

CITY OF ALBUQUERQUE

Planning Department
Alan Varela, Director



Mayor Timothy M. Keller

May 2, 2024

Elizabeth A. Willmot, P.E.
Kimley-Horn and Associates, Inc.
1201 Third Avenue, Suite 2800
Seattle, WA 98101

**RE: Raising Cain's – St Joseph's NW
Grading Plans and Drainage Report
Engineer's Stamp Date: 04/19/24
Hydrology File: G11D067D**

Dear Ms. Willmot:

Based upon the information provided in your submittal received 04/22/2024, the Grading Plans and Drainage Report are approved for Building Permit, and Grading Permit. Please attach a copy of this approved plan in the construction sets for Building Permit processing along with a copy of this letter.

PRIOR TO CERTIFICATE OF OCCUPANCY:

1. Engineer's Certification, per the DPM Part 6-14 (F): *Engineer's Certification Checklist For Non-Subdivision* is required.
2. Please provide the executed paper Drainage Covenant (latest revision) printed on one-side only with Exhibit A and a check for **\$25.00** made out to "**Bernalillo County**" for the stormwater quality pond per Article 6-15(C) of the DPM to Hydrology for review at Plaza de Sol.
3. The Southern Oxbow Center's (overall development) Owner will have to substantially completed the following:
 - a. The Work Order for all improvements within the R.O.W. of St. Joseph as outlined in the Infrastructure List (PR-2021-005597).
 - b. All private access drives and private drainage structures to convey the storm discharge from this site to the ultimate outfall point for Southern Oxbow Center which is the existing 36-inch storm sewer stub on Coors Blvd.

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

CITY OF ALBUQUERQUE

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Mayor Timothy M. Keller

Engineer (Doug Hughes, PE, jhughes@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

If you have any questions, please contact me at 924-3995 or rbrissette@cabq.gov.

Sincerely,

Renée C. Brissette

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

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov



City of Albuquerque

Planning Department
Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Project Title: Raising Cane's **Building Permit #:** NA **Hydrology File #:** NA
DRB#: _____ **EPC#:** NA **Work Order#:** NA

Legal Description: TR X-2-A AMENDED PLAT OF TRS X-2-A & X-2-B THE UNIVERSITY OF ALBUQUERQUE URBAN CENTER CONT 26.4990
City Address: AC M/L

Applicant: Modulus Architects & Land use planning **Contact:** 505-338-1499
Address: 8220 San Pedro, NE. Suite 520, Albuquerque, NM, 87113
Phone#: 505-338-1499 **Fax#:** _____ **E-mail:** rokoye@modulusarchitects.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: 4/19/2024 **By:** _____

Regina Okoye

COA STAFF:

ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

FINAL DRAINAGE REPORT
FOR
Raising Cane's 1156
Lot 7

The University of Albuquerque Urban Center
Albuquerque, NM 87120

April 19, 2024

PREPARED FOR:

RAISING CANE'S

6800 BISHOP ROAD

PLANO, TX 75024

PREPARED BY:

KIMLEY-HORN

1201 THIRD AVENUE, SUITE 2800

SEATTLE, WA 98101

OFFICE: (206) 667-8610

KHA PROJECT #: 090042013

City of Albuquerque
Planning Department
Development Review Services
HYDROLOGY SECTION
APPROVED

DATE: 05/02/24

BY:

Renee C. Brissette

HydroTrans # G11D067D

THE APPROVAL OF THESE PLANS/REPORT SHALL NOT BE
CONSTRUED TO PERMIT VIOLATIONS OF ANY CITY
ORDINANCE OR STATE LAW, AND SHALL NOT PREVENT
THE CITY OF ALBUQUERQUE FROM REQUIRING
CORRECTION, OR ERROR OR DIMENSIONS IN PLANS,
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AUTHORIZATION.



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Disclosure Statement:

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Table of Contents

EXECUTIVE SUMMARY	2
INTRODUCTION.....	2
PURPOSE AND SCOPE OF STUDY	2
PROJECT REQUIREMENTS.....	2
PROJECT DESCRIPTION.....	2
LOCATION	2
BACKGROUND DOCUMENTS	2
PLANNING HISTORY	2
DRAINAGE HISTORY AND RELATED DOCUMENTS.....	3
EXISTING CONDITIONS.....	3
SITE INVESTIGATION.....	3
DEVELOPED CONDITIONS.....	3
ONSITE	3
OFFSITE	3
CALCULATIONS	3
TABLE 1 – EXISTING VS POST DEVELOPMENT PEAK DISCHARGE.....	4
CONCLUSION	5
REFERENCES.....	5
APPENDIX A: MAPS.....	6
VICINITY MAP.....	6
HYDROLOGIC SOIL GROUP MAP.....	7
POST-DEVELOPMENT THRESHOLD DISCHARGE AREAS MAP	8
APPENDIX B: CALCULATIONS	9
PROPOSED PEAK DISCHARGE.....	9
THRESHOLD DISCHARGE AREA CALCULATIONS	10
STORMWATER QUALITY VOLUME CALCULATIONS.....	11
APPENDIX C: RELEVANT DOCUMENTS.....	12
SOUTHERN OXBOW CENTER MASTER DRAINAGE PLAN BY HUGH FLOYD, PE NO. 16633 ON 4/28/2022.....	12
APPROVED BY RENEE C. BRISSETTE, PE, CFM on 4/28/2022	12
GRADING PLAN.....	13

EXECUTIVE SUMMARY

The project is located in the City of Albuquerque at the southwest corner of the intersection of St Josephs Dr NW and Coors Blvd NW. Current zoning is Commercial, NR-C, which aligns with the proposed project. The site is currently a vacant lot. Proposed improvements consist of the construction of a new 3,174 SF building with drive-thru, parking lot, and associated improvements. Proposed improvements in St Josephs Dr NW and Coors Blvd NW are to be designed and constructed by others. The project will cause an increase in impervious cover when compared to pre-developed conditions and will thus generate additional stormwater runoff to be mitigated onsite through various infiltrating detention ponds. The project is located at the northwest corner of a master planned development. All work in the right-of-way and construction of internal private access roads and utilities which the proposed Raising Cane's is utilizing will be designed and constructed by the overall developer "the developer" and are not considered a part of the project scope.

INTRODUCTION

PURPOSE AND SCOPE OF STUDY

The purpose of this Final Drainage Report (FDR) is to provide the hydrologic and hydraulic calculations and to document and finalize the drainage design methodology in support of the proposed Raising Cane's restaurant ("the Site"). The Site is located within the jurisdictional limits of City of Albuquerque ("the City").

PROJECT REQUIREMENTS

The Site was designed in accordance with the City of Albuquerque's Development Process Manual ("DPM") Chapter 6 (*Drainage, Flood Control, and Erosion Control*), Part 6-2(A) (*Procedure for 40 Acre and Smaller Basins*), and Part 6-12 (*Stormwater Quality and Low-Impact Development*). These sections state that the principal design storm is the 100-year event, and that stormwater quality must be provided for new development projects.

All proposed stormwater improvements onsite are private and are proposed to tie to a private stormwater system at the southeast corner of the site to be built by the developer prior to Cane's construction. The Site was historically vacant land with some asphalt pavement to be demolished by the developer. The Site is part of an overall development which defines drainage patterns and stormwater detention for the whole development.

PROJECT DESCRIPTION

LOCATION

The Site is located southwest of the intersection of St Josephs Dr NW and Coors Blvd NW. Historically, the Site was vacant land surrounded by residential and commercial developments. Refer to **Appendix A** for the Vicinity Map.

BACKGROUND DOCUMENTS

PLANNING HISTORY

The Site, in its historical condition, was undeveloped. It is zoned Commercial (NR-C). Current zoning aligns with what is proposed for the Site.

DRAINAGE HISTORY AND RELATED DOCUMENTS

The Site is part of a master development with an *Overall Drainage Report* describing historic drainage conditions onsite, see **Appendix C**.

EXISTING CONDITIONS

SITE INVESTIGATION

The *Overall Drainage Report* for the master development further details out forms of analysis and downstream capacity, see **Appendix C**.

DEVELOPED CONDITIONS

ONSITE

Proposed improvements consist of a new 3,174 SF building with drive thru, parking lot, and associated improvements. Runoff will surface flow to valley gutters where it will enter grate inlets and flow to the infiltrating detention ponds through a bubble up structure. Runoff will also flow to the ponds through curb cuts. Runoff flows to Ponds A and C through 8" HDPE pipes to bubble up structures on the bottom on the pond. Ponds A and C will be fully infiltrating. Runoff flows through valley gutters and curb cuts to Pond B where it will fully infiltrate. Runoff flows to Pond D through surface flow and curb cuts as well as through a 6" HDPE pipe connected to a bubble up structure on the bottom of pond. Pond D will infiltrate water while also tying into the 18" storm system to be built by the developer. See **Appendix B** for pond and pipe sizing calculations and drain time.

OFFSITE

All offsite work in St Josephs Dr NW and Coors Blvd NW will be done by the developer. Offsite paving is proposed in the easement at the SW corner of the site to connect to the common loop road to be built by the developer.

CALCULATIONS

The allowable peak discharge generated by the site for developed conditions was determined using the rational method in the Southern Oxbow Center Drainage Plan by Hugh Floyd, PE No. 16633 on 4/28/2022, refer to **Appendix C**. The site is located in precipitation zone 1 and a 100-year, 12-minute storm was used for design. See **Table 1 – Existing vs Post Development Peak Discharge** for calculations. The proposed inlets, pipes, and infiltrating detention ponds onsite have been sized to contain the 100-year, 60-minute storm event based on the Peak Discharge Rate found in the City of Albuquerque's Development Process Manual Chapter 6 (*Drainage, Flood Control, and Erosion Control*), Part 6-2(A) (*Procedure for 40 Acre and Smaller Basins*).

TABLE 1 – EXISTING VS POST DEVELOPMENT PEAK DISCHARGE

Pre-Development Conditions	
<i>Allowable 100-year Peak Runoff (cfs)</i>	<i>Discharges to</i>
2.90	Refer to Southern Oxbow Center Drainage Plan by Hugh Floyd, PE No. 16633 on 4/28/2022 for Details

Post-Development Conditions		
<i>Basin</i>	<i>100-year Peak Runoff (cfs)</i>	<i>Discharges to</i>
DA1	0.98	Pond A - Fully Infiltrating
DA2	1.08	Pond B - Fully Infiltrating
DA3	0.96	Pond C - Fully Infiltrating
DA4	1.42	Pond D - Infiltration and Outflow to Existing Storm System by Developer
Bypass Areas	0.56	Offsite

	<i>100-year Peak Runoff (cfs)</i>
<i>Pre-Development Conditions</i>	2.90
<i>Post-Development Conditions</i>	2.34
Total Decrease in Peak Runoff by Proposed Project	0.56

In addition to matching or lowering peak discharge from the site, stormwater quality is also required. Because this site is a new development and there is a significant increase in impervious cover compared to existing conditions, the calculations for required SWQV are as follows:

$$SWQV (ac - ft) = \frac{A_{impervious} (ac) \times 0.42 (in)}{12 (in/ft)}$$

With the proposed 0.73 acres of impervious cover being proposed, the total SWQV that must be accommodated is 0.026 ac-ft or 1,133 cubic feet. There are four proposed infiltrating detention ponds onsite, and each has been designed to meet the stormwater quality requirements for the amount of impervious area in the drainage basin. Three ponds are fully infiltrating and one pond infiltrates and ties into the storm system to be built by the developer at the SE corner of the site. The four ponds can store a combined stormwater quality volume of 1,410 cubic feet of runoff.

The pipe sizes were determined using Bentley FlowMaster to ensure the minimum velocity is 3 feet per second for the 10-year storm event. The pipes were also designed to have capacity to hold the runoff from the 100-year event.

The proposed development will increase the amount of impervious cover when compared to existing conditions and propose four infiltrating detention ponds to mitigate the increase in impervious area and will thus decrease the peak discharge generated by the site.

Refer to **Appendix B** for all calculations.

CONCLUSION

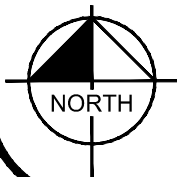
The proposed development will increase the amount of impervious cover onsite and will mitigate the increase in stormwater runoff onsite through the addition of several onsite infiltrating detention ponds and associated stormwater infrastructure. Two proposed bypass areas will flow offsite but will not exceed existing peak runoff conditions. No adverse effects are anticipated downstream as a result of this development.

REFERENCES

1. City of Albuquerque "Development Process Manual" (DPM) dated June 2020.

APPENDIX A: MAPS

VICINITY MAP



HYDROLOGIC SOIL GROUP MAP

Hydrologic Soil Group—Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico
 Survey Area Data: Version 18, Sep 7, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 22, 2021—Dec 2, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MWA	Madurez-Wink associatin, gently sloping	B	7.1	100.0%
Totals for Area of Interest			7.1	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

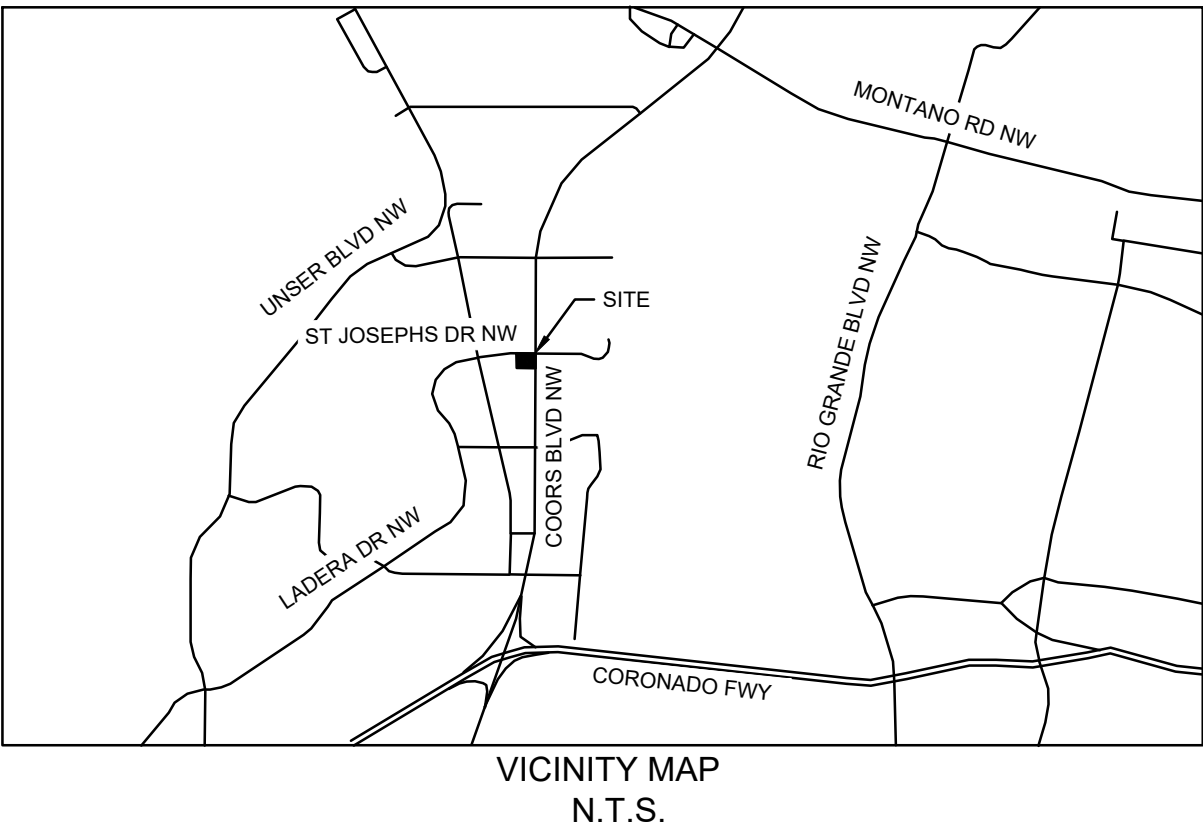
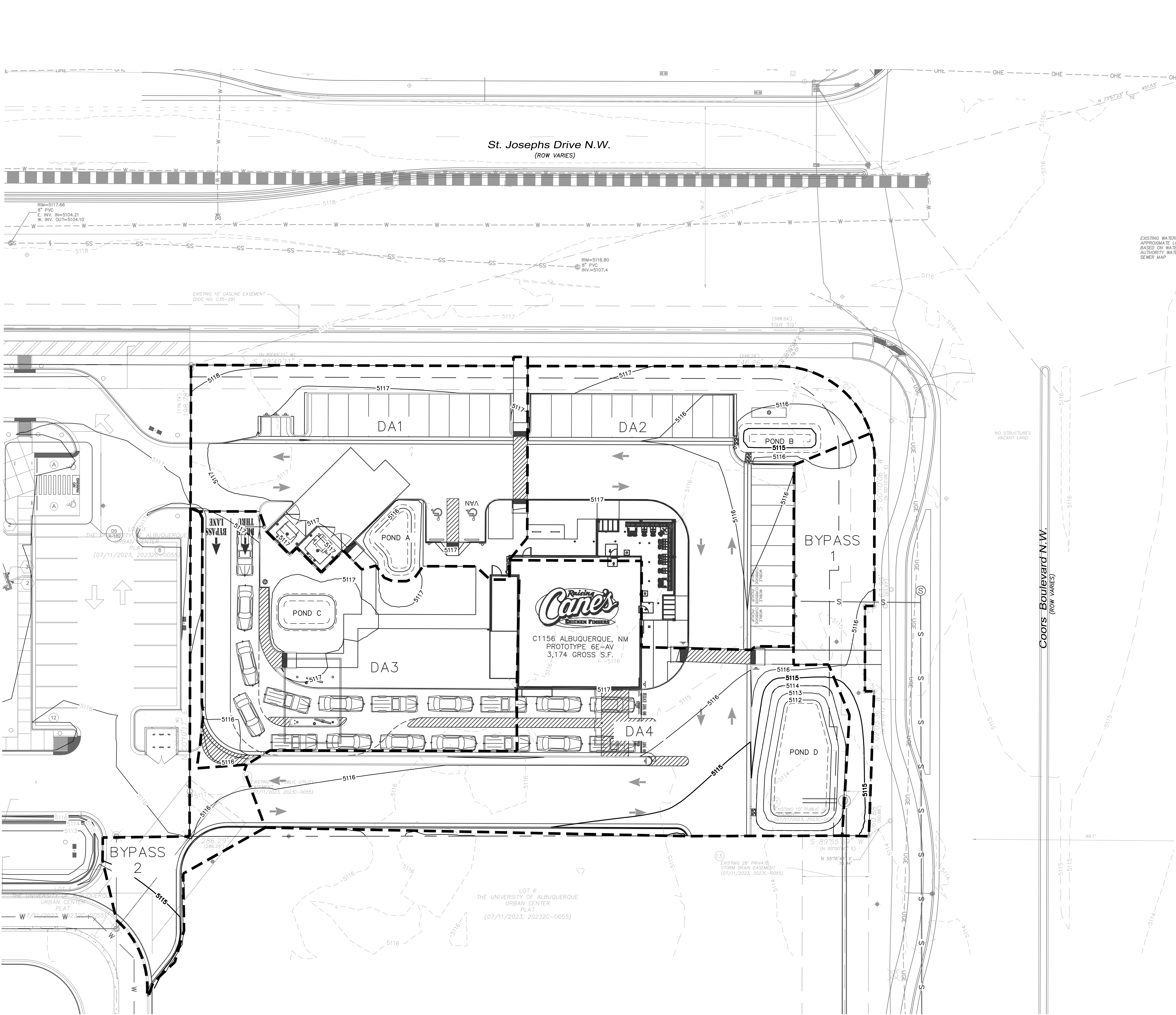
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

POST-DEVELOPMENT THRESHOLD DISCHARGE AREAS MAP

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LEGEND

---	PROPERTY LINE
---	SETBACK
---	EXISTING EASEMENT
---	DRAINAGE AREAS



KHA PROJECT 090042013		DATE 4/18/2024		SCALE AS SHOWN		DESIGNED BY SP		DRAWN BY SP		CHECKED BY LW	
POST-DEVELOPMENT THRESHOLD DISCHARGE AREA MAP											
PROPOSED RAISING CANE'S RESTAURANT AND DRIVE-THRU						ZONE ATLAS PAGE G-11-Z ALBUQUERQUE, NM 87120					
SHEET NUMBER EXHIBIT						ST JOSEPHS DR. NW & COORS BLVD NW					
Kimley»Horn						© 2024 KIMLEY-HORN AND ASSOCIATES, INC. 1201 3RD AVE, SUITE 2800, SEATTLE, WA 98101 PHONE: 206-607-2800 WWW.KIMLEY-HORN.COM					
ELIZABETH ANNE WILLOTT 28862 Professional Engineer 04/18/2024						REVISIONS					
						BY DATE					

APPENDIX B: CALCULATIONS

PROPOSED PEAK DISCHARGE

Project Name: C1156 ABQ, NM

Project Number: 90042013

Per : DPM Chapter 6, Section 6-2(A)(5)

The peak discharge rate is given in [TABLE 6.2.14](#) for small watersheds, less than or equal to 40 acres, where the time of concentration is assumed to be 12 minutes.

TABLE 6.2.14 Peak Discharge				
Zone	Land Treatment			
	A	B	C	D
100-YEAR PEAK DISCHARGE (CSF/ACRE)				
1	1.54	2.16	2.87	4.12
2	1.71	2.36	3.05	4.34
3	1.84	2.49	3.17	4.49
4	2.09	2.73	3.41	4.78
2-YEAR PEAK DISCHARGE (CSF/ACRE)				
1	0.00	0.02	0.50	1.56
2	0.00	0.08	0.61	1.66
3	0.00	0.15	0.71	1.73
4	0.00	0.28	0.87	1.88
10-YEAR PEAK DISCHARGE (CSF/ACRE)				
1	0.30	0.81	1.46	2.57
2	0.41	0.95	1.59	2.71
3	0.51	1.07	1.69	2.81
4	0.70	1.28	1.89	3.04

To determine the peak rate of discharge,

- Determine the area in each treatment, A_A , A_B , A_C , A_D .
- Multiply the peak rate for each treatment by the respective areas and sum to compute the total Q_p .

EQUATION 6.6
$$\text{Total } Q_p = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$$

Proposed Project Site Q_p

Assumptions Per DPM Section 6-2(A)(5):

t_c is 12 minutes

100-yr Peak Discharge (CFS/ACRE)

Site is in Zone 1

Per Table 6.2.14

Zone	Land Treatment			
	A	B	C	D
1	1.54	2.16	2.87	4.12

Eq 6.6:

AREA TO POND A (DA1)

$Q_{PA} = 1.54$ cfs/ac

$A_A = 0$ acres

$Q_{PB} = 2.16$ cfs/ac

$A_B = 0$ acres

$Q_{PC} = 2.87$ cfs/ac

$A_C = 0.06$ acres

$Q_{PD} = 4.12$ cfs/ac

$A_D = 0.19$ acres

Total $Q_p = 0.98$ cfs

AREA TO POND B (DA2)

$Q_{PA} = 1.54$ cfs/ac

$A_A = 0$ acres

$Q_{PB} = 2.16$ cfs/ac

$A_B = 0$ acres

$Q_{PC} = 2.87$ cfs/ac

$A_C = 0.07$ acres

$Q_{PD} = 4.12$ cfs/ac

$A_D = 0.21$ acres

Total $Q_p = 1.08$ cfs

AREA TO POND C (DA3)

$Q_{PA} = 1.54$ cfs/ac

$A_A = 0$ acres

$Q_{PB} = 2.16$ cfs/ac

$A_B = 0$ acres

$Q_{PC} = 2.87$ cfs/ac

$A_C = 0.08$ acres

$Q_{PD} = 4.12$ cfs/ac

$A_D = 0.18$ acres

Total $Q_p = 0.96$ cfs

AREA TO POND D (DA4)

$Q_{PA} = 1.54$ cfs/ac

$A_A = 0$ acres

$Q_{PB} = 2.16$ cfs/ac

$A_B = 0$ acres

$Q_{PC} = 2.87$ cfs/ac

$A_C = 0.06$ acres

$Q_{PD} = 4.12$ cfs/ac

$A_D = 0.303$ acres

Total $Q_p = 1.42$ cfs

BYPASS AREAS 1 AND 2

$Q_{PA} = 1.54$ cfs/ac

$A_A = 0.00$ acres

$Q_{PB} = 2.16$ cfs/ac

$A_B = 0$ acres

$Q_{PC} = 2.87$ cfs/ac

$A_C = 0.11$ acres

$Q_{PD} = 4.12$ cfs/ac

$A_D = 0.06$ acres

Total $Q_p = 0.56$ cfs

Hydrograph for Small Watershed
Per : DPM, Chapter 6, Section 6-2(A)(7)

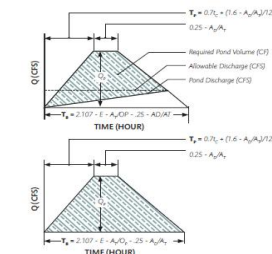
Base time, t_p , for a small watershed hydrograph is:

EQUATION 6.8 $t_p = (2.107 \cdot E \cdot A_p / Q_p) - (0.25 \cdot A_p / A_1)$

Where t_p is in hours, E is the excess precipitation in inches (from [Table 6.2.1.3](#)), Q_p is the peak flow in cfs, A_p is the area in treatment D, and A_1 is the total area in acres. Using the time of concentration, t_c (hours), the time to peak in hours is:

EQUATION 6.9 $t_p = (0.7 \cdot t_c) + [(1.6 \cdot (A_p / A_1)) / 12]$

FIGURE 6.2.5 Time to Peak in 10-years



Eq 6.8:

Eq 6.9:

$E = 1.87$ inches
 $A_1 = 1.33$ acres
 $A_0 = 0.95$ acres
 $Q_A = 2.90$ cfs
 $Q_p = 5.00$ cfs
 $Q_{utilization} = 3.03$ cfs
 $Q_{design} = 0.56$ cfs

$t_b = 0.87$ hrs

$t_c = 12$ minutes

$t_p = 0.21$ hrs

$0.25 \times A_p / A_1 = 0.18$ hrs

$(t_p + (0.25 \times A_p / A_1)) = 0.39$ hrs

$t_b + (t_p + (0.25 \times A_p / A_1)) = 0.48$ hrs

Determine Required Pond Volume:

Allowable Site Discharge ($Q_p - Q_{utilization}$) =	2.34	cfs
Pond Design Discharge ($18^\circ\text{N} @ 0.5\%$) =	7.43	cfs
Required Pond Volume:	0.08	ac-ft
Pond Volume for Designed Discharge:	0.00	ac-ft

Solve for: Required Pond Volume

$Q_p - Q_p - Q_{utilization} = 2.66$ cfs
 $0.5 \cdot T_p \cdot Q_p = 544$ cu. ft.

Area 1: $(0.25 \cdot A_p / A_1) \cdot Q_p = 1,709$ cu. ft.

Area 3: $0.5 \cdot (t_b + (t_p + (0.25 \times A_p / A_1))) \cdot Q_p = 1213$ cu. ft.

Leading Leg:

Slope of line = 23.40

Intersection point of lines = 0.10

Falling Leg:

Slope of line = -10.49

Intersection point of lines = 0.65

Total Required Pond Volume = 0.08 ac-ft

Solve for: Pond Volume for Designed Discharge

$Q_p - Q_p - Q_{utilization} = -2.43$ cfs
 $0.5 \cdot T_p \cdot Q_p = 453$ cu. ft.

Area 2: $(0.25 \cdot A_p / A_1) \cdot Q_p = -1,560$ cu. ft.

Area 3: $0.5 \cdot (t_b + (t_p + (0.25 \times A_p / A_1))) \cdot Q_p = 1010$ cu. ft.

Leading Leg:

Slope of line = 23.40

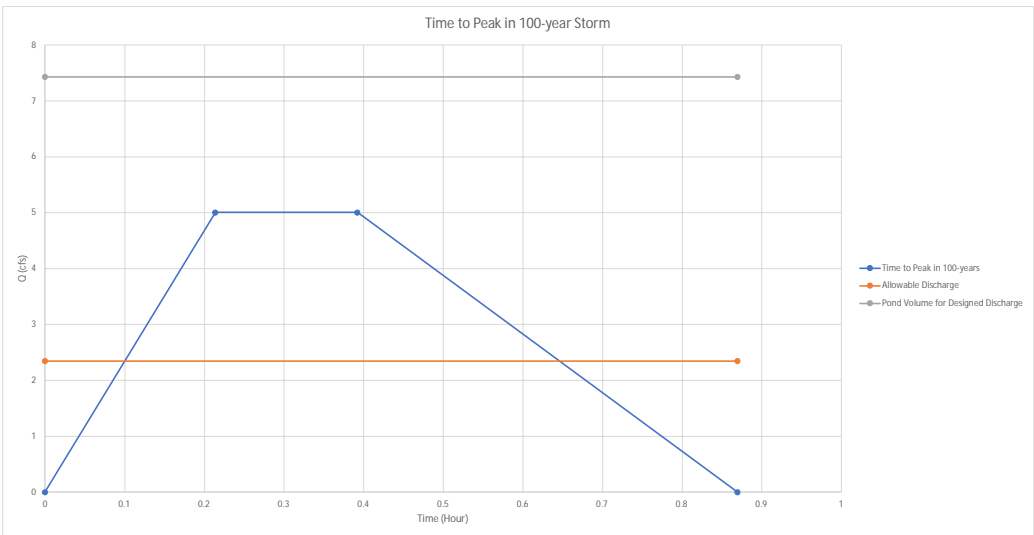
Intersection point of lines = 0.32

Falling Leg:

Slope of line = -10.49

Intersection point of lines = 0.16

Total Provided Pond Volume = 0.00 ac-ft



Worksheet for Outfall Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	7.43 cfs
Results	
Discharge	7.43 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft ²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	12.7 in
Percent Full	100.0 %
Critical Slope	0.007 ft/ft
Velocity	4.20 ft/s
Velocity Head	0.27 ft
Specific Energy	1.77 ft
Froude Number	(N/A)
Maximum Discharge	7.99 cfs
Discharge Full	7.43 cfs
Slope Full	0.005 ft/ft
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	18.0 in
Critical Depth	12.7 in
Channel Slope	0.005 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for 10-year Pipe-01

Project Description	
Friction Method	Manning
Solve For	Formula Normal Depth
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.009 ft/ft
Diameter	8.0 in
Discharge	0.59 cfs
Results	
Normal Depth	3.8 in
Flow Area	0.2 ft ²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.9 in
Top Width	0.67 ft
Critical Depth	4.3 in
Percent Full	47.9 %
Critical Slope	0.006 ft/ft
Velocity	3.57 ft/s
Velocity Head	0.20 ft
Specific Energy	0.52 ft
Froude Number	1.264
Maximum Discharge	1.37 cfs
Discharge Full	1.27 cfs
Slope Full	0.002 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	47.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.8 in
Critical Depth	4.3 in
Channel Slope	0.009 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for 100-year Pipe-01

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.009 ft/ft
Diameter	8.0 in
Discharge	0.98 cfs
Results	
Normal Depth	5.3 in
Flow Area	0.2 ft ²
Wetted Perimeter	1.3 ft
Hydraulic Radius	2.3 in
Top Width	0.63 ft
Critical Depth	5.6 in
Percent Full	66.0 %
Critical Slope	0.008 ft/ft
Velocity	4.01 ft/s
Velocity Head	0.25 ft
Specific Energy	0.69 ft
Froude Number	1.138
Maximum Discharge	1.37 cfs
Discharge Full	1.27 cfs
Slope Full	0.006 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	66.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.3 in
Critical Depth	5.6 in
Channel Slope	0.009 ft/ft
Critical Slope	0.008 ft/ft

Worksheet for 10-year Pipe-02

Project Description	
Friction Method	Manning
Solve For	Formula Normal Depth
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.069 ft/ft
Diameter	6.0 in
Discharge	0.87 cfs
Results	
Normal Depth	3.2 in
Flow Area	0.1 ft ²
Wetted Perimeter	0.8 ft
Hydraulic Radius	1.5 in
Top Width	0.50 ft
Critical Depth	5.5 in
Percent Full	52.6 %
Critical Slope	0.018 ft/ft
Velocity	8.31 ft/s
Velocity Head	1.07 ft
Specific Energy	1.34 ft
Froude Number	3.198
Maximum Discharge	1.72 cfs
Discharge Full	1.60 cfs
Slope Full	0.020 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	52.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.2 in
Critical Depth	5.5 in
Channel Slope	0.069 ft/ft
Critical Slope	0.018 ft/ft

Worksheet for 100-year Pipe-02

Project Description	
Friction Method	Manning
Solve For	Formula Normal Depth
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.069 ft/ft
Diameter	6.0 in
Discharge	1.42 cfs
Results	
Normal Depth	4.4 in
Flow Area	0.2 ft ²
Wetted Perimeter	1.0 ft
Hydraulic Radius	1.8 in
Top Width	0.44 ft
Critical Depth	5.9 in
Percent Full	73.5 %
Critical Slope	0.050 ft/ft
Velocity	9.18 ft/s
Velocity Head	1.31 ft
Specific Energy	1.68 ft
Froude Number	2.736
Maximum Discharge	1.72 cfs
Discharge Full	1.59 cfs
Slope Full	0.055 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	73.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.4 in
Critical Depth	5.9 in
Channel Slope	0.069 ft/ft
Critical Slope	0.050 ft/ft

Worksheet for 10-year Pipe-03

Project Description	
Friction Method	Manning
Solve For	Formula Normal Depth
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.008 ft/ft
Diameter	8.0 in
Discharge	0.57 cfs
Results	
Normal Depth	3.9 in
Flow Area	0.2 ft ²
Wetted Perimeter	1.0 ft
Hydraulic Radius	2.0 in
Top Width	0.67 ft
Critical Depth	4.3 in
Percent Full	48.5 %
Critical Slope	0.006 ft/ft
Velocity	3.39 ft/s
Velocity Head	0.18 ft
Specific Energy	0.50 ft
Froude Number	1.192
Maximum Discharge	1.29 cfs
Discharge Full	1.20 cfs
Slope Full	0.002 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	48.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.9 in
Critical Depth	4.3 in
Channel Slope	0.008 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for 100-year Pipe-03

Project Description	
Friction Method	Manning
Solve For	Formula Normal Depth
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.008 ft/ft
Diameter	8.0 in
Discharge	0.96 cfs
Results	
Normal Depth	5.4 in
Flow Area	0.3 ft ²
Wetted Perimeter	1.3 ft
Hydraulic Radius	2.3 in
Top Width	0.62 ft
Critical Depth	5.6 in
Percent Full	67.7 %
Critical Slope	0.008 ft/ft
Velocity	3.82 ft/s
Velocity Head	0.23 ft
Specific Energy	0.68 ft
Froude Number	1.059
Maximum Discharge	1.29 cfs
Discharge Full	1.20 cfs
Slope Full	0.005 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	67.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.4 in
Critical Depth	5.6 in
Channel Slope	0.008 ft/ft
Critical Slope	0.008 ft/ft

THRESHOLD DISCHARGE AREA CALCULATIONS



STANDARD FORM SF-1
RUNOFF COEFFICIENTS - IMPERVIOUS CALCULATION

PROJECT NAME: RC1156ABQ
PROJECT NUMBER: 090042013
CALCULATED BY: SP
CHECKED BY: LW

DATE: 4/18/2024

SOIL:

	TYPE A	TYPE B	TYPE C	TYPE D
LAND USE:	AREA	AREA	AREA	AREA
2-YEAR COEFF.	0.00	0.02	0.50	1.56
5-YEAR COEFF.	0.00	0.00	0.00	0.00
10-YEAR COEFF.	0.30	0.81	1.46	2.57
100-YEAR COEFF.	1.54	2.16	2.87	4.12
IMPERVIOUS %	7%	7%	45%	90%

DESIGN BASIN	DESIGN POINT	TYPE A AREA (AC)	TYPE B AREA (AC)	TYPE C AREA (AC)	TYPE D AREA (AC)	TOTAL AREA (AC)	C(2)	C(5)	C(10)	C(100)	Imp %
On-Site Basins											
DA1	1	0.000	0.000	0.063	0.194	0.26	1.30	0.00	2.30	3.81	79%
DA2	2	0.000	0.000	0.072	0.213	0.29	1.29	0.00	2.29	3.80	79%
DA3	3	0.000	0.000	0.075	0.181	0.26	1.25	0.00	2.25	3.75	77%
DA4	4	0.000	0.000	0.061	0.303	0.36	1.38	0.00	2.38	3.91	82%
Bypass 1	5	0.000	0.000	0.094	0.004	0.10	0.55	0.00	1.51	2.92	47%
Bypass 2	6	0.000	0.000	0.019	0.052	0.07	1.27	0.00	2.27	3.78	78%
		0.00	0.00	0.38	0.95	1.33	1.25	0.00	2.25	3.76	77%
BASIN SUBTOTAL		0%	0%	29%	71%	100%					

STORMWATER QUALITY VOLUME CALCULATIONS



Storm Water Quality Volume (SWQC) Total

Project Name: C1156 ABQ NM

Project Number: 90042013

Per Drainage, Flood Control, and Erosion Control Manual, Chapter 6, Section 6-12

SWQV:

New Development

SWQV: (Impervious area x 0.42)/12

Impervious Area = 0.73 acres

SWQV = $\frac{0.026}{1,133}$ ac-ft

SWQV = $\frac{1,133}{1,133}$ CF



Storm Water Quality Volume (SWQC) DA1

Project Name: C1156 ABQ NM

Project Number: 90042013

Per Drainage, Flood Control, and Erosion Control Manual, Chapter 6, Section 6-12

SWQV:

New Development

SWQV: (Impervious area x 0.42)/12

Impervious Area = 0.18 acres

SWQV = $\frac{0.006}{261}$ ac-ft

SWQV = $\frac{261}{261}$ CF



Storm Water Quality Volume (SWQC) DA2

Project Name: C1156 ABQ NM

Project Number: 90042013

Per Drainage, Flood Control, and Erosion Control Manual, Chapter 6, Section 6-12

SWQV:

New Development

SWQV: (Impervious area x 0.42)/12

Impervious Area = 0.20 acres

SWQV = $\frac{0.007}{305}$ ac-ft

SWQV = $\frac{305}{305}$ CF



Storm Water Quality Volume (SWQC) DA3

Project Name: C1156 ABQ NM

Project Number: 90042013

Per Drainage, Flood Control, and Erosion Control Manual, Chapter 6, Section 6-12

SWQV:

New Development

SWQV: (Impervious area x 0.42)/12

Impervious Area = 0.16 acres

SWQV = $\frac{0.006}{261}$ ac-ft

SWQV = $\frac{261}{261}$ CF



Storm Water Quality Volume (SWQC) DA4

Project Name: C1156 ABQ NM

Project Number: 90042013

Per Drainage, Flood Control, and Erosion Control Manual, Chapter 6, Section 6-12

SWQV:

New Development

SWQV: (Impervious area x 0.42)/12

Impervious Area = 0.28 acres

SWQV = $\frac{0.010}{1}$ ac-ft

SWQV = $\frac{436}{1}$ CF



Retention Pond Drain Time

Project Name: RC1156
Project Number: 090042013

Retention Pond Drain Time				
Pond	Volume	Percolation Rate*	Pond Bottom	Drain Time
	cf	inches/hr	Sq. Ft.	hr
A	302	0.60	202	30
B	348	0.60	79	89
C	268	0.60	179	31
D	492	0.60	889	12

*Percolation rate per Geotech Report by Terracon dated 12/19/2023

APPENDIX C: RELEVANT DOCUMENTS

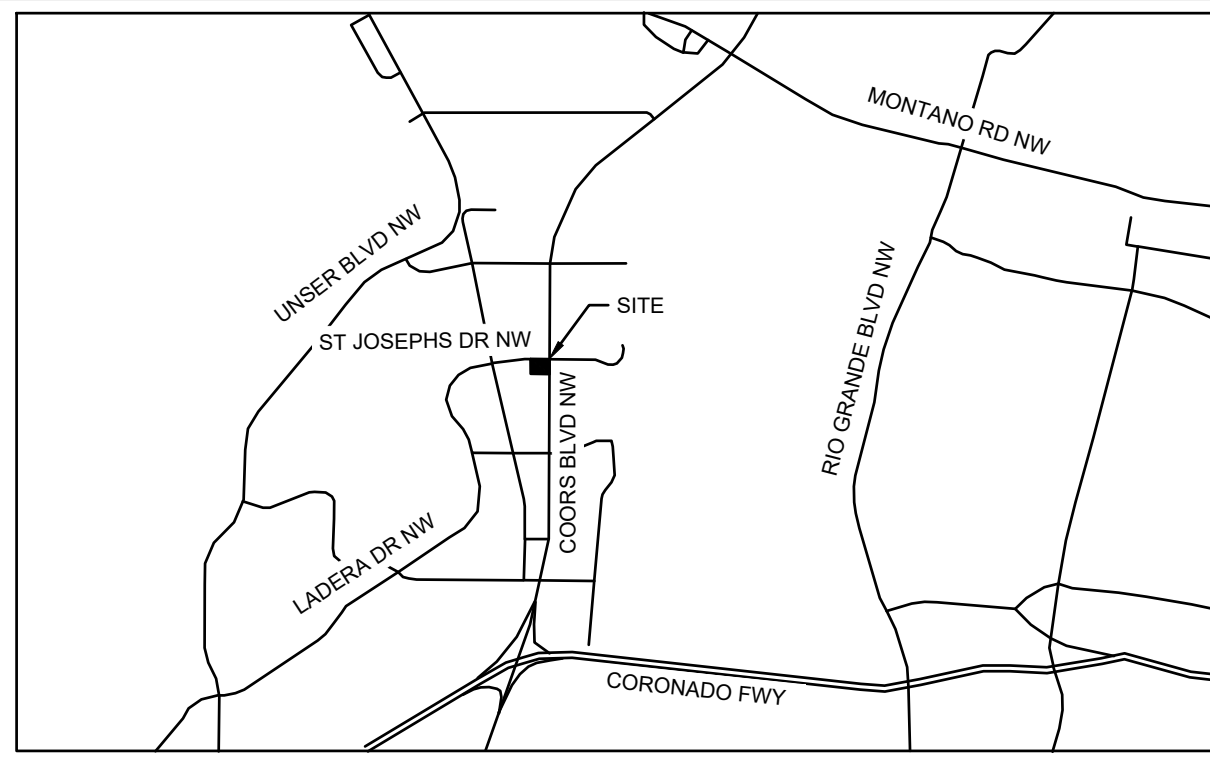
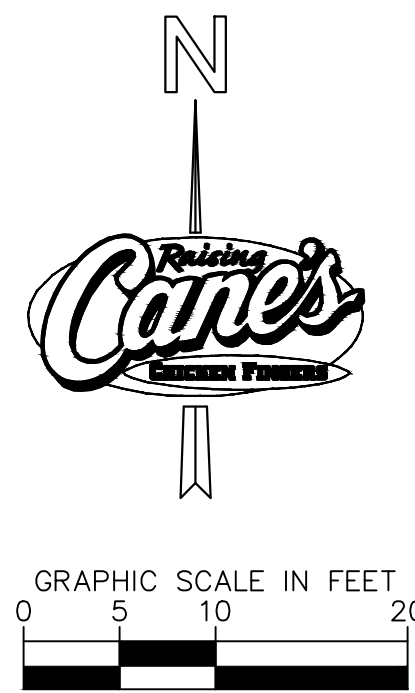
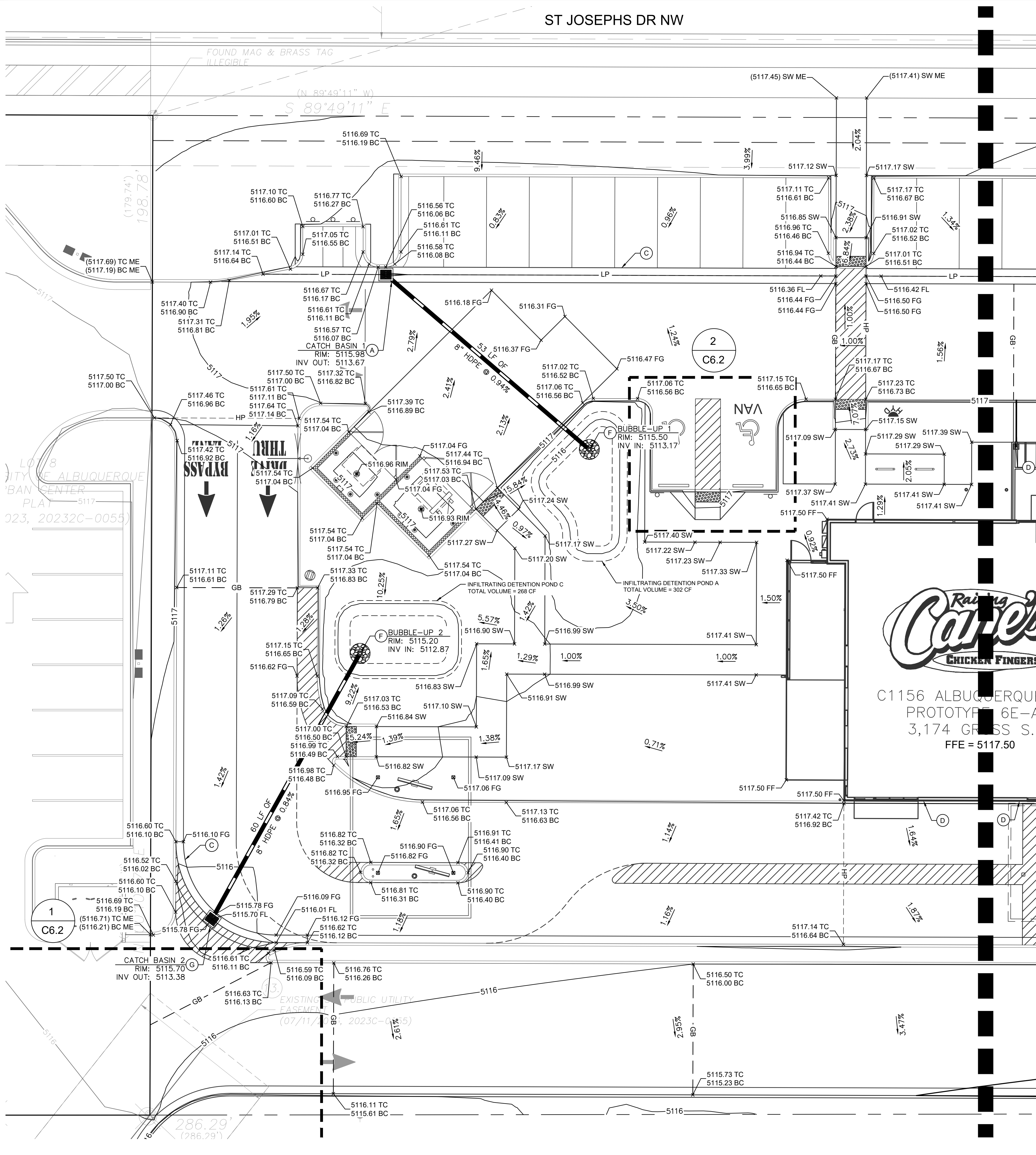
**SOUTHERN OXBOW CENTER MASTER DRAINAGE PLAN BY HUGH
FLOYD, PE NO. 16633 ON 4/28/2022**

APPROVED BY RENEE C. BRISSETTE, PE, CFM on 4/28/2022

INCORPORATED BY REFERENCE

GRADING PLAN

Plotted By: Wilmet, L.P. Sheet Set: C1156 Albuquerque MM Sheet Set Layout: GRD 1 April 19, 2024 07:23:0am K:SEA Civil/SEA DS:09042 - Raising Cane's/09042013 - C1156 - Coors & St. Josephs, Albuquerque MMCAD/PlanSheets/C-GRADING PLAN.dwg
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LEGEND	
	PROPOSED PROPERTY LINE
	ADJACENT PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR
	PROPOSED FLOW ARROW WITH SLOPE
	PROPOSED SPOT ELEVATION
	GRADE BREAK
	FINISHED FLOOR
	FUTURE GRADE
	SIDEWALK
	MATCH EXISTING ELEVATION
	TOP OF RIM ELEVATION
	FLOW LINE
	TOP OF CURB
	BOTTOM OF CURB
	PROPOSED GRADE BREAK
	PROPOSED HIGH POINT
	PROPOSED LOW POINT

DRAINAGE KEYNOTES	
(A)	NYLOPLAST 18" DRAIN BASIN WITH 2X3 CURB INLET GRATE, SEE DETAIL SHEET C6.4
(B)	PROPOSED 3' WIDE DRAINAGE CURB CUT, SEE DETAIL SHEET C6.4
(C)	PROPOSED VALLEY GUTTER, SEE DETAIL SHEET C6.4
(D)	PROPOSED 3" PVC CANOPY DRAIN DOWNSPOUT TO DAYLIGHT TO FACE OF CURB, SEE DETAIL SHEET C6.4
(E)	PROPOSED ROOF DOWNSPOUT SPILL TO GRADE WITH SPLASH BLOCK
(F)	BUBBLE-UP EMITTER WITH RIP RAP, REFER TO DETAIL ON SHEET C6.4
(G)	NYLOPLAST 18" DRAIN BASIN WITH 2X3 GRATE, SEE DETAIL SHEET C6.4
(H)	STORM TIE-IN BY OTHERS
(I)	NYLOPLAST 24" DRAIN BASIN WITH A DOME GRATE OR APPROVED EQUIVALENT, REFER TO DETAIL ON SHEET C6.4

- ### GRADING NOTES
- ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THESE PLANS AND THE CITY/AHJ STANDARDS AND SPECIFICATIONS.
 - PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL MAKE CERTAIN THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PLANS AND OTHER DOCUMENTS APPROVED BY ALL OF THE PERMITTING AUTHORITIES.
 - THE GENERAL CONTRACTOR AND ALL SUB-CONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE COMMENCEMENT OF ANY CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES. MINOR ADJUSTMENTS TO FINISH GRADE TO ACCOMPLISH SPOT DRAINAGE ARE ACCEPTABLE, IF NECESSARY, UPON PRIOR APPROVAL OF ENGINEER. PAVING INSTALLED SHALL "FLUSH OUT" AT ANY JUNCTURE WITH EXISTING PAVING.
 - THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
 - ALL CUT OR FILL SLOPES SHALL BE 4:1 OR FLATTER UNLESS OTHERWISE NOTED.
 - CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.
 - CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED AREAS.
 - TOPOGRAPHIC INFORMATION IS TAKEN FROM A TOPOGRAPHIC SURVEY BY LAND SURVEYORS. IF THE CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR TO THE OWNER FOR REVIEW.
 - CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT BUILDING FOOTPRINT DIMENSIONS.
 - CONTRACTOR SHALL REFER TO FINAL GEOTECH REPORT FOR BUILDING SUBGRADE AND SITE PREPARATION REQUIREMENTS.
 - CONTRACTOR SHALL ADJUST EXISTING VALVES, MANHOLE RIMS, ETC. AS NECESSARY TO MATCH FINISHED GRADE.
 - ALL ELEVATIONS ARE TOP OF PAVEMENT UNLESS NOTED OTHERWISE. TO GET TOP OF CURB ELEVATIONS ADD 6" TO THE ELEVATION SHOWN.
 - GRADING FOR ALL SIDEWALKS AND ACCESSIBLE ROUTES INCLUDING CROSSING DRIVEWAYS SHALL CONFORM TO ADA STANDARDS. SLOPES SHALL NOT EXCEED 5% LONGITUDINAL SLOPE OR 2% CROSS SLOPE. SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS SHALL BE ADA COMPLIANT. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET AT ANY LOCATION.
 - ANY PROPOSED CONTOURS SHOWN ARE APPROXIMATE. PROPOSED SPOT ELEVATIONS AND DESIGNATED GRADIENT ARE TO BE USED IN THE EVENT OF ANY DISCREPANCIES.
 - REFER TO EROSION CONTROL PLAN FOR EROSION CONTROL DEVICES TO BE INSTALLED PRIOR TO COMMENCING GRADING OPERATIONS.
 - ALL FILL TO BE PLACED SHALL BE IN ACCORDANCE WITH THE CURRENT APPLICABLE GEOTECHNICAL REPORT RECOMMENDATIONS.

FLOODPLAIN NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE "X" OF THE FLOOD INSURANCE RATE MAP (FIRM), COMMUNITY PANEL NO. 3501C0114H, WHICH BEARS AN EFFECTIVE DATE OF AUGUST 16, 2012 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.



KHA PROJECT 090042013				DATE 4/18/2024				BY			
SCALE AS SHOWN				DESIGNED BY SP				REVISIONS			
DRAWN BY SP				CHECKED BY LW				No.			
DATE 4/18/2024				DATE				DATE			

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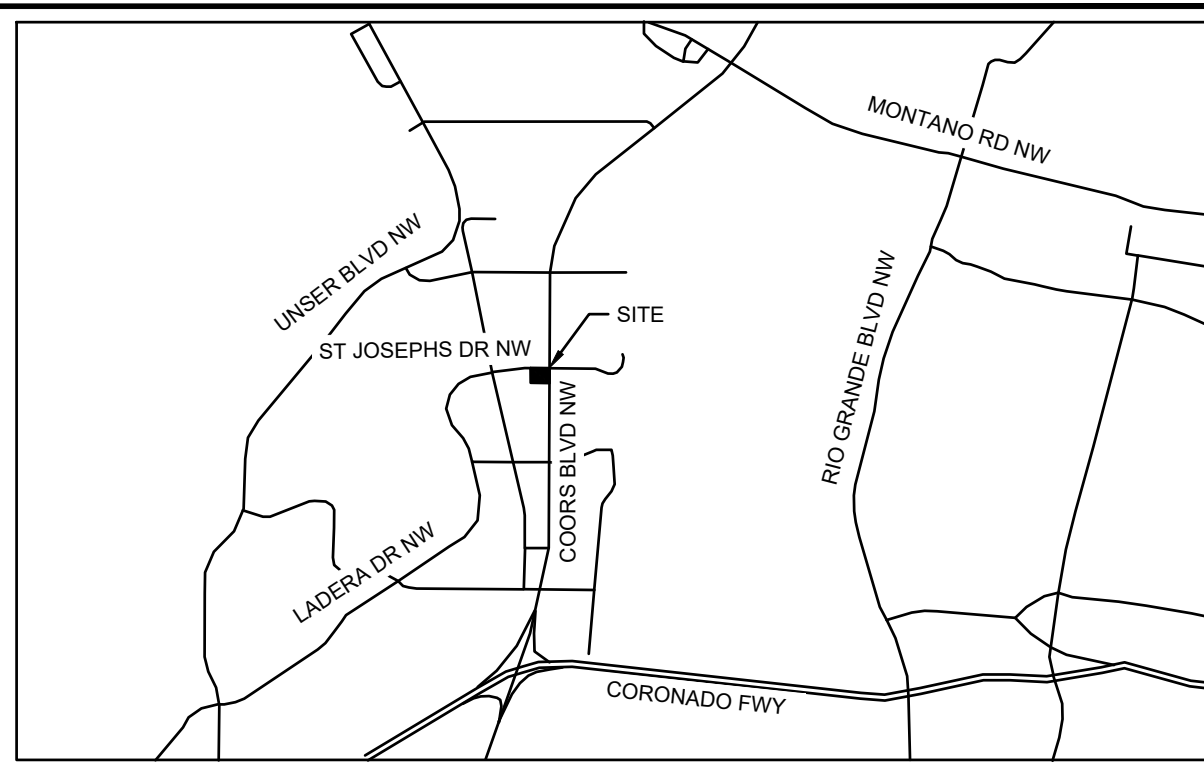
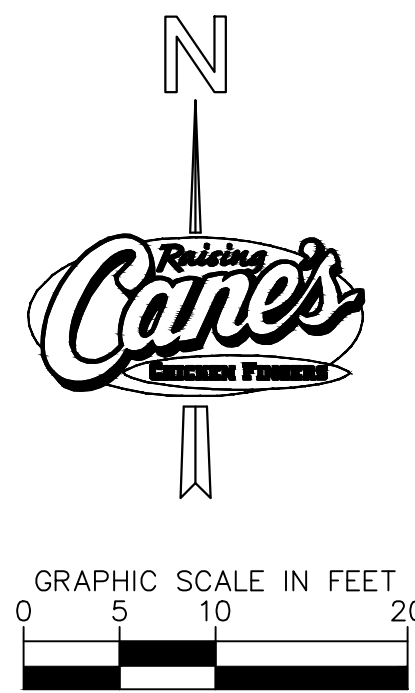
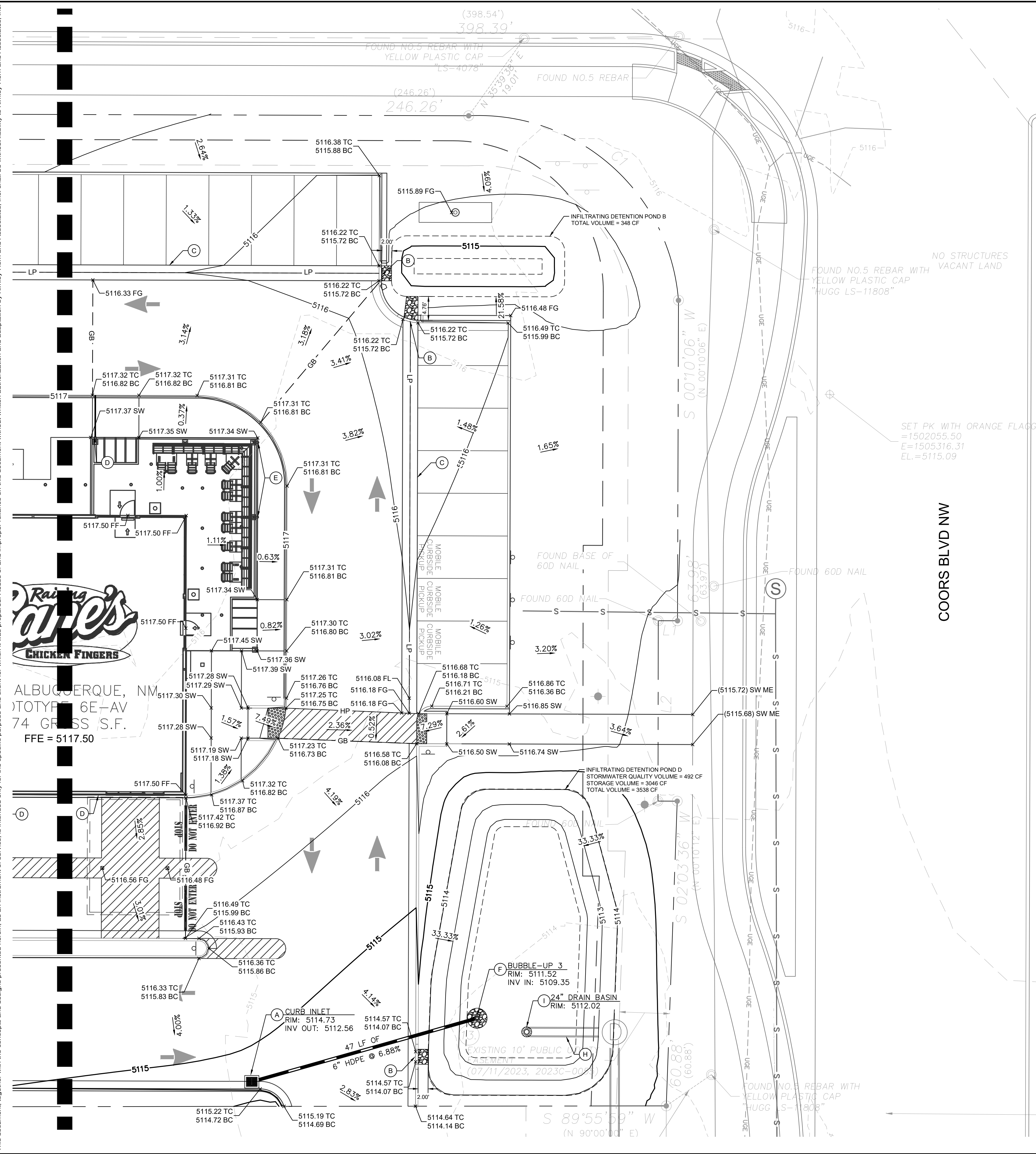
GRADING AND STORM DRAINAGE PLAN

PROPOSED RAISING CANE'S RESTAURANT AND DRIVE-THRU

















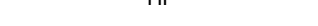

ST JOSEPHS DR. NW & COORS BLVD NW

ZONE ATLAS PAGE G-11-Z ALBUQUERQUE, NM 87120

SHEET NUMBER C6.1



LEGEND

	PROPOSED PROPERTY LINE
	ADJACENT PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR
	PROPOSED FLOW ARROW WITH SLOPE
	PROPOSED SPOT ELEVATION
	GRADE BREAK
	FINISHED FLOOR
	FUTURE GRADE
	SIDEWALK
	MATCH EXISTING ELEVATION
	TOP OF RIM ELEVATION
	FLOW LINE
	TOP OF CURB
	BOTTOM OF CURB
	PROPOSED GRADE BREAK
	PROPOSED HIGH POINT
	PROPOSED LOW POINT

DRAINAGE KEYNOTES

A	NYLOPLAST 18" DRAIN BASIN WITH 2X3 CURB INLET GRATE, SEE DETAIL SHEET C6.4
B	PROPOSED 3" WIDE DRAINAGE CURB CUT, SEE DETAIL SHEET C6.4
C	PROPOSED VALLEY GUTTER, SEE DETAIL SHEET C6.4
D	PROPOSED 3" PVC CANOPY DRAIN DOWNSPOUT TO DAYLIGHT TO FACE OF CURB, SEE DETAIL SHEET C6.4
E	PROPOSED ROOF DOWNSPOUT SPILL TO GRADE WITH SPLASH BLOCK
F	BUBBLE-UP EMITTER WITH RIP RAP. REFER TO DETAIL ON SHEET C6.4
G	NYLOPLAST 18" DRAIN BASIN WITH 2X3 GRATE, SEE DETAIL SHEET C6.4
H	STORM TIE-IN BY OTHERS
I	NYLOPLAST 24" DRAIN BASIN WITH A DOME GRATE OR APPROVED EQUIVALENT. REFER TO DETAIL ON SHEET C6.4

GRADING NOTES

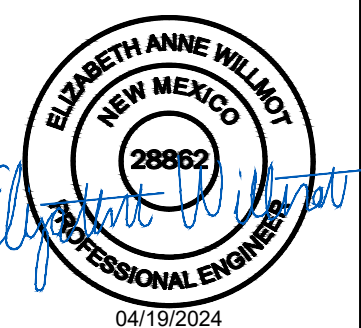
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FLOODPLAIN NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN
ZONE "X" OF THE FLOOD INSURANCE RATE MAP
(FIRM), COMMUNITY PANEL NO. 35001C0114H, WHICH
BEARS AN EFFECTIVE DATE OF AUGUST 16, 2012 AND
IS NOT IN A SPECIAL FLOOD HAZARD AREA.

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KHA PROJECT	DATE
090042013	4/18/2024
SCALE	AS SHOWN
DESIGNED BY	S
DRAWN BY	S
CHECKED BY	L

GRADING AND STORM DRAINAGE PLAN

PROPOSED RAISING CANE'S RESTAURANT AND DRIVE-THRU

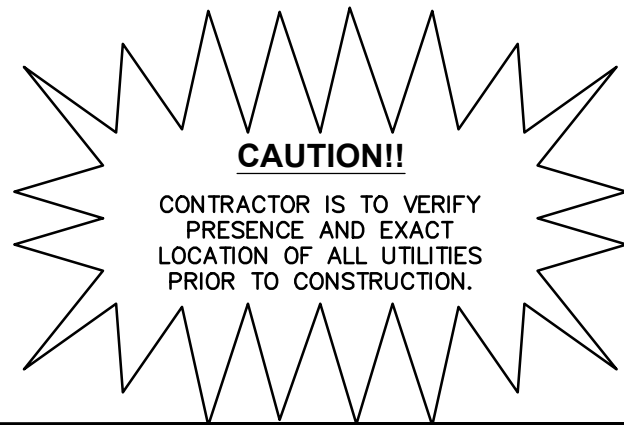
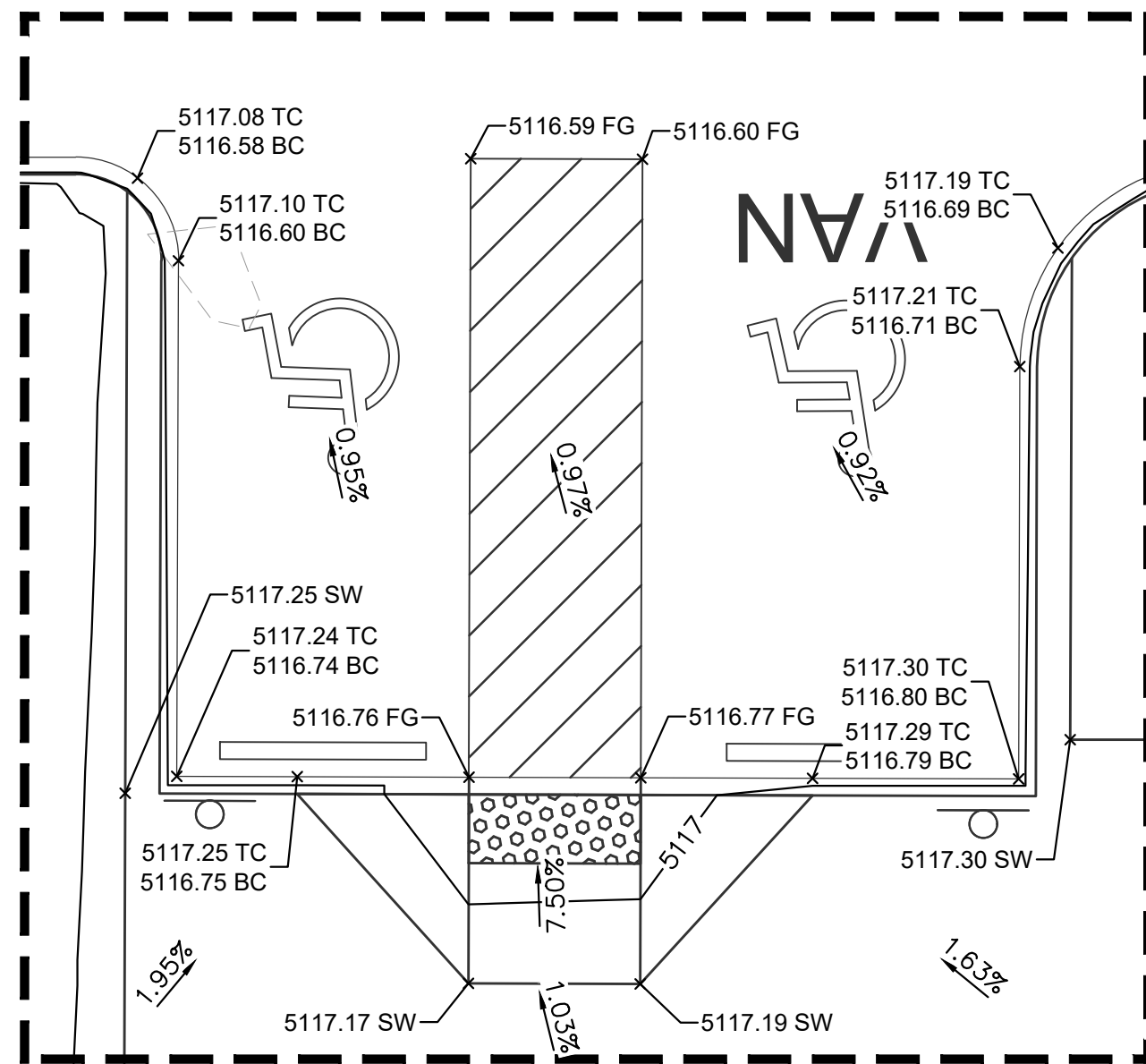
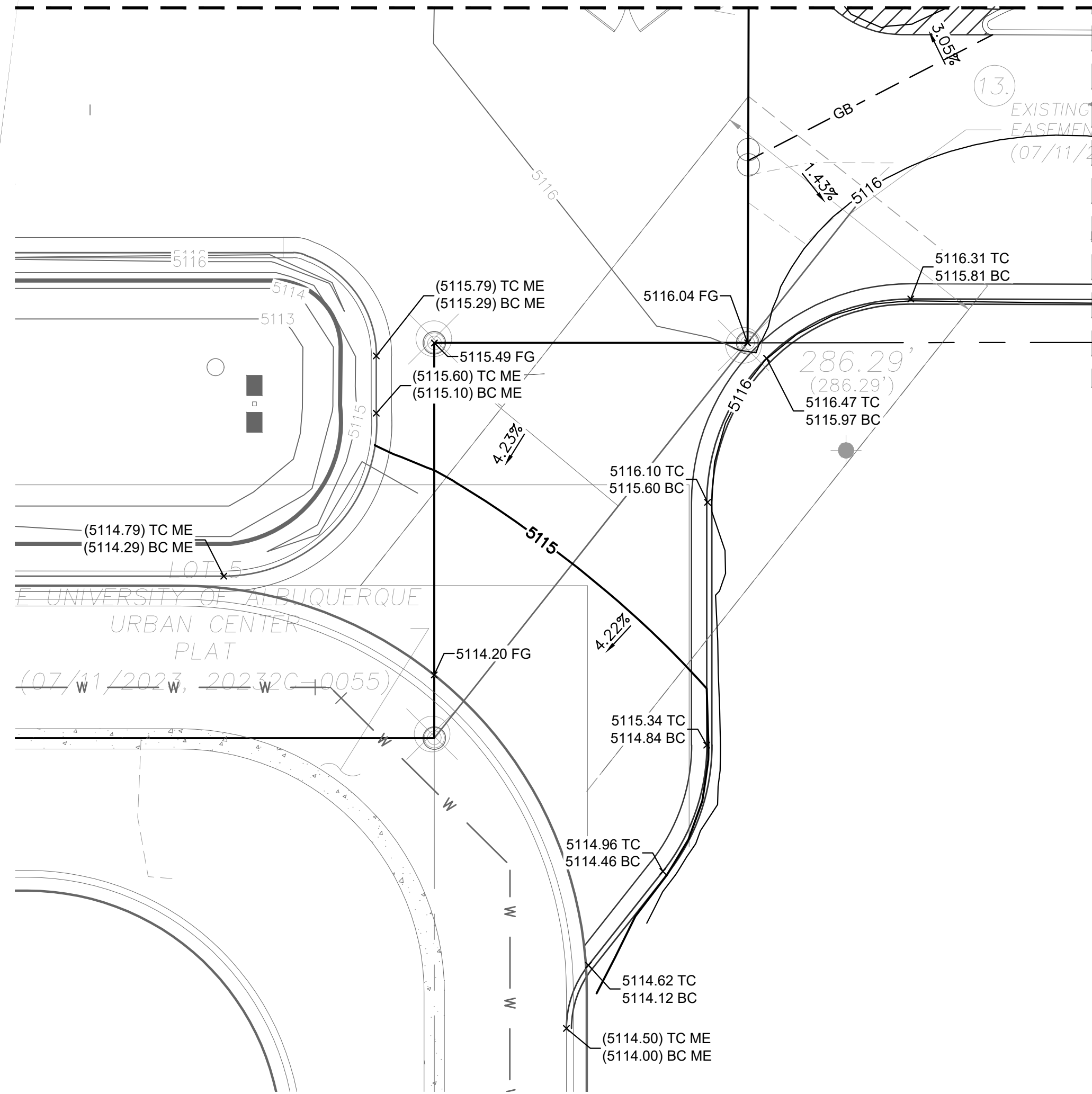
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ZONE ATLAS PAGE G-11-Z

ST JOSEPHS DR. NW

REVISIONS	DATE	BY
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PROPOSED RAISING CANE'S RESTAURANT AND DRIVE-THRU

ST JOSEPHS DR. NW
& COORS BLVD NW

SHEET NUMBER

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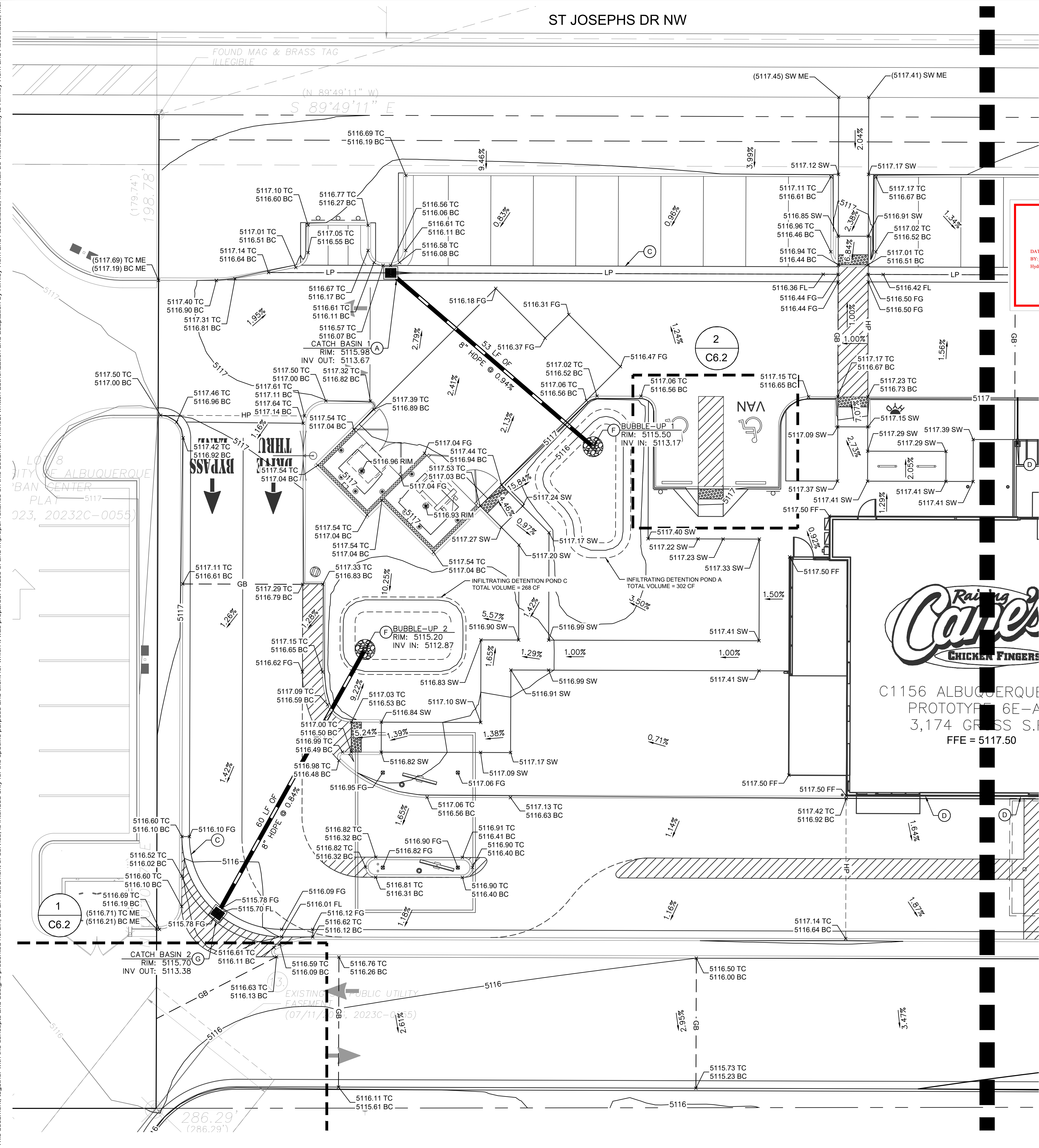
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PHONE: 206-607-2600
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DATE
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DESIGNED BY
DRAWN BY
CHECKED BY

Plotted By: Profile, Sydney, Sheet Set: C1156 Albuquerque NM Sheet Set, Layout: GRD 1, May 01, 2024, 01:43:44pm, K:\SEA Civil\SEA_DS\09042013 - C1156 - Coors & St. Josephs, Albuquerque MMCAD\PlanSheets\C-GRADING PLAN.dwg
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City of Albuquerque
Planning Department
Development Review Services
HYDROLOGY SECTION
APPROVED
DATE: 05/02/24
BY: *Renee C. Branstetter*
HydroTeam # G11D067D

APPROVAL OF GRADING & DRAINAGE PLANS SHALL EXPIRE TWO (2) YEARS AFTER THE APPROVAL DATE BY THE CITY IF NO BUILDING PERMIT HAS BEEN PULLED ON THE DEVELOPMENT.

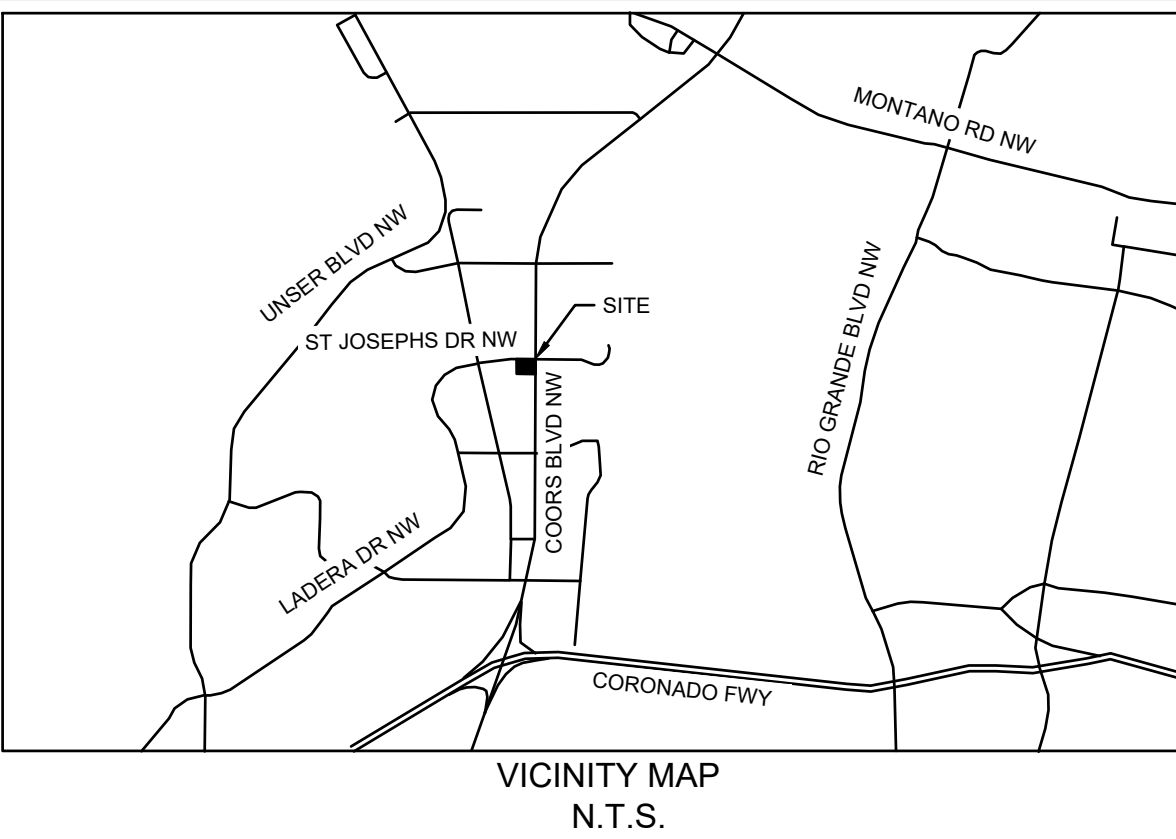
DRAINAGE KEYNOTES	
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BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE "X" OF THE FLOOD INSURANCE RATE MAP (FIRM), COMMUNITY PANEL NO. 35001C0114H, WHICH BEARS AN EFFECTIVE DATE OF AUGUST 16, 2012 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.



CAUTION!!
CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.



LEGEND	
---	PROPOSED PROPERTY LINE
---	ADJACENT PROPERTY LINE
---	EXISTING CONTOUR
---	PROPOSED CONTOUR
---	PROPOSED FLOW ARROW WITH SLOPE
---	PROPOSED SPOT ELEVATION
GB	GRADE BREAK
FF	FINISHED FLOOR
FG	FUTURE GRADE
SW	SIDEWALK
ME	MATCH EXISTING ELEVATION
RIM	TOP OF RIM ELEVATION
FL	FLOW LINE
TC	TOP OF CURB
BC	BOTTOM OF CURB
GB	PROPOSED GRADE BREAK
HP	PROPOSED HIGH POINT
LP	PROPOSED LOW POINT

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1201 3RD AVE, SUITE 2800, SEATTLE, WA 98101
PHONE: 206-607-2800
WWW.KIMLEY-HORN.COM

ELIZABETH ANNE HALLIST
NEW MEXICO
28862
Professional Engineer
04/19/2024

KHA PROJECT	090042013	DATE	4/19/2024	SCALE	AS SHOWN	DESIGNED BY	SP	DRAWN BY	SP	CHECKED BY	LW
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GRADING AND STORM DRAINAGE PLAN

PROPOSED RAISING CANE'S RESTAURANT AND DRIVE-THRU

SHEET NUMBER

C6.1

ZONE ATLAS PAGE G-11-Z

ALBUQUERQUE, NM 87120

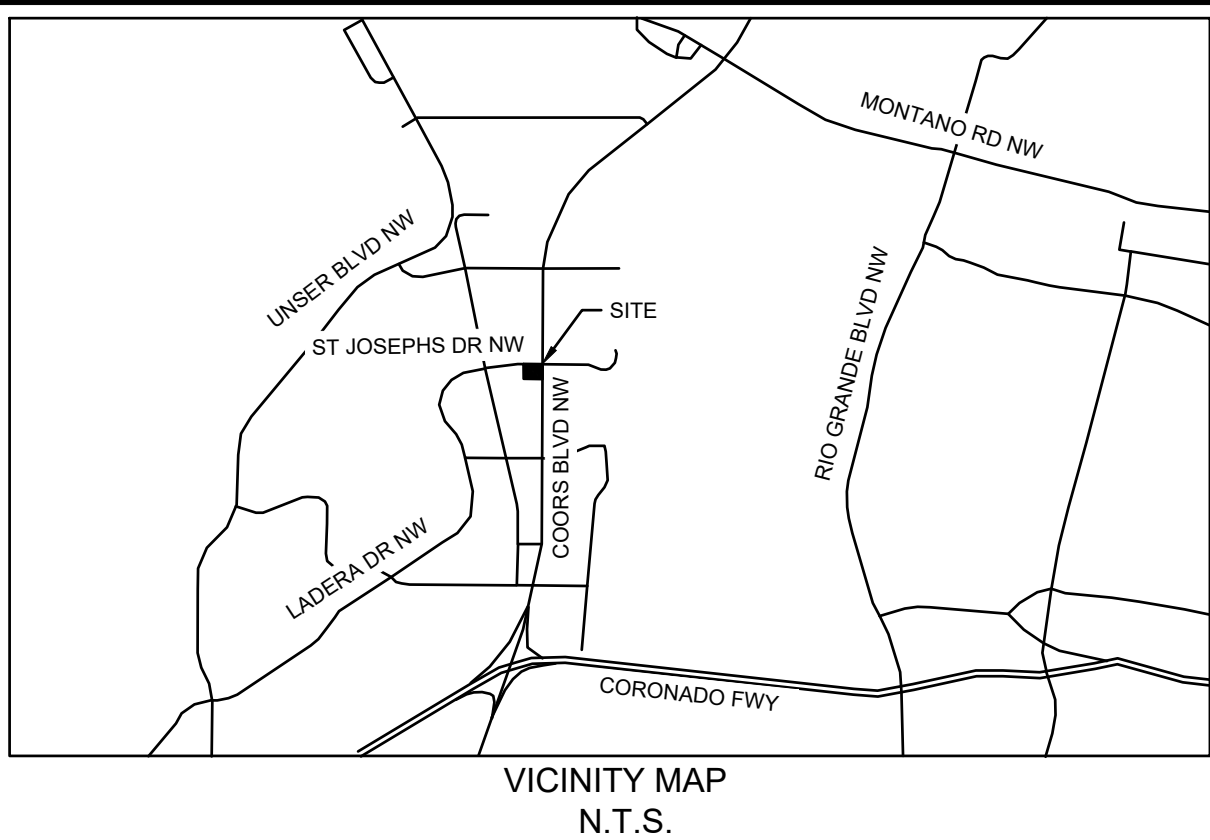
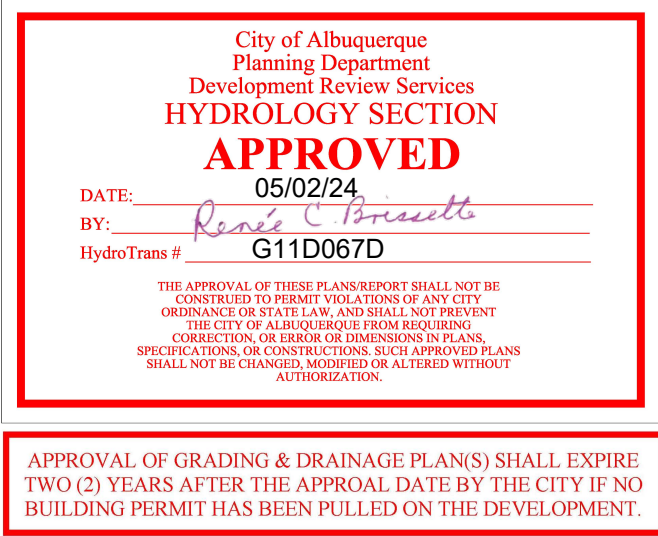
ST JOSEPHS DR. NW & COORS BLVD NW

DATE

REVISIONS

No.

BY



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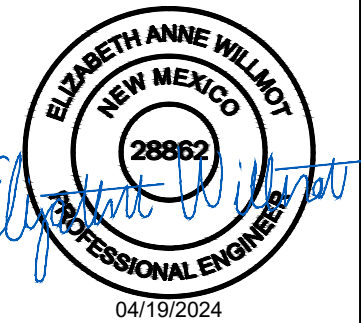
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KHA PROJECT	DATE
090042013	4/19/2024
SCALE	AS SHOWN
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DRAWN BY	\$
CHECKED BY	L

GRADING AND STORM DRAINAGE PLAN

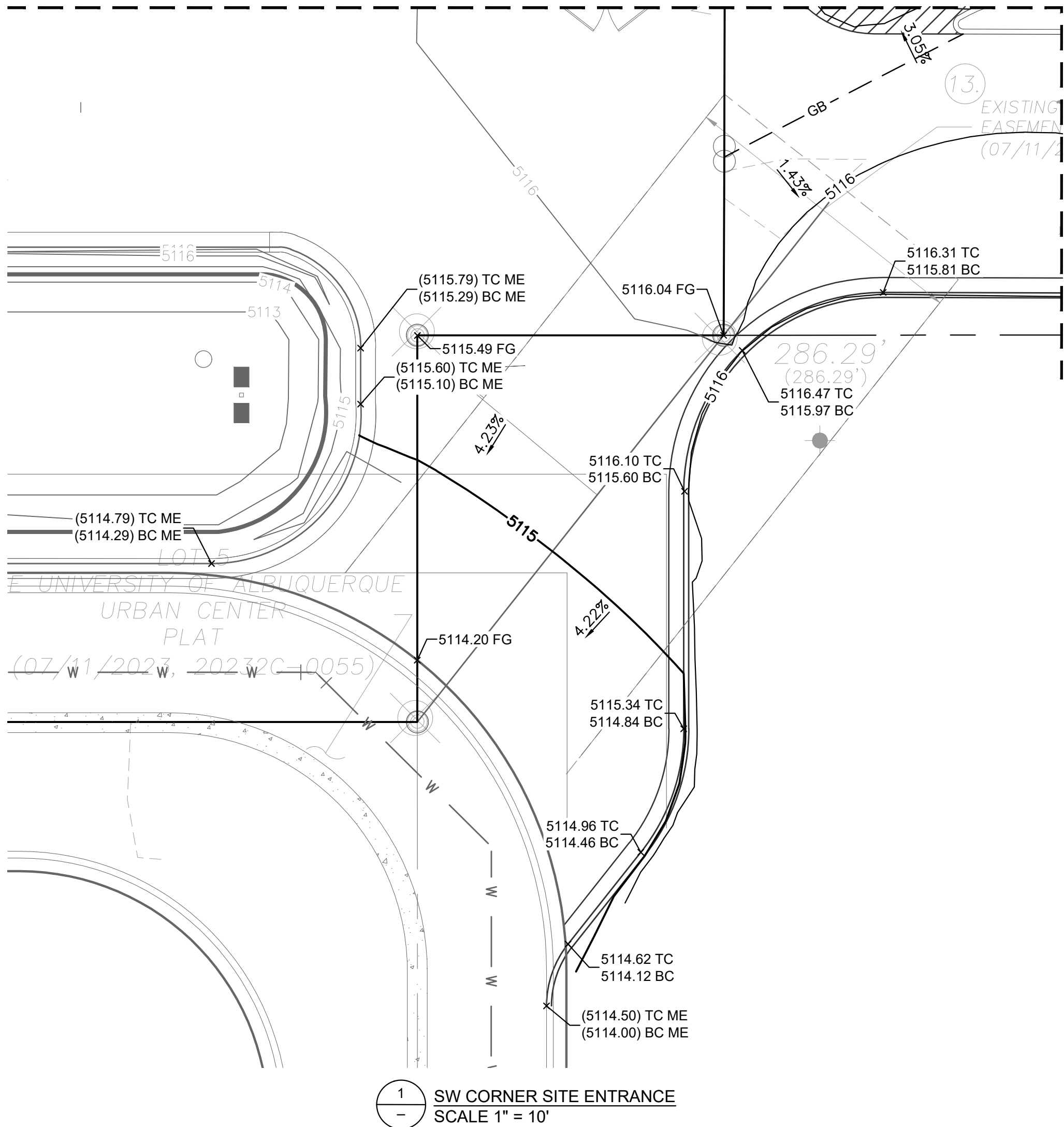
PROPOSED RAISING CANE'S
RESTAURANT AND DRIVE-THRU

SHEET NUMBER
C6.2

No.	REVISIONS	DATE	BY
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ZONE ATLAS PAGE G-11-Z

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INTRODUCTION AND PROJECT DESCRIPTION:

THE PROJECT SITE IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF ST JOSEPHS DRIVE NW AND COORS BOULEVARD NW IN THE CITY OF ALBUQUERQUE, NM. THE SITE IS ZONED AND PLANNED FOR COMMERCIAL DEVELOPMENT, AND THE USE PROPOSED IS A RESTAURANT WITH DRIVE-THROUGH. AS SHOWN BY MAP NO. 35001C0114H OF THE NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAPS PUBLISHED BY FEMA FOR BERNALILLO COUNTY, NEW MEXICO DATED AUGUST 16, 2012, THE SITE IS LOCATED IN ZONE X AND IS NOT WITHIN A FLOOD HAZARD AREA.

METHODOLOGY:

CHAPTER 6 OF THE COA DPM WAS UTILIZED TO CALCULATE THE PEAK FLOW AND RUNOFF VOLUME FOR 10-YEAR AND 100-YEAR, 24-HOUR STORM EVENTS. THE SITE IS LOCATED IN PRECIPITATION ZONE 1. SOUTHERN OXBOW CENTER MASTER DRAINAGE PLAN BY HUGH FLOYD, PE NO. 16633 ON 4/28/2022 DETERMINED ALLOWABLE PEAK DISCHARGE GENERATED BY THE SITE FOR DEVELOPED CONDITIONS.

EXISTING CONDITIONS:

THE SITE HISTORICALLY IS VACANT LAND. THE SITE HISTORICALLY SURFACE FLOWS TO THE SOUTHEAST CORNER OF THE SITE. THERE IS NO EXISTING STORMWATER INFRASTRUCTURE ONSITE. THE DEVELOPER WILL BUILD A PRIVATE STORMWATER SYSTEM PRIOR TO CANE'S CONSTRUCTION.

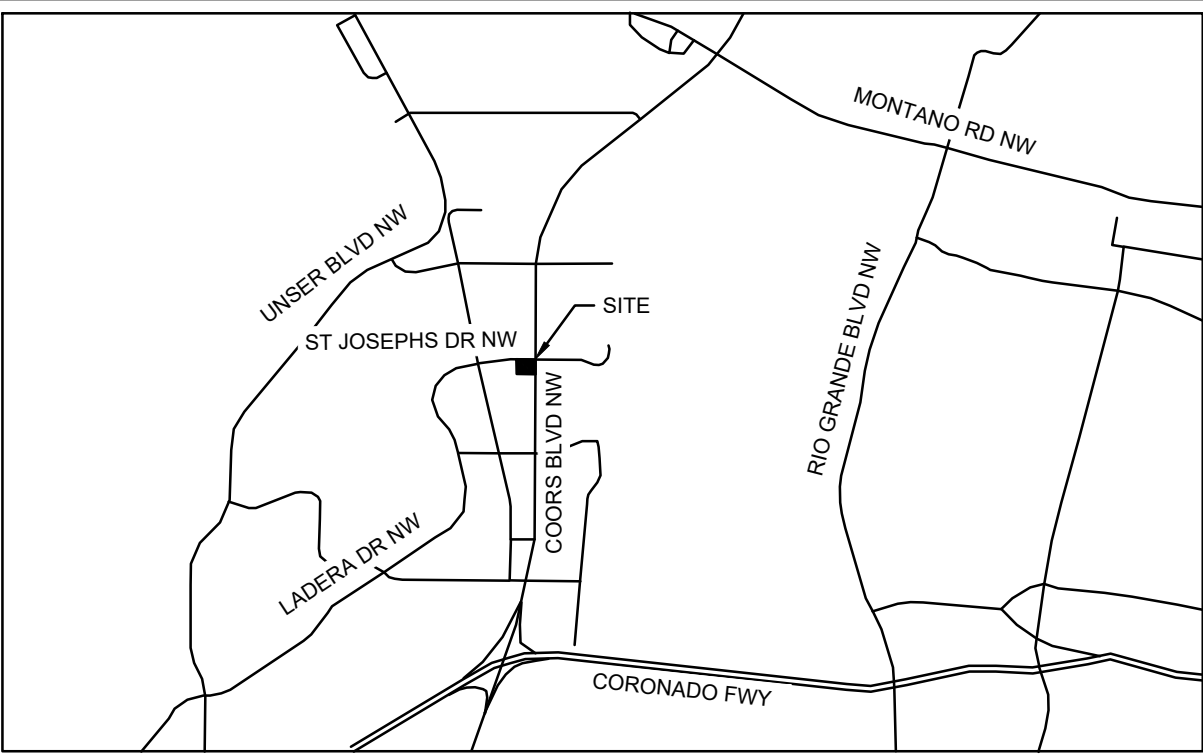
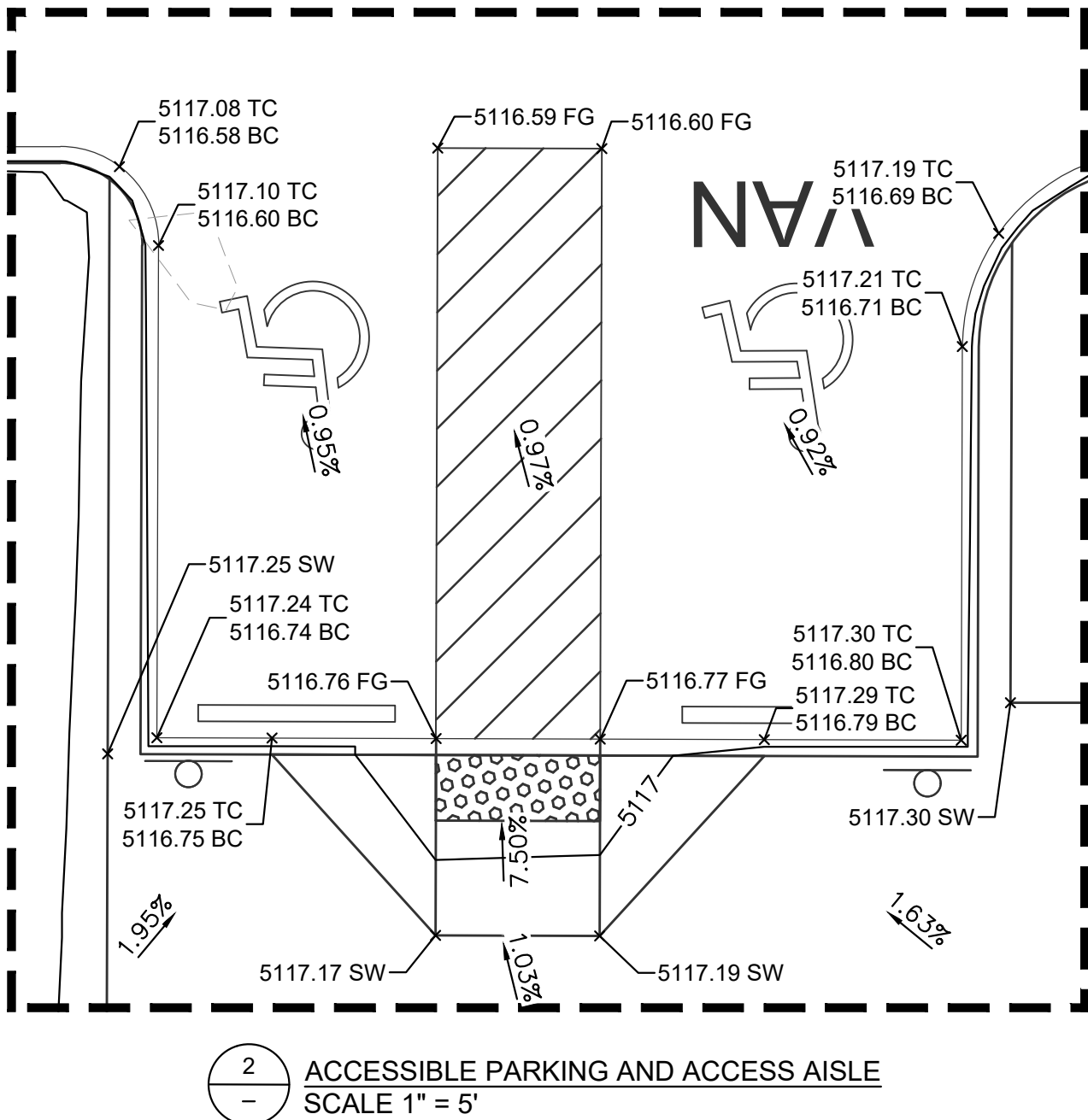
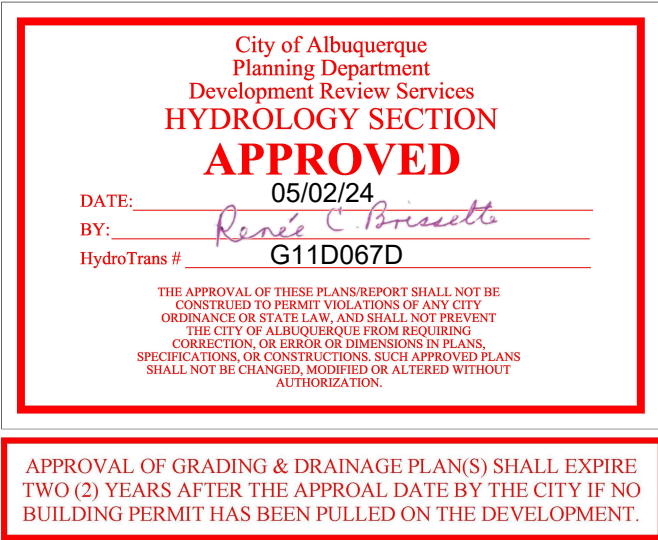
PROPOSED CONDITIONS:

THE PROJECT IMPROVEMENTS WILL INCLUDE INSTALLATION OF A RESTAURANT WITH DRIVE-THROUGH, CUSTOMER PARKING, SITE DRIVEWAYS, AND LANDSCAPE AREAS. THE PROJECT SITE GENERATES A PEAK FLOW OF 2.34 CFS IN THE 100-YEAR, 60-MINUTE STORM EVENT. THE PROPOSED DEVELOPMENT WILL INCREASE THE AMOUNT OF IMPERVIOUS COVER WHEN COMPARED TO THE EXISTING CONDITIONS AND PROPOSES DETENTION PONDS TO MITIGATE THE INCREASE IN RUNOFF THUS DECREASING THE PEAK DISCHARGE GENERATED BY THE SITE.

THE REQUIRED SWQ VOLUME IS 0.42 INCHES PER SF OF IMPERVIOUS AREA= 0.42*(1 FT/ 12 IN)* 31,951 SF= 1.133 CF. THE SITE HAS PROVIDED APPROXIMATELY 1,410 CF OF SWQV AND 3,046 CF OF STORAGE VOLUME IN DEPRESSED LANDSCAPE AREAS ON THE SITE.

CONCLUSIONS:

THE PROPOSED DEVELOPMENT WILL NOT INCREASE RUNOFF FROM THE SITE COMPARED TO PRE-DEVELOPED CONDITIONS. THE SITE WILL INFILTRATE AND DISCHARGE ANY ADDITIONAL RUNOFF TO A PRIVATE STORMWATER SYSTEM TO BE BUILT BY THE DEVELOPER IN THE SE CORNER OF THE SITE.



LEGEND

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- ADJACENT PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED FLOW ARROW WITH SLOPE
- PROPOSED SPOT ELEVATION
- GRADE BREAK
- FINISHED FLOOR
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- SIDEWALK
- MATCH EXISTING ELEVATION
- TOP OF RIM ELEVATION
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- ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THESE PLANS AND THE CITY/AHJ STANDARDS AND SPECIFICATIONS.
- PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL MAKE CERTAIN THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PLANS AND OTHER DOCUMENTS APPROVED BY ALL OF THE PERMITTING AUTHORITIES.
- THE GENERAL CONTRACTOR AND ALL SUB-CONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE COMMENCEMENT OF ANY CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES. MINOR ADJUSTMENTS TO FINISH GRADE TO ACCOMPLISH SPOT DRAINAGE ARE ACCEPTABLE. IF NECESSARY, UPON PRIOR APPROVAL OF ENGINEER, PAVING INSTALLED "FLUSH OUT" AT ANY JUNCTURE WITH EXISTING PAVING.
- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
- ALL CUT OR FILL SLOPES SHALL BE 4:1 OR FLATTER UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.
- CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED AREAS.
- TOPOGRAPHIC INFORMATION IS TAKEN FROM A TOPOGRAPHIC SURVEY BY LAND SURVEYORS. IF THE CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR TO THE OWNER FOR REVIEW.
- CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT BUILDING FOOTPRINT DIMENSIONS.
- CONTRACTOR SHALL REFER TO FINAL GEOTECH REPORT FOR BUILDING SUBGRADE AND SITE PREPARATION REQUIREMENTS.
- CONTRACTOR SHALL ADJUST EXISTING VALVES, MANHOLE RIMS, ETC. AS NECESSARY TO MATCH FINISHED GRADE.
- ALL ELEVATIONS ARE TOP OF PAVEMENT UNLESS NOTED OTHERWISE. TO GET TOP OF CURB ELEVATIONS ADD 6" TO THE ELEVATION SHOWN.
- GRADING FOR ALL SIDEWALKS AND ACCESSIBLE ROUTES INCLUDING CROSSING DRIVEWAYS SHALL CONFORM TO ADA STANDARDS. SLOPES SHALL NOT EXCEED 5% LONGITUDINAL SLOPE OR 2% CROSS SLOPE. SIDEWALK ACCESS TO EXTERNAL BUILDING DOORS SHALL BE ADA COMPLIANT. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF ADA CRITERIA CANNOT BE MET AT ANY LOCATION.
- ANY PROPOSED CONTOURS SHOWN ARE APPROXIMATE. PROPOSED SPOT ELEVATIONS AND DESIGNATED GRADIENT ARE TO BE USED IN THE EVENT OF ANY DISCREPANCIES.
- REFER TO EROSION CONTROL PLAN FOR EROSION CONTROL DEVICES TO BE INSTALLED PRIOR TO COMMENCING GRADING OPERATIONS.
- ALL FILL TO BE PLACED SHALL BE IN ACCORDANCE WITH THE CURRENT APPLICABLE GEOTECHNICAL REPORT RECOMMENDATIONS.

FLOODPLAIN NOTE

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE "X" OF THE FLOOD INSURANCE RATE MAP (FIRM), COMMUNITY PANEL NO. 35001C0114H, WHICH BEARS AN EFFECTIVE DATE OF AUGUST 16, 2012 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.



WEIGHTED E CALCULATIONS (DEVELOPED CONDITION)																
											100- Year			10- Year		
			Treatment A		Treatment B		Treatment C		Treatment D		Weighted E	Volume	Flow	Weighted E	Volume	Flow
Basin	Area (SF)	Area (AC)	Acres	%	Acres	%	Acres	%	Acres	%	(in)	(ac-ft)	(cfs)	(in)	(ac-ft)	(cfs)
DA 1	11,326	0.26	0.00	0%	0.00	0%	0.063	24%	0.194	75%	1.90	0.041	0.98	1.17	0.03	0.59
DA 2	12,632	0.29	0.00	0%	0.00	0%	0.072	25%	0.213	73%	1.88	0.045	1.08	1.16	0.03	0.65
DA 3	11,326	0.26	0.00	0%	0.00	0%	0.075	29%	0.181	70%	1.83	0.040	0.96	1.12	0.02	0.57
DA 4	15,682	0.36	0.00	0%	0.00	0%	0.061	17%	0.303	84%	2.05	0.061	1.42	1.28	0.04	0.87
Bypass 1	4,356	0.10	0.00	0%	0.00	0%	0.094	94%	0.004	4%	0.98	0.008	0.29	0.46	0.00	0.15
Bypass 2	3,049	0.07	0.00	0%	0.00	0%	0.019	27%	0.052	74%	1.92	0.011	0.27	1.18	0.01	0.16

Excess Precipitation E (in)		
Zone 1	100-Year	10-Year
Ea	0.55	0.11
Eb	0.73	0.26
Ec	0.95	0.43
Ed	2.24	1.43

Peak Discharge (cfs/acre)		
Zone 1	100-Year	10-Year
Qa	1.54	0.3
Qb	2.16	0.81
Qc	2.87	1.46
Qd	4.12	2.57

SWQ VOL	
Impervious Area (sf)	31,951
SWQ VOL Required (CF)*	1,133
SWQ VOL Provided (CF)	1,410
*0.42 in per impervious SF	

				REVISIONS		DATE	BY
				No.			

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PHONE: 206-607-2800
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KHA PROJECT	090042013	DATE	4/19/2024	SCALE	AS SHOWN	DESIGNED BY	SP	DRAWN BY	SP	CHECKED BY	LW
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GRADING AND STORM DRAINAGE PLAN

PROPOSED RAISING CANE'S RESTAURANT AND DRIVE-THRU

ST JOSEPHS DR. NW & COORS BLVD NW

ZONE ATLAS PAGE G-11-Z ALBUQUERQUE, NM 87120

SHEET NUMBER

C6.3