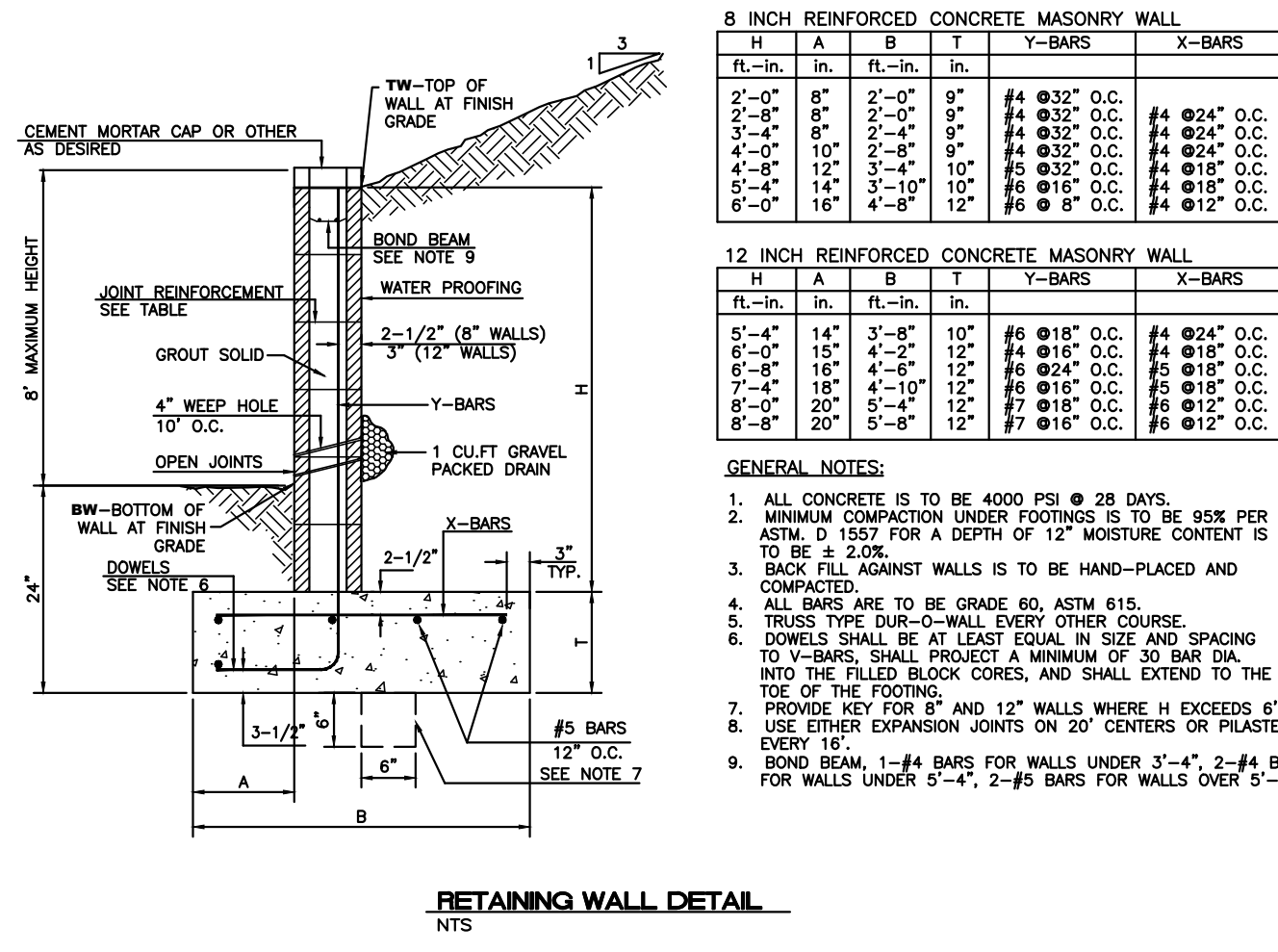
Benton Avenue, N.W.  
(64' PUBLIC ROW)

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ENGINEER'S SEAL	WINTERGREEN LUXURY APARTMENTS 10820 GOLF COURSE RD. NW	DRAWN BY BF
 06/08/21	SOUTH GRADING PLAN	DATE 5/19/2021
		2020013_GRB_DETAIL
RONALD R. BOHANNAN P.E. #7868		SHEET # <b>C5</b>
		JOB # 2020013





"ISSUED FOR PERMIT - NOT FOR CONSTRUCTION"		
ENGINEER'S SEAL	WINTERGREEN LUXURY APARTMENTS  10820 GOLF COURSE RD. NW	DRAWN BY BF  DATE 5/19/2021
  06/08/2021	<b>CONSTRUCTION DETAILS</b>	2020013_DTB
	 <b>TIERRA WEST, LLC</b> 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com	SHEET #  <b>C6</b>
RONALD R. BOHANNAN P.E. #7868		JOB # 2020013



